Globalisation and the Ottoman Empire.
A study of integration between Ottoman and world cotton markets.

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# Table of contents

**Table of contents**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of contents</td>
<td>i</td>
</tr>
<tr>
<td>List of tables</td>
<td>iv</td>
</tr>
<tr>
<td>List of figures and maps</td>
<td>vii</td>
</tr>
<tr>
<td>Thesis Summary</td>
<td>x</td>
</tr>
<tr>
<td>Statement of authorship</td>
<td>xii</td>
</tr>
</tbody>
</table>

## Introduction

1. The Ottoman Empire during the first wave of globalisation  
   1.1 The first wave of globalisation  
   1.2 Transformations in the Empire’s political and socio-economic structure  
   1.3 Composition and patterns of trade and capital flows during the first wave of globalisation  
      1.3.1 Capital flows  
   1.4 Landholdings and agricultural investments  
   1.5 Trade networks

2. The global development of the cotton market and its repercussions for the Ottoman Empire  
   2.1 Cotton production and trade during the Industrial Revolution: the making of an empire without parallel  
      2.1.1 Technological progress and productivity gains  
      2.1.2 The worldwide expansion of the cotton market  
      2.1.3 Cotton and industrialisation: was it all a myth?  
   2.2 Cotton cultivation in two areas of the Ottoman Empire: Egypt and Western Anatolia  
      2.2.1 Trends in cotton production and trade in the Empire  
   2.3 The impact of the American Civil War and the Lancashire cotton famine on the Ottoman Empire  
      2.3.1 Western Anatolia
2.3.2 Egypt
2.4 A demand shock: the 1873-96 depression and its repercussions for the Empire
   2.4.1 Western Anatolia
   2.4.2 Egypt
2.5 The 20th century: growth after the depression
   2.5.1 Western Anatolia
   2.5.2 Egypt

3. The Ottoman Empire and market integration
   3.1 Various approaches by Ottoman economic historians on the Empire’s integration with the global economy
   3.2 Market integration: economic theory
      3.2.1. Definition
   3.3 Market integration: econometric measurement
      3.3.1 Static framework
      3.3.2 Dynamic framework
      3.3.3 Co-integration in the presence of structural breaks

4. Integration with the global economy: a study of the cotton market in Egypt and Western Anatolia
   4.1 Analytical framework
   4.2 Methodology and data
      4.2.1 Price data
   4.3 Application
      4.3.1 Co-integration analysis with Ottoman world prices
   4.4 Conclusion

5. De-industrialisation and re-industrialisation in the Ottoman cotton industry
   5.1 De-industrialisation
   5.2 Re-industrialisation
   5.3 Theoretical approaches to analysis of de-industrialisation and
re-industrialisation

5.3.1 The model

5.3.2 De-industrialisation and market integration

5.4 Industrialisation, terms of trade and market integration

5.5 Summary

6. Summary and Conclusion

Appendix 1: Ad valorem and specific export taxes

Appendix 2: Impulse response function results

Bibliography
List of tables

1.1.1: Merchandise exports as share of GDP (%) 11
1.2.1: Shipping tonnage entering main Ottoman ports, thousand tons 18
1.2.2: Trend in Ottoman terms of trade, 1854-1913 (Fisher price indices: 1880=100) 23
1.2.3a: Price of major Egyptian imports and exports, 1854-1879 (1880=100) 23
1.2.3b: Price of major Egyptian imports and exports, 1880-1913 (1913=100) 23
1.3.1a: Ottoman foreign trade, 1830-1913 (annual average, in millions of pounds sterling) 25
1.3.1b: Egyptian foreign trade, 1823-1913 (annual averages in millions of Egyptian pounds) 25
1.3.2: Estimates of exports and population growth in the Ottoman Empire and Egypt, 1840-1914 27
1.3.3: British cotton goods and total exports to Turkey and Egypt, annual averages in British pounds 29
1.3.4: Public debt of the Ottoman Empire and Egypt, 1876-1914 31
1.3.5: Foreign direct investment in the Ottoman Empire and Egypt 32
1.3.6: Sectoral distribution of foreign direct investments in the Ottoman Empire and Egypt in 1914 32
1.4.1: Land ownership, land distribution and forms of tenancy in the Asiatic provinces of the Ottoman Empire, 1869 34
2.1.1: Quantity of cotton and cotton goods utilised in Great Britain at the end of the 18th Century 48
2.1.2: Labour productivity in cotton spinning 50
2.1.3: British cotton spinning productivity, 1820-1896 50
2.1.4: Relative shares in British world cotton exports, 1820-1896 56
2.1.5: The cotton industry as an employer of labour and as a generator of income in Great Britain, 1801-1901 61
2.2.1: Cotton exports from the port of Izmir, 1780-1858 64
2.2.2: Cotton price index in Izmir, 1845-76 (1845-1849=100) 66
2.2.5: Value and price of Egyptian cotton exports, 1838-59 70
2.3.1: British raw cotton imports and re-exports, in million lb. 75
4.3.13: ARDL long-run coefficients for Izmir market 1845-61

4.3.14: ARDL long-run coefficients for Izmir market, 1862-1895

4.3.15: ARDL long-run coefficients for Izmir market between 1896 and 1914

4.3.16: Short-run dynamics in Izmir between 1845 and 1861

4.3.17: Short-run dynamics in Izmir between 1862 and 1895

4.3.18: Short-run dynamics in Izmir between 1897 and 1914

4.3.1.1: ARDL bound test for co-integration in the Alexandria cotton market, 1882-1914

4.3.1.2: ARDL long-run coefficients for the Alexandria market 1882-1914

4.3.1.3: ARDL short-run dynamics in Alexandria 1882-1914

4.3.1.4: ARDL bound test for co-integration in the Izmir cotton market

4.3.1.5: ARDL long-run coefficients in Izmir

4.3.1.6: ARDL short-run coefficients in Izmir

5.1.1: Percentages of domestic textile market supplied by foreign and local sources in different areas of the developing world, 19th Century

5.1.2: Average annual hand-spun yarn production and machine-spun yarn imports in the Ottoman Empire in tons, 1810-1910 (with the exclusion of Egypt)

5.1.3: Hand-spun cotton yarn production in the Ottoman Empire in 1900

5.2.1: Comparison of imported and domestic yarn prices, in piastres per oke

5.3.1.1: Daily real wages index in Istanbul, 1800-1909

5.3.2.1: Cotton yields in Egypt, 1865-1913

5.4.1: Relative cotton prices in Western Anatolia, 1854-1862

5.4.2: Product wages of skilled textiles workers in the Ottoman Empire, 1896-1908
List of figures and maps

1.1.1: North and British freight rate indexes, 1741-1913 8
1.3.1: Composition of Ottoman exports in 1897 27
1.3.2: Composition of Egyptian exports in 1879 28
1.3.3: Composition of Ottoman imports in 1897 28
1.3.4: Composition of Egyptian imports 1885-1913 (annual averages, £E, 000) 29

2.1.1: Increase in the number of power looms in Great Britain in the long 19th Century. 50
2.1.3: Average annual share in world cotton exports, 1850-1914 54
2.1.4: Number of cotton spinning spindles (in millions) in the world, 1800-1914 58
2.1.5: Power looms in the cotton industry of the world, 1820-1913 (thousands) 58
2.1.6: The cotton output of the main producers in the US, Asia, Africa and Latin America, 1905-1914 (in thousands of metric tons) 59
2.1.7: The world’s cotton consumption in thousands of quintals 59
2.2.1: Raw cotton exports from Izmir, Halep and Adana (1865-92); quantities in bales of 440 lbs 66
2.2.2: Annual average volume of exports of Egyptian cotton to main importing countries, in qantars, 1822-1913 72
2.3.1: The movement of cotton prices in Liverpool, Alexandria and Izmir, 1857-1867, in pounds per metric ton 76
2.4.1: Trend in world cotton prices, 1873-1896, in British pounds per metric ton 87
2.4.2: Shares of world raw cotton consumption, 1856-1883 88
2.4.3: Value and volume of cotton exports from Izmir, 1874-1894 92
2.4.4: Trend of Egyptian raw cotton prices during the great depression 1873-96, in British pounds per metric ton 95
2.4.5: Trend in Egyptian raw cotton exports, 1873-96 95
2.5.1: World cotton production and mill consumption in thousands bales of 500 lbs, 1890-1913 99
2.5.2: Trends in global cotton price movements, 1896-1914 (Liverpool prices) 100
2.5.3: Cotton price movements in Izmir, 1896-1914, in British pounds per metric ton 102
2.5.4: Trend in Egyptian cotton prices, 1896-1914, in British pounds per metric ton 107
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.1: Market integration</td>
<td>120</td>
</tr>
<tr>
<td>3.2.2: Monopsony power in the domestic market</td>
<td>122</td>
</tr>
<tr>
<td>3.2.3: Monopoly power</td>
<td>123</td>
</tr>
<tr>
<td>3.2.4: Price transmission in the case of monopoly power</td>
<td>124</td>
</tr>
<tr>
<td>3.2.5: Export tax</td>
<td>126</td>
</tr>
<tr>
<td>3.2.6: Export tax in the case of monopsony power (small country)</td>
<td>126</td>
</tr>
<tr>
<td>3.2.7: Export tax in the case of monopsony power (large country)</td>
<td>127</td>
</tr>
<tr>
<td>4.1.1: Cotton price movements in Liverpool, Alexandria and Izmir, 1845-1914, in British pound per metric ton</td>
<td>149</td>
</tr>
<tr>
<td>4.1.2: Ottoman cotton supply chain</td>
<td>152</td>
</tr>
<tr>
<td>4.2.1: Methodology used to study the process of price transmission</td>
<td>154</td>
</tr>
<tr>
<td>4.3.1: Transformation of cotton price data in logarithmic values</td>
<td>157</td>
</tr>
<tr>
<td>4.3.2: Single structural break</td>
<td>160</td>
</tr>
<tr>
<td>4.3.3: IO tests for structural breaks</td>
<td>161</td>
</tr>
<tr>
<td>4.3.4: AO tests for structural breaks</td>
<td>162</td>
</tr>
<tr>
<td>4.3.5: Impulse response functions</td>
<td>164</td>
</tr>
<tr>
<td>4.3.6: Plots of CUSUM and CUSUMSQ for Alexandria and Izmir</td>
<td>173</td>
</tr>
<tr>
<td>4.3.7: Plot of CUSUM and CUSUMSQ for Alexandria, 1845-1897</td>
<td>175</td>
</tr>
<tr>
<td>4.3.8: Plot of CUSUM and CUSUMSQ for Alexandria, 1898-1914</td>
<td>176</td>
</tr>
<tr>
<td>4.3.9: Plot of CUSUM and CUSUMSQ for Izmir 1845-61</td>
<td>179</td>
</tr>
<tr>
<td>4.3.10: Plot of CUSUM and CUSUMSQ for Izmir 1862-95</td>
<td>180</td>
</tr>
<tr>
<td>4.3.11: Plot of CUSUM and CUSUMSQ for Izmir 1896-1914</td>
<td>180</td>
</tr>
<tr>
<td>4.3.1.1: Price movements of Egyptian cotton in Liverpool and Alexandria, 1845-1914, in British pound per metric ton.</td>
<td>181</td>
</tr>
<tr>
<td>4.3.1.2: Movements of domestic and export cotton prices in Izmir, 1876-1908, in British pound per metric ton.</td>
<td>184</td>
</tr>
<tr>
<td>5.3.1.1: Equilibrium in a three sectors economy</td>
<td>202</td>
</tr>
<tr>
<td>5.3.1.2: Effects of terms of trade improvement in the non-tradable sector</td>
<td>204</td>
</tr>
<tr>
<td>5.3.1.3: Effects of terms of trade improvement in the manufacturing sector</td>
<td>204</td>
</tr>
<tr>
<td>5.3.1.4: Technological change in the cotton sector</td>
<td>204</td>
</tr>
<tr>
<td>5.3.2.1: Net barter terms of trade of the Middle East, 1796-1913</td>
<td>211</td>
</tr>
<tr>
<td>5.4.1: Relative price of raw cotton in Western Anatolia, 1862-1895</td>
<td>217</td>
</tr>
</tbody>
</table>
Map 1.2.1: Territorial configuration of the Ottoman Empire in the 19th Century 14
Map 1.2.2: Railroads in the Ottoman Empire, 1914 19
Map 1.2.3: Egypt’s railway system, 1914 21
Map 1.5.1: The Greek commercial and maritime network, 1830-60s; number of families at the port cities of the network 42
Map 2.2.1: Cotton cultivation in the Ottoman Empire 64
Map 2.2.2: Cotton cultivation along the Nile 68
Map 2.3.1: The Izmir-Aydin railway and the network of caravan roads 80
Thesis summary

The so called “First Wave of Globalisation” (from the second half of the 19th Century till the outbreak of the First World War) saw the emergence of increasingly more integrated commodity and factor markets; the evolution of this process of integration was influenced by both economic and political developments. This research explores one aspect of this process, which has been discussed by several economic historians in a largely qualitative manner, by examining the linkages established between the cotton industries of Egypt and Western Anatolia, which were part of the Ottoman Empire, and the international cotton market during this period.

The Ottoman Empire (1299-1922), together with Europe and India, was one of the key areas in Eurasia where cotton textiles played a major role in 19th Century economic progress. How was the Empire’s development in cotton production and trade connected to the major changes of a world market which was becoming increasingly more global? The thesis will answer this question through an exploration of the Ottoman response to its encounter with European capitalism, examining the rapid transformations which modified its socio-economic and political structure and which destroyed old patterns of trade and production to give origin to new ones. The approach proposed intends to provide both a qualitative and quantitative contribution to the broader literature: from a qualitative perspective, the approach outlines the peculiarity of the Ottoman experience, whose response to the new international economic environment was determined not only by its relative factor endowments, but also by a series of specific institutional, political and cultural factors. In so doing, it allows the Ottoman Empire to be compared with other cases of agricultural specialisation and manufacturing decline, thus reflecting on the impact of the industrial revolution on domestic handicrafts.

The study also draws attention to important differences in the evolution of the economic structure within different regions of the Ottoman Empire, specifically between Western Anatolia and Egypt. This is highlighted in findings from a quantitative analysis of the evolution of the market linkages and of the patterns of price transmission between the Ottoman and the global cotton industries. As far as we are aware, this is the first rigorous econometric analysis of cotton market integration between the international and Ottoman
Empire markets. Our empirical results reveal not only that the degree of Ottoman market integration varied both over time and between the two regions under study (Egypt and Western Anatolia) but also that the consolidated interconnection with the global economy led to another change in one of these regions: in Western Anatolia weaker international price transmission and domestic policy interventions facilitated the creation of a nascent domestic textile industry, based on imported machinery. The same modern machines, which had displaced artisans, reoriented patterns of production and produced de-industrialisation in the first part of the 18th Century, led to a revival of the Ottoman textile industry towards the end of the long 19th Century.
Statement of authorship

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis submitted for the award of any other degree or diploma.

No other person’s work has been used without due acknowledgment in the main text of the thesis.

This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

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Introduction

Many regions of the world became progressively integrated into global markets during the so-called “First Wave of Globalisation” under the influence of both socio-economic and political factors. The evolution of this process is one of the most widely debated among economic historians\(^1\), whose investigations have covered the many dimensions characterising this phase of unprecedented change for the world economy which include international commodity trade, global movements of factors of production, technology diffusion and the distributional effects of the new global division of labour.

Much of the literature in this area remains qualitative in nature. But recently there has been a surge of interest in studies that utilise mainstream economic models and sophisticated econometric techniques to investigate these historical processes.\(^2\) However, most of these studies focus on the economic history of the Atlantic world and, to a lesser degree, on Southern Europe. For example, in recent years research focusing on the process of globalisation in Spain, Italy and Portugal has increased considerably.\(^3\) Literature on countries in the “periphery”, such as the Ottoman Empire or the developing countries, remains sparse.

The main aim of this thesis is to contribute to this partially unexplored field of economic history by examining the process of integration of the Ottoman Empire with the world economy in the 19\(^{th}\) Century, through an investigation of the evolution of the cotton industries of Western Anatolia and Egypt which were part of the Ottoman Empire.

For the Ottoman Empire (1299-1922) the so-called long 19\(^{th}\) Century\(^4\) was a period of swift and unprecedented transformations, which undermined the survival of its territorial unity and deeply modified its economic structure. This last century of the life of the Empire was characterised by a continuous striving by the central authorities to find a synthesis between the centrifugal forces within its own territory and an international system that was

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\(^1\) According to Federico (2008:3): “Market integration is nowadays one of the hottest topics in economic history”.

\(^2\) See, among others: O’Rourke and Williamson (1999); Ejrnaes and Persson (2000); Jacks (2005 and 2006); Esteves, Reis and Ferramosca (2009).

\(^3\) See, for example, Pamuk and Williamson (eds.), 2000.

\(^4\) The term long 19\(^{th}\) Century is often used by historians to refer to the period between the French Revolution (1789) and the First World War (1914).
progressively becoming more globalised. Cotton, a key Ottoman export, played a role of crucial significance in the world economy during this particular historical period. Further, the evolution of the cotton industry in Egypt (which was gradually drifting away from the Empire and effectively becoming a British colony) and in Western Anatolia (at the core of the Empire right up to the First World War) was marked in both regions by strong similarities as well as some striking differences. Both regions underwent de-industrialisation, experiencing a collapse of their textile manufacturing industries when cheap textiles produced with modern machinery flooded their markets. Both became exporters of raw cotton to the industrial centres of Europe. Pamuk and Williamson (2011) have compared the Ottoman Empire experience of de-industrialisation with similar experiences of other regions in the “periphery” in Latin America, Asia and Europe. They suggest that de-industrialisation forces emanating from international price changes may have affected the Ottoman Empire more strongly than other regions in the early part of the 19th century, with these forces becoming comparatively much weaker from the second half of the century.

We believe that comparisons made between the Ottoman Empire – treated as a more or less homogenous single entity - and other regions in the ‘periphery’ can mask important differences between regions within the Empire. These differences were becoming quite apparent by the end of the long 19th century: in particular, while Egypt – which had gradually pulled away politically from the Empire - became specialised in the cultivation of raw cotton for export to world markets, Western Anatolia, remaining at the ‘core’ of the Empire, experienced a process of re-industrialisation with the development of a modern textile manufacturing industry. The nature of these developments and the reasons for this divergence in the evolution of their cotton industries provide an interesting case study that can shed light on the economic and political forces at work that shaped the structural transformations of many countries throughout the world during the first wave of globalisation. It can also contribute to developing a richer picture of the differences between different regions of the world in terms of their de-industrialisation experience.

In this study we apply both quantitative and qualitative methods to analyse the different trajectories of the cotton industries of these two regions of the Ottoman Empire. We conduct an econometric analysis of the nature and evolution of price transmission between domestic and world markets in raw cotton during the long 19th century, relating changes in market integration between these markets to major domestic and global economic and political
developments. We both complement and flesh out this market integration analysis with a broader, more qualitative analysis aimed at exploring the process of globalisation in the Empire not just as a purely economic phenomenon, but also as the result of the interplay among a series of political, social and cultural dimensions.

The thesis has the following structure: the first chapter explores the swift transformations which affected the Ottoman Empire’s socio-economic and political structure at the time when world markets were becoming increasingly more global. The second chapter proposes an analysis of the development of the world cotton industry during the 19th Century, investigating its impact on the Empire’s agricultural production, trade and commercialisation. The third chapter illustrates the different approaches utilised by economic historians to describe the process and extent of market integration of the Ottoman Empire with the global economy; a critical discussion of the qualitative approach adopted by the vast majority of the studies found in the literature will be coupled with an analysis of the economics of market integration and of the econometric techniques used to measure it. Chapter Four provides a quantitative analysis of the pattern of price transmission between the international cotton market and two different Ottoman Empire regions – Western Anatolia and Egypt - between 1845 and 1914, with the aim of exploring the changes in the nature of spatial market integration between these markets and the world economy. Chapter Five sets the Ottoman Empire experience in a comparative perspective. It points to the importance of paying attention to the extent of price transmission between international and domestic markets and the nature of domestic factor markets when applying the “Dutch Disease” model of de-industrialisation, which has already been used to study Ottoman Empire industrialisation by Williamson and Pamuk (2011). The final chapter provides a summary and some brief concluding remarks.
1. The Ottoman Empire during the first wave of globalisation

“Little research on the relationship between political and economic change has been carried out. Although the political life in the Middle East under the Western impact has been explored relatively well, the social and economic side of the Ottoman story essentially remains unstudied”.

Quataert (1983: xv)

The 19th Century was an era of growth and of unprecedented transformations in the global economy, moulded by new patterns of production, division of labour and balance of power among nations. Two revolutions, the French and the Industrial, were at the origin of this process of dramatic change, which had a profound impact on the economic and political world system and affected the Ottoman Empire5 both in its domestic institutions and in its international relationships. The French Revolution, followed by the Napoleonic Wars, stimulated a process of internal reform and political reordering in the Empire, known as Tanzimat. The central authorities of both the semi-independent province of Egypt and of the Empire undertook a process of modernisation of the military (in recognition of the increasing disparity of power compared with Europe) and of centralisation of political power. On the other hand, the Industrial Revolution led to a change in the structure of the economic world order, which found its “centre” in Western Europe6 and its “periphery” in Asia, Africa and Latin America. The former region became the main global supplier and exporter of

5 The Ottoman Empire originated during the early 1300s from the unification of a series of small Anatolian principalities through the military achievements of a Turkish chieftain named Osman. His subjects came to be known by his family name, Osmanlis (Ottomans). The Ottoman state continued expanding throughout the following three centuries, conquering both European territories and Arab lands. At the height of its power, in the 16th Century, the Ottoman Empire stretched from the Danube to Yemen, from Albania to the Black Sea and from Algiers to Baghdad, and represented one of most powerful world empires. The second half of the 17th and the 18th Centuries marked a period of political and economic disintegration for the Empire, brought about by the combination of political decentralisation and intense external pressures. Social, political and economic transformation deepened during the 19th Century, when the Empire participated to the sweep of change which was affecting the global economy.

6 The “centre” expanded during the course of the long 19th Century, and came to include the so-called Atlantic world.
manufactured goods while the latter region specialised in the production of agricultural commodities (foodstuff and raw materials).

The approach offered in this chapter differs from the “centre-periphery paradigm”, widespread in the period 1960-70, that assumed that ‘peripheralization’ in a world economy dominated by European states and commercial companies sufficed to explain why Ottoman manufacturers not only were unable to capture markets abroad, but even to maintain themselves in their own domestic context (Faroqhi, 2009:3). To integrate this view, the process of Ottoman commercialisation will not be regarded as a mere economic phenomenon which led to a transformation of its rural production, but rather as a process both shaped and enabled by a set of specific institutional conditions. In fact, the Ottoman Empire fully participated in the sweeping global changes as a member of the periphery; though, it is important to understand that the transformations that determined the nature and direction of its economic system were the result of a combination of both external pressures, embodied in the changing international environment, and of internal dynamics, stemming from specific socio-political and cultural structures (i.e. land regime, legal codes, social hierarchies, political establishment, etc.). It was through the joint effect of the new global division of labour, of relative factor endowments and of particular institutions that the Ottoman Empire underwent a process of economic change and agricultural commercialisation, different from other parts of the developing world.

This chapter will explore this era of change which affected both the global economy and, more specifically, the Empire. The various chapter sections outline the factors which prompted Ottoman integration in the global system and the forms in which globalisation manifested itself, through an analysis of the patterns of trade and of the direction of capital flows. The last two sections illustrate the changes in land tenure and outline the importance of market networks in prompting trade expansion.

### 1.1 The first wave of globalisation

The years between the second half of the 19th Century and the outbreak of the First World War saw the emergence of an international economic system which was becoming

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7 For such an approach to peripheralization see Inan (1987) and Kasaba (1988).
progressively more integrated. This period, during which the worldwide web of trade in commodities and factors of production became interwoven to an unprecedented degree, gained the label “first wave of globalisation”.

The word globalisation is so widely used, that it signifies a lot of different things to a lot of different people; indeed, globalisation is a portmanteau concept that encompasses a wide range of phenomena simultaneously interacting with each other, ranging from the cultural and social to the political and economic spheres. It therefore requires specification: what we mean here is the creation of a global system in which an interconnected network of trade in goods and services and an intensified flow of capital and labour led to the establishment of integrated global markets. As suggested by Foreman-Peck, the polar case of market integration is given by the law of one price which holds when prices of homogeneous goods among spatially separated markets equalise (thus implying that trade costs are lower than price differentials). However markets can be integrated even when different prices prevail in different markets, provided that their changes will be comparable when there is a shock to one market (Foreman-Peck 1995:36).

The evolution of this process of global integration was influenced by economic, political, cultural and technological developments and was triggered by a sharp reduction in trade costs which enabled countries to expand their commercial networks to an extent never reached before.

The unprecedented magnification in trade was prompted by three main factors: the improvements in transportation, first at sea, then overland; a more liberal trade policy; the consolidation and expansion of market networks. We now look at each of these in turn.

*Decline in transport costs*

The transport revolution, ushered in by the invention of the steam engine, was the fundamental factor which allowed national economies to open up to international trade in ways radically different from previous centuries. The first dramatic improvements affected river and sea transportation with inland waterways followed by the seas and oceans becoming beneficiaries of the invention of the steamship. From the beginning of the 1830s and until the 1860s steamships carried predominantly high value-added goods, while sail ships were used for the rest of merchandise traded. A series of innovations in the following decades such as
the screw propeller, the compound engine and steel hulls, improved steamships’ efficiency allowing them to increase the amount of commodities transported. For example, in the route from Kolkata to Britain in 1874, steamships carried 90 per cent of all ginger, 90 per cent of all poppy seeds, 90 per cent of all tea and 99 per cent of all cow hides transported (Fletcher, 1958:561). Another important development that increased steam tonnage compared to sail was the opening of the 101 kilometre-long Suez Canal on November 17, 1869. The Canal halved the distance between Britain and India, thus making it possible for European traders to compete on Asian routes (Foreman-Peck, 1995:34).

Another hallmark of the transport revolution was the railway: railroads were built all over the globe and played a fundamental role in expanding both domestic and international markets and in reducing price gaps between producers and consumers. A phenomenal increase in railway mileage was achieved, in particular, in the decades before World War I, largely financed by the inter-imperial rivalry among British, French and German capital in Asia, Africa and in the Ottoman Empire.

A way to measure the impact of these transport innovations on productivity improvements is to look at the decline in freight rates: Figure 1.1.1 illustrates the so-called North’s index (North 1958) and the British index (Harley, 1988) which indicate a sharp drop in the British ocean freight rate. This reduction implies an annual steady decline in transport costs of about 1.5 per cent for the Atlantic economy (Findlay and O’Rourke, 2003). The considerable reduction in transport costs did not affect only the Atlantic routes: freight rates declined worldwide involving, among others, the naval routes between Europe and the Black Sea or the Eastern Mediterranean and intra-Asian routes.

---

8 The Canal could not be navigated by sailing ships as they would have to be towed through it and due to unfavourable wind conditions. The first sailing ship that tried to make the journey, the Noel, was wrecked on the first evening of its voyage (Fletcher, 1958:558).
10 The freight rate on coal between Nagasaki and Shanghai fell by 76 per cent between 1880 and 1910; total factor productivity on Japan’s tramp freighter routes serving Asia advanced at 2.5 per cent per annum between 1879 and 1909 (Findlay and O’Rourke, 2003).
Trade policy

Despite the fact that various countries adopted different commercial strategies in the 19th Century, some general trends in trade policy are recognisable: in Western Europe the first decades of 1800 saw a continuation of 18th Century mercantilism followed by a gradual liberalisation from the 1830s to the 1870s and then by a return to more protectionist policies.

The situation was quite different in the US, Canada and Australia, which did not experience a considerable shift away from protectionism. In the developing world two trends were underway: while in Africa and Asia and the Middle East free trade policies imposed by Western powers lasted all through the 19th Century, in Latin America the newly independent states adopted a protectionist stance with the most protectionist states being Brazil, Mexico and Venezuela with an average tariff of 30 per cent in 1857 (Foreman-Peck, 1995:47).

Following the example of Great Britain which was the first major economy to liberalise its markets since the abolition of the Corn Laws in 1846, most European nations gradually started to lower their trade barriers. One of the cornerstones of the path towards freer trade was the signing of the Cobden-Chevalier treaty (1860) which further liberalised trade between France and Great Britain, establishing a most-favoured-nation (MFN) relationship between them. This encouraged the inclusion of the MFN clause in various trade treaties.
among Western European countries thus strengthening the general move towards liberalisation. The French liberalisation of trade is commonly regarded as the decisive step which inaugurated the shift in continental European commercial policy (Foreman-Peck, 1995: 45). By the 1870s general duties on manufactures had reached 9-12 per cent on the Continent, thus reversing the high levels of protection of the post-Waterloo era. The effects of a more liberal trade policy acted as a catalyst to the reduction of trade costs initiated by the transport revolution.

But once the impact of liberalisation on income distribution started to be felt and the interests of the European landlord classes worsened more and more damaged by cheap grain imports from Russia and the New World, the scenario changed. As a consequence of the grain invasion, protectionism triumphed in all major European economies with the exception of Great Britain,\(^\text{11}\) despite growing internal opposition. In the New World, where landowners benefited from European liberalisation, tariffs remained high during the whole duration of the long 19\(^{th}\) Century, with the main aim of protecting domestic manufactures. On the other hand, in Africa and Asia, free trade treaties imposed both on colonies and on most independent countries had the effect of opening both continents to international trade.\(^\text{12}\) The impact was particularly strong for countries which had previously been almost closed economies such as China and Japan; they both signed treaties establishing a low upper limit on their tariff rates, as did the Ottoman Empire. The impossibility of pursuing an independent trade policy by the developing world has been regarded as the fundamental culprit behind the destruction of domestic manufacturing and de-industrialisation.\(^\text{13}\)

\textit{Market networks}

The increased level of global economic linkages, fostered by the technological revolution, had an impact on the nature and the workings of markets, allowing them to become more impersonal. While in previous centuries, in the absence of reliable market institutions and

\(^{11}\) Smaller countries like Denmark, Belgium, the Netherlands and Sweden maintained a freer trade policy.

\(^{12}\) While British colonies generally adopted non-discriminatory free trade policy, Italian and Portuguese ones discriminated in favour of the mother country.

\(^{13}\) Although a large branch of scholarship has analysed the economic history of the periphery along the imperialism-underdevelopment axis (Myrdal, 1956; Frank, 1967; Wallerstein, 1974; Bagci, 1982; Kasaba, 1993), not everyone subscribes to such an interpretation (among others, Morris, 1963; Foreman-Peck, 1995; Roy, 2002; Ray, 2009).
with limited access to information, economic transactions relied on personal connections and trust based along co-ethnic or co-religious lines, the new global era enabled economic agents to behave rationally in seeking profit maximisation.

Nevertheless, markets did not suddenly become neutral sites for direct transactions between buyers and sellers; the influence of non-economic components in the exchange of goods and services did not disappear during the long 19th Century. The first wave of globalisation did not manifest itself purely through the interplay of economic, political and technological factors: cultural dynamics served a crucial function in the way in which economic agents interacted with each other and deeply influenced the extent and nature of commercial exchanges. It is therefore important to recognise the role that cultural factors played in promoting or in preventing market integration: barriers to the creation of global markets are, in fact, not only related to transport costs, protectionist trade policy or to the presence of market power; there are two other main factors which increase trade costs and therefore hinder economic integration:

- Cultural, ethnic or religious: a lack of awareness in regard to the different values and tastes among various religious or ethnic groups could lead to disadvantageous economic misunderstandings.

- Informational: a lack of accessibility to information or of knowledge about the possibility of exploiting market opportunities can distort economic activities.

The mitigation of these barriers represented an important driving force in fostering globalisation and in integrating markets. Research shows that networking based on religious or ethnic lines can cut the costs of commercial transactions, as shared moral values reduce the risk of cheating or free riding. Thus, information sharing among community members becomes pivotal in the workings of market networks and in the expansion of economic activities.

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14 For factors hindering market integration see Section 3.2.
15 See Magee and Thompson (2010:6-8).
16 See, for example, Pearson (2001).
17 Ratanapruk (2007) looks at how kinship and religious practices among Nepali traders in South and Southeast Asia create and sustain trade networks and increase their competitiveness.
Magee and Thompson (2010) illustrate the importance of co-ethnic networks in expanding trade and outline the crucial role of cultural identity in increasing Britain’s penetration in the global economy during the first wave of globalisation. However, preference for “Britishness” in trade and investments over outsiders could also restrict and distort economic integration, as trade relations, despite being trans-national, were racially circumscribed.

But it is not necessarily the networking of a dominant culture which encourages globalisation: Harlaftis (1996) describes how the expanding network of Greek merchants played a pivotal position in the Ottoman Empire’s participation in the global economy. Deeb (1978) regards non-Muslim minorities as the major agents of change affecting Egypt’s integration in the world market.

The impact of these socio-economic, technological, political and cultural developments on the world economy was dramatic and triggered an unprecedented expansion in international trade (see Table 1.1.1). The most significant development representing a dramatic break with the past was the creation of integrated global commodity and factor markets. There is common agreement among economic historians that in previous centuries there was no world-wide convergence in prices (O’Rourke and Williamson, 2004); moreover, Federico (2008) reports that on the eve of the Industrial Revolution markets in Europe were no more integrated than in China, while India lagged behind.

Table 1.1.1: Merchandise exports as share of GDP (%).

<table>
<thead>
<tr>
<th></th>
<th>1870</th>
<th>1913</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Europe</td>
<td>10</td>
<td>16.3</td>
</tr>
<tr>
<td>Russia</td>
<td>n.a.</td>
<td>2.9</td>
</tr>
<tr>
<td>US</td>
<td>2.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Latin America</td>
<td>9</td>
<td>9.5</td>
</tr>
<tr>
<td>China</td>
<td>0.7</td>
<td>1.7</td>
</tr>
<tr>
<td>India</td>
<td>2.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Japan</td>
<td>0.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Total Asia</td>
<td>1.3</td>
<td>2.6</td>
</tr>
<tr>
<td>World</td>
<td><strong>4.6</strong></td>
<td><strong>7.9</strong></td>
</tr>
</tbody>
</table>


The evidence for the formation of global markets for the first time in human history emerges from looking at international price convergence; there is a substantial literature which
documents this process, analysing various markets in different areas of the world (see Section 3.3 for the methodologies used). Commodity market integration had a truly global extension: in the Atlantic economy, examples of price convergence range from Liverpool-Chicago wheat prices, London-Cincinnati bacon prices, Boston-Manchester cotton textile prices between 1870 and 1913 (Findlay and O’Rourke, 2003). In Asia, the Liverpool-Bombay cotton price gap, the London-Kolkata jute price gap and the London-Rangoon rice price gap fell in the last three decades of the long 19th Century (Findlay and O’Rourke, 2007). Moreover, grain markets in Russia (Metzer, 1974) and in India (Hurd, 1975), among others, became more integrated.

The opening up of markets also affected labour and capital flows. The 19th Century was a period of mass migrations, fostered by falling transport costs: around 60 million Europeans migrated to the New World between 1820 and 1914 and there was also considerable emigration from India and China. Capital flows, mainly from Europe to the New World and to developing countries, expanded at a dramatic rate, too. FDI rose from 7 per cent of world GDP in 1870 to almost 20 per cent in 1914 (see Foreman-Peck, 1995, and Findlay O’Rourke, 2007 for a detailed analysis of the patterns and direction of capital and labour movements).

1.2 Transformations in the Empire’s political and socio-economic structure

The 19th Century marked the continuation of a period of institutional renovation for the Ottoman Empire which had started in the preceding century; transformations in the socio-political and economic spheres, coupled with technological improvements brought about by the Industrial Revolution, contributed to modifying the role of the Empire in the international economic system and its position in a world which was progressively becoming more globalised.

This section of the chapter aims to identify the factors which promoted Ottoman participation in the first wave of globalisation. Drawing upon Hay and Marsh (1992), our approach considers globalisation not as the cause of the changes occurring in the Empire, but rather as
the *explicandum*; it thus focuses on the *explicans* of the Empire’s inclusion in the swift transformations affecting the whole world system.

With this focus, the dynamic articulation of the series of events which enabled the Empire’s integration in the world economy will be divided into three interrelated categories:

a. Socio-political, which found expression in the *Tanzimat* and in the signing of free trade treaties;
b. Technological, which enabled a sharp reduction in transport costs;
c. Economic, manifested through favourable terms of trade.

*a. Socio-political transformations*

Changes in the Ottoman social and political spheres were a result of the decline of the royal central authority (embodied by the sultan in Istanbul) combined with external pressures (of which the most significant impact came from a new international economic and political environment). The interaction of these combined forces assumed two main forms:

- The deterioration of the absolute rule of the sultan undermined by the rising power of the royal central authority’s own administrative structure: the *Janissaries* (the military), the *derebeys* and *a’yan* (tax-farmers, i.e. local feudal lords) and the *ulema* (members of the Islamic religious establishment).
- The incapability of the central state to control its own territories, which led to permanent territorial losses: most of Hungary was ceded to the Hapsburgs (1699), Russia obtained the northern shores of the Black Sea (1700), Romania and Crimea (1774); in Africa, Algiers and Tunis had fallen away in the 18\textsuperscript{th} Century and then formally in the 19\textsuperscript{th} Century; nationalist uprisings in the Balkans led to the independence of Serbia (1830), Greece (1832); Moldavia and Wallachia (1856), Bulgaria, Montenegro, Bosnia, Herzegovina and other areas of the Caucasus (1878); Cyprus fell into British hands in 1878.

The unfolding of these events was once considered by various historians to be a clear sign of the decline of the Empire. However, this once prevalent idea (particularly within the Orientalist tradition\textsuperscript{18}) has now been thoroughly questioned and is no longer accepted: the period from 1800 to the outbreak of the First World War is seen as an era of renovation in

which the Empire strived to find a synthesis between the centrifugal forces within its own territory and the changing international system. Despite the undergoing process of change and the relatively weakened political and economic position played in the international arena, at the height of the 19th Century the Ottoman Empire represented both a leading Islamic state and a world empire of vast influence at the crossroads of intercontinental trade, covering parts of the Balkans, Anatolia, Armenia, Mesopotamia, Greater Syria, the Hijaz, Egypt, Cyrenaica and Tripolitania (see Map 1.2.1).

Map 1.2.1: Territorial configuration of the Ottoman Empire in the 19th Century.

Egypt, conquered in 1517 by Selim I, held a moot position within the Empire: whether it can be considered part of the Ottoman Empire is open to debate, with most scholars treating it as a separate entity with a separate government and head of state.\(^{19}\)

\(^{19}\) Richards (1987) considers the beginning of Muhammad Ali’s rule as the crucial time when Egypt shifted from belonging to the “Ottoman world-system” to integrating into the capitalist system. This is when, according to
In fact, Egypt increased its level of autonomy during the late 18th Century in both the administrative and financial spheres under a revived Mamluk order; its successive involvement in the Franco-British rivalry during the Napoleonic War strengthened its position at the expense of a weakened Ottoman state. Muhammad Ali, recognized by Istanbul as the Ottoman governor of Egypt in 1805, transformed the region from a subordinated province to a military and politically autonomous power, although he and his successors continued paying the yearly tribute and submitting the annual budget to the Sublime Porte for approval. The former was fixed at 40 million kuruş, but increased over time (in 1866 and 1873). Moreover, even after the British occupation in 1882, Egypt always recognised Ottoman suzerainty.

In our study we consider Egypt as still nominally part of the Ottoman Empire from an economic perspective. From an international trade viewpoint, it was subjected to the same commercial conventions signed by Istanbul, hence it had no power to implement an independent trade policy; moreover, no direct taxes could be imposed on foreigners without the consent of Istanbul, because of the presence of Capitulations. On the other hand, the semi-autonomous province had complete control over domestic taxation.

During the 19th Century the major restructuring of Ottoman and Egyptian institutions was based on the centralisation of the state structure aimed at increasing government’s income and at getting direct control over tax revenues; the strengthening of the bureaucratic apparatus of the “Sick man of Europe” as well as of Egypt, found the support of Western powers: it reflected the strategic interests of both bureaucracies and was designed to consolidate a single unified administration, thus decreasing the power of multiple provincial notables. During this program of re-centralisation, which started with the Sultan Mahmud II in Constantinople and Muhammad Ali in Cairo and continued during the rest of the century,

the author, a dramatic change in the country’s social and technical relations of productions in agriculture occurred.

20 On May 25 1838 Muhammad Ali declared his wish to establish himself and his dynasty as an independent ruler, but he backed down after the Ottoman Sultan in Istanbul, backed by French troops, mobilised his army.

21 The Ottoman concept of capitulation was based on the Turkish امتياز أجنبي meaning privileges for foreigners; they referred to the agreements undertaken by the Sultan of the Ottoman Empire and European powers, which granted tax exemption and other privileges to foreigners. The Capitulations recognised the status of conditional extraterritoriality to foreign subjects, while affirming the political sovereignty of the Ottoman state. They were further extended to non-Muslim Ottoman citizens.

22 European political-economic interests were more inclined at preserving and consolidating a single centralised Ottoman administration, which would have allowed market access to the Great Powers, rather than having to negotiate with multiple provincial dynasts and notables.
de facto properties of big landlords were expropriated and attempts were made to control the tax collection process, which was in their hands. The efforts to eliminate tax farming and to reform the system of rural tax collection (tax-farmers in fact accumulated wealth rather than passing it to the government\textsuperscript{23}) had diverging results in the two regions: while in the broader Empire they were ineffective, in Egypt they were more successful; one of the main reasons for this divergence lies in the fact that Muhammad Ali, unlike his Ottoman counterpart, could count both on a system of experienced Coptic clerks and on the services of village sheikhs, whose tradition of strong local power and subservience to external authorities made them the ideal agents of the central government. By these means Muhammad Ali gained control over the major source of Egyptian revenue, land tax, which supplied at least half of total government income. Other crucial objectives of the Tanzimat and of the Egyptian political restructuring were the secularisation and Westernisation of both the state apparatus and the military order.

In the Empire two reforms can be held as hallmarks of this period of transformation: the first, of a domestic nature, was the abolition of the Janissary corps in 1826. The Janissary were once professional soldiers who then became artisans and guildsmen and were only occasionally on the military payroll; before their abolition they had played a crucial role in the Empire’s economy and represented the most powerful advocates of protectionism. Their elimination, which led to the guilds’ disempowerment, was part of the centralisation strategy adopted by the Sultan in Istanbul.

The second reform was the signing of a series of international free trade agreements, starting with the 1838 Anglo-Turkish Convention, which fixed duties at 5 per cent for imports, 3 per cent for transit commodities and 12 per cent for exports. The Convention was followed by similar trade agreements with France (1838), Hanseatic towns, the United States, Sardinia (1839), Sweden and Norway, the Netherlands, Prussia, Belgium (1840), Denmark and Toscana (1841). \textsuperscript{24} Like the Anglo-Turkish Convention, these agreements signaled the

\textsuperscript{23} For example in Egypt in 1798/9, when three quarters of government expenditure came from the land tax, only a little over one fifth of the amount taken from the farmers went to the central government.

\textsuperscript{24} Before the signing of these international trade agreements, the Empire had already been forced to make commercial concessions to Russia, after defeat in the war of 1828-9. The resulting treaty came to be seen as the basis from which European powers could initiate future economic accords with the Empire. It would have been highly unlikely for the politically, militarily and financially weakened Ottoman state to resist pressures from Great Britain and other European powers to comply. In particular, when both Russia and Egypt became
government’s formal commitment to abolish industrial, commercial and agricultural monopolies, directing the Empire’s trade policy towards economic liberalism. The signing of free trade agreements represented a continuation of the already established economic path set in 1826 and has been portrayed by many historians as a decisive step that made Ottoman trade “one of the most liberal in the world”.

These two reforms have been considered in the literature as the engines of a process of market integration between the Ottoman and world economies. Following an experience common to many other developing countries, the most visible signs of the Empire’s rising participation in the world market were the commercialisation of Ottoman agriculture and the rise in manufactured goods imported from Europe. The Empire shifted from being an agrarian state where cultivation was centred around subsistence crops to the production of cash crops for the external market. Complementary to this development was the decline in manufacturing activities owing to competition from cheaper imported finished products.

During the 19th Century Egypt underwent the same structural change experienced by the rest of the Ottoman Empire and began its transition from a subsistence to an export-oriented economy, supplying primary commodities (mainly cotton) to the global market and importing manufactured goods. This process was incentivised not only by the adherence to the Anglo-Turkish Convention, but also by a series of measures adopted during Muhammed Ali’s rule. He had an ambition to transform Egypt into a “modern” complex economy: the prevailing communal form of land ownership was abolished, a series of irrigation works were undertaken in order to increase the land under cultivation and infrastructure was improved. However, most likely the initiative that provoked the most remarkable change was the introduction of long staple cotton planting on a commercial scale (for a detailed description of the Egyptian cotton market see Section 2.2).

The Empire became militarily and politically stronger and represented a threat to the Empire, the government in Istanbul opted for British military and political support in return for opening its economy to free trade.

Despite the adherence to international trade agreements that favoured trade liberalisation, it is of fundamental importance to remember that the flow of goods in the various parts of the Empire was subjected to internal duties of 8 per cent. Most internal duties on overland commerce were only abolished only in 1874, while those on sea transport were eliminated by the Istanbul Chamber of Commerce in 1894, thus easing the intra-Empire grain trade. Other sea-transported goods shipped within the empire continued paying 8 per cent duty until this was reduced to 4 per cent in 1889, and 2 per cent in 1900.

See, for example, Puryear (1969), Issawi (1980b) and Kasaba (1988).

Particularly significant were the improvement of the port of Alexandria and its linking with the Suez Canal.
b. Technological improvements

The remarkable improvements in the transport sector during the 19th Century acted as a catalyst in linking markets worldwide. As illustrated in the previous section (1.1), the invention of the steam engine in the late 18th Century and its application to transportation had a revolutionary impact on the movement of people and commodities, both by water and land. The diffusion of steamships not only overcame the unpredictability of travelling by sail, but also led to a significant diminution of transport costs over the course of the century; similarly, the building of railroads linked inland regions to the coasts and consequently, to the global economy.

These technological developments, which intensified the connection between the Empire and the international market, had a double effect on the Ottoman economy: on the one hand new market opportunities arose, both around the port areas served by shipping and in the regions served by railroads, while on the other hand exposure to foreign competition increased dramatically.

The number of steamships which began entering Ottoman waters in 1820 soared over time, particularly after the opening of the Suez Canal in 1869. As these waters allowed for larger sized vessels, there was a consequent rise in the volume of shipping: in Izmir, for example, it increased from 100 to 2,200 thousand tons by the beginning of the 20th Century (see Table 1.2.1) while in Istanbul it quadrupled reaching 4,000 thousand tons in the two decades before 1914.

**Table 1.2.1: Shipping tonnage entering main Ottoman ports, thousand tons.**

<table>
<thead>
<tr>
<th>Port</th>
<th>1830</th>
<th>1860</th>
<th>1890</th>
<th>1913</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandria</td>
<td>140</td>
<td>1,250</td>
<td>1,500</td>
<td>3,500</td>
</tr>
<tr>
<td>Basra</td>
<td>10</td>
<td>-</td>
<td>100</td>
<td>400</td>
</tr>
<tr>
<td>Beirut</td>
<td>40</td>
<td>400</td>
<td>600</td>
<td>1,700</td>
</tr>
<tr>
<td>Izmir</td>
<td>100</td>
<td>600</td>
<td>1,600</td>
<td>2,200</td>
</tr>
<tr>
<td>Trabzon</td>
<td>15</td>
<td>120</td>
<td>500</td>
<td>-</td>
</tr>
</tbody>
</table>

*Source: Issawi (1982:48).*

The growth of steamship tonnage and commerce prompted a process of modernisation of Ottoman port facilities. Major improvements came after the second half of the century and were primarily financed by foreign investments: foreign companies constructed and operated port facilities at Salonika, Izmir, Istanbul, Alexandria, Suez and Port Said.
Developments in the railway sector were complementary to the expansion in shipping, although the railroad age came late to the Ottoman Empire and, as in the case of port modernisation, foreign capital and workers played a critical role in new construction.\textsuperscript{28} Railroad building began after the Crimean War, financed by British capital: the first new line was in the Balkans, followed by construction of the Izmir-Aydin railway. The most significant railroad extension took place between 1890-5 with the construction of the 100 kilometre-long Anatolian railway, from Izmit to Ankara. Unique among Ottoman railroads was the Hejaz Railway, built by Ottoman capital and labour.\textsuperscript{29} Map 1.2.2 illustrates the railway network in the Ottoman Empire in 1914 (excluding Egypt and the Hejaz railway).

\textit{Map 1.2.2: Railroads in the Ottoman Empire, 1914.}

\begin{center}
\includegraphics[width=\textwidth]{railroads_map.png}
\end{center}

\textit{Source: Inalcik and Quataert (1996:805).}

\textsuperscript{28} To encourage foreign investments the Ottoman government adopted a new financial technique, called the kilometric guarantee system. This system was based on an agreement between the state and the railway company that the latter would raise certain minimum revenue per kilometre of track in operation with the state committing to fund any deficiency. In exchange, the private company holding the concession had to provide the initial capital.

\textsuperscript{29} The line was planned to connect Damascus and Mecca. The internal financing was funded by voluntary donations, special taxes, contributions by non-Ottoman Muslims (Egyptians and Indians mainly) and savings on the wage bills by the use of army labour. The railroads had a strong impact on the Empire’s economy, as they connected the interior regions and dramatically reduced transport costs. They also vastly increased the circulation of people within the Empire.
In Egypt the process of railroad building started in 1851 and proceeded at a fast pace, with the aim of connecting the capitals of the various provinces, as well as linking Cairo and Alexandria with their suburbs. The railroad project received huge backing from the British government and was mainly built by British capital: not only did it allow the export of British capital and skilled labour, but it also meant less transit time and increased security on Britain’s main trading route to India. The first rail section was opened in 1853; subsequently the line was further developed to link Cairo to both Alexandria and Suez (1858). With the opening of the Suez Canal to international navigation in 1869, the foreign interest in railroad development in Egypt ceased. Nevertheless the government continued with its project of railroad expansion, financed through borrowings from Europe. In 1877 there were 1,519 kilometres of railway and by 1913 this figure rose to 2,953 kilometres (see Map 1.2.3). The railway network came to connect the main areas of the country: it linked Egypt’s main farming districts with its principal trading hubs (Cairo, Alexandria and Damietta), thus strengthening commercial ties with the world market and reinforcing the central government’s grip on the country. Particularly relevant was the rail network’s role in promoting the export of cotton. According to Amr Nasr El Din (2006:21): “The massive expansion of the Egyptian railroad network was mainly directed at connecting Egypt’s main trading centres with its outlets to the external world. Its main purpose was to facilitate the export of Egyptian cotton to the world. One could, therefore, fairly conclude that Egypt’s integration in the international economy indirectly controlled and guided the rationale behind expanding the Egyptian railroads”.

Aside from these developments in the railway system, transport along the Nile and in its network of canals underwent considerable improvements, too.

c. Trends in the Empire’s terms of trade.

Terms of trade movements played an important role in influencing the pace of integration of the Ottoman Empire in the world market: advantageous movements in the terms of trade, favourable to agricultural commodities between the 1820s and the mid-1850s and between 

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30 The use of massive railway projects was widely adopted by colonialist powers as a device to gain political and economic control. In the Ottoman Empire many such projects were undertaken by the Germans, the French and the British, and an environment of fierce competition was engendered among them. British support for the railroad project in Egypt was also motivated by the fear that the French would gain political influence at the expense of Britain.
the mid-1890s and 1914 intensified the Empire’s specialisation in primary goods production and exports to the global economy.

*Map 1.2.3: Egypt’s railway system (in red), 1914.*

*Source: Herschlag (1964).*

The first decades of the century, specifically, from 1820 to the mid-1850s, were characterised by an improvement in both Ottoman and Egyptian terms of trade caused primarily by the rapid decline in the price of cotton goods and the slower decline of other manufactures, which constituted the main imports. The following decade, between the mid-1850s and 1865, represented a phase of uninterrupted decline in the Ottoman terms of trade, despite the rise in prices of primary commodities caused by the Crimean War and the American Civil War: Pamuk (1987:49) attributes the worsening in terms of trade to “the higher share of cotton manufactures imports than the share of Ottoman raw cotton exports”.

The improvement that followed between 1865 and 1871 can be ascribed to the return of prices of textiles to their normal level after the cotton famine. On the other hand, in Egypt the terms of trade continued improving till the 1870s owing to the predominant position occupied by cotton in the country’s composition of exports. The fall in cotton prices after the American Civil War was compensated for by the increase in value of cotton seed, wheat and beans after 1865 (see Table 3a). According to Owen (1969:179): “Looking at the period as a whole the evidence would suggest that Egypt’s position showed small improvements (in terms of trade) during the twenty-five years 1854 to 1879. That this was due almost entirely to cotton is yet another illustration of the way this one crop had now come to play a role of central importance in the Egyptian economy”.

The last decades of the century (from 1871 to 1896) coincide with the great depression (see Section 2.4) and mark a deterioration in the terms of trade of both Egypt and the Ottoman Empire owing to the faster decline in primary commodity prices compared to manufactures. This trend was reversed from the mid-1890s after the previous global price deflation, with increased demand for foodstuffs and raw materials from industrialised countries: prices of primary commodities rose faster than those of manufactures, thus generating an improvement of both Egyptian and Ottoman terms of trade. Table 1.2.2 illustrates the terms of the trade movements in the Empire computed by Pamuk (1987) using data on imports from, and exports to, the UK (1854-1913), France (1854-1913), Germany (1880-1913), Austria (1891-1913) and the US (1896-1913).
### Table 1.2.2: Trend in Ottoman terms of trade, 1854-1913 (Fisher price indices: 1880=100).

<table>
<thead>
<tr>
<th>Years</th>
<th>Terms of trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1854-6</td>
<td>113.7</td>
</tr>
<tr>
<td>1858-60</td>
<td>118</td>
</tr>
<tr>
<td>1865-6</td>
<td>91</td>
</tr>
<tr>
<td>1870-2</td>
<td>105.8</td>
</tr>
<tr>
<td>1888-9</td>
<td>85.8</td>
</tr>
<tr>
<td>1894-6</td>
<td>91.8</td>
</tr>
<tr>
<td>1911-13</td>
<td>106</td>
</tr>
</tbody>
</table>


Tables 1.2.3a and 3b indicate the price indexes of Egypt’s major exports to and imports from Great Britain. Between 1880 and 1913 (Table 1.2.3b), the specified two groups of imports, i.e. flour, rice, coffee, coal and tobacco on the one side and manufactured goods on the other, represented, respectively, 22 per cent and 20-25 per cent of all Egyptian imports.

### Table 1.2.3a: Price of major Egyptian imports and exports, 1854-1879. 1880=100.

<table>
<thead>
<tr>
<th>Egyptian exports to GB</th>
<th>Egyptian imports from GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>Cotton seed</td>
</tr>
<tr>
<td>1854</td>
<td>80</td>
</tr>
<tr>
<td>1855-9</td>
<td>99</td>
</tr>
<tr>
<td>1860-4</td>
<td>211</td>
</tr>
<tr>
<td>1865-9</td>
<td>195</td>
</tr>
<tr>
<td>1870-4</td>
<td>129</td>
</tr>
<tr>
<td>1875-9</td>
<td>105</td>
</tr>
</tbody>
</table>

<sup>a</sup> Exports to all countries.

<sup>b</sup> 1861-4 only.

<sup>c</sup> 1862-4 only.


### Table 1.2.3b: Price of major Egyptian imports and exports, 1880-1913. 1913=100.

<table>
<thead>
<tr>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flour</td>
<td>Rice</td>
</tr>
<tr>
<td>1880-4</td>
<td>146</td>
</tr>
<tr>
<td>1885-9</td>
<td>115</td>
</tr>
<tr>
<td>1890-4</td>
<td>100</td>
</tr>
<tr>
<td>1895-9</td>
<td>77</td>
</tr>
<tr>
<td>1900-4</td>
<td>85</td>
</tr>
<tr>
<td>1905-9</td>
<td>100</td>
</tr>
<tr>
<td>1910-2</td>
<td>113</td>
</tr>
</tbody>
</table>

<sup>a</sup> British exports to all countries.

<sup>b</sup> 1886-8 only.

1.3 Composition and patterns of trade and capital flows during the first wave of globalisation

The most influential forces which shaped the nature and direction of the Empire’s economy during the long 19th Century came from the international market and were connected with the substantial expansion in world output, triggered by the technological revolution in production and transport. As touched upon in the previous section, the Empire’s agrarian system shifted from production aimed primarily at self subsistence to cultivation of export crops for external markets.

The main stimulus to Ottoman agriculture which led to this process of agricultural commercialisation was, in fact, foreign demand which rose at varying pace until the First World War. Shocks in global demand had profound repercussions on the Empire’s production, thus testifying to its rising interconnection with the world market. For example, the Crimean War drove an increase in wheat exports in various Ottoman regions; the American Civil War led to a sharp rise in the output of cotton in Egypt and Anatolia, as well as of tobacco, grains, raisins and figs in other areas.

The pattern of specialisation of the Empire reflected the prediction of classical international trade theory: the development of primary commodity export was due to the higher abundance of land and labour over capital which made the relative price of agricultural goods cheaper than manufactures. Hence, agricultural output could expand for two main reasons:

a) Abundance of land: farming required a small amount of capital and a low level of fixed investments, other than irrigation;

b) Technological innovation was not strictly necessary and the old farming system was applied to new crops; hence cultivation could be extended to the margins set by technology.

International trade kept on growing during the century and in 1914 it represented a larger proportion of total trade than in 1800: the considerable intensification of the linkages between the Empire and the world market was visible through a substantial expansion of trade volume and value. Total exports from the Empire and from Egypt increased by 6.5 and 22 times, respectively, as depicted in Table 1.3.1a and 1b. The rates of export growth were

---

[31] Nevertheless intra-Ottoman trade continued to prevail over international trade and covered almost 75 per cent of Ottoman trade transactions.
particularly spectacular between 1840 and 1870 and in the period from the mid-1890s to WWI.

Table 1.3.1a: Ottoman foreign trade, 1830-1913 (annual average, in millions of pounds sterling).

<table>
<thead>
<tr>
<th>Period</th>
<th>Exports</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1830s</td>
<td>4.2</td>
<td>5.1</td>
</tr>
<tr>
<td>1840s</td>
<td>6</td>
<td>6.9</td>
</tr>
<tr>
<td>1850s</td>
<td>9.8</td>
<td>12.3</td>
</tr>
<tr>
<td>1860s</td>
<td>15.4</td>
<td>18.3</td>
</tr>
<tr>
<td>1870s</td>
<td>18.6</td>
<td>20.8</td>
</tr>
<tr>
<td>1880s</td>
<td>15.5</td>
<td>16</td>
</tr>
<tr>
<td>1890s</td>
<td>17.7</td>
<td>18.6</td>
</tr>
<tr>
<td>1900s</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>1910-1913</td>
<td>27.3</td>
<td>38.6</td>
</tr>
</tbody>
</table>


Table 1.3.1b: Egyptian foreign trade, 1823-1913 (annual averages in millions of Egyptian pounds).

<table>
<thead>
<tr>
<th>Period</th>
<th>Exports</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1823</td>
<td>1.455</td>
<td>0.656</td>
</tr>
<tr>
<td>1841-4</td>
<td>1.67</td>
<td>1.838</td>
</tr>
<tr>
<td>1845-9</td>
<td>1.836</td>
<td>1.631</td>
</tr>
<tr>
<td>1850-54</td>
<td>2.926</td>
<td>1.849</td>
</tr>
<tr>
<td>1855-59</td>
<td>3.683</td>
<td>2.58</td>
</tr>
<tr>
<td>1860-64</td>
<td>8.623</td>
<td>3.52</td>
</tr>
<tr>
<td>1865-69</td>
<td>11.712</td>
<td>5.203</td>
</tr>
<tr>
<td>1870-73</td>
<td>11.134</td>
<td>6.249</td>
</tr>
<tr>
<td>1875-79</td>
<td>13.595</td>
<td>4.685</td>
</tr>
<tr>
<td>1880-84</td>
<td>13.673</td>
<td>7.384</td>
</tr>
<tr>
<td>1885-89</td>
<td>12.27</td>
<td>7.947</td>
</tr>
<tr>
<td>1890-94</td>
<td>14.348</td>
<td>8.872</td>
</tr>
<tr>
<td>1895-99</td>
<td>14.787</td>
<td>10.249</td>
</tr>
<tr>
<td>1900-04</td>
<td>20.372</td>
<td>16.297</td>
</tr>
<tr>
<td>1905-09</td>
<td>26.81</td>
<td>23.805</td>
</tr>
<tr>
<td>1910-13</td>
<td>32.191</td>
<td>26.138</td>
</tr>
</tbody>
</table>


The fluctuations in trade flows during the long 19th Century can be divided into four phases:
- 1800-1840: A gradual shift in distribution of trade: from the second quarter of the 19th Century the axis started to swing from the Black Sea and Eastern Europe (Austria and Russia
were the main trading partners until the end of 18th Century) to Western Europe. Despite this, Ottoman–European trade increased at an annual rate below 1.5 per cent.

- 1840-73: The most spectacular period of trade expansion for both the Empire and Egypt. Agricultural production for the external market emerged, prompted by the signing of free trade treaties and by favourable terms of trade.

- 1873-96: The impressive trade expansion of the 1840s to the 1870s was interrupted by a long phase of stagnation for both economies which coincided with a period of global price depression. The phase of deflation and of economic downturn which took place simultaneously in all major economies was transmitted to the Ottoman Empire, thus generating a slower pace of external trade expansion.32

- 1896-1914: The end of the great depression opened a new phase of expansion for the global economy; the new positive world conjuncture, characterised by positive agricultural terms of trade, was transmitted to the Empire. The latter’s benefits were generated by two main factors: on the demand side, an upswing in the level of economic activities in industrialised countries led to higher rates of demand for Ottoman primary products while on the supply side the building of railroads and infrastructure by foreign capital facilitated trade expansion.

One of the most striking differences between the two areas of the Empire emerges from an analysis of the trend of per capita exports: in the phase following the 1880s export trade performance in the two areas followed two different paths: while Egyptian exports continued expanding both in absolute terms and per capita, in the Empire they did not change considerably in per capita terms in the three decades before the First World War, as illustrated in Table 1.3.2. Over the whole period Ottoman per capita exports expanded over three times whereas in Egypt they rose almost tenfold, thus demonstrating the higher degree of market orientation of the Egyptian economy.

---

32 The years between 1873 and 1878 were marked by political and socio-economic events of an extraordinary nature: the European financial crisis in 1873 led to the cessation of foreign lending to both the Empire and Egypt which, in turn, declared the impossibility of repaying their debt obligations and went bankrupt. Moreover, the war with Russia in 1877-8 caused considerable territorial losses in the Balkans.
### Table 1.3.2: Estimates of exports and population growth in the Ottoman Empire and Egypt, 1840-1914.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual exports in millions of ₤GB</th>
<th>Population in millions</th>
<th>Exports per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ottoman Empire</td>
<td>Egypt</td>
<td>Ottoman Empire</td>
</tr>
<tr>
<td>1840-2</td>
<td>2.8</td>
<td>1.6</td>
<td>12.8</td>
</tr>
<tr>
<td>1880-2</td>
<td>15.2</td>
<td>13.2</td>
<td>20</td>
</tr>
<tr>
<td>1910-2</td>
<td>26.9</td>
<td>31.5</td>
<td>25.4</td>
</tr>
</tbody>
</table>


The composition of exports demonstrates another significant dissimilarity between the two areas: Ottoman export commodities were diversified (see Figure 1.3.1) and did not change significantly throughout the century: in 1910, 90 per cent of exports were raw materials and foodstuffs. There was not a particular export crop that played a dominant role: no single commodity exceeded 15 per cent of total exports, so the Empire never approached conditions of monoculture. Some areas of the Empire switched production from subsistence to cash crops and became net food importers. For example Lebanon specialised in silk and Palestine in oranges. On the other hand, in Anatolia another trend was underway: cereals became an important part of the expansion of agricultural production; in fact in Turkey until the dissolution of the Empire in 1922 the vast majority of all cultivated land was still devoted to grains (84 per cent in 1909).

*Figure 1.3.1: Composition of Ottoman exports in 1897, values in millions of piatres.*

*Source: Inalcik, Quataert (1996: 833).*
The situation was quite different in Egypt, where cotton represented the leading export commodity (see Figure 1.3.2). Its share in total exports continued increasing over time and rose to more than 90 per cent at the beginning of the 20th Century. Specialisation in cotton came at the expense of other crops like wheat, beans and sugar, whose exported quantities declined after 1870.

Despite the difference in types of exports, the composition of imports was very similar in the two regions (see Figure 1.3.3 and 1.3.4) with textiles manufactures, especially cotton cloth and yarn, being the biggest imports. However, after 1870 the relative share of foodstuffs increased in both areas and by the end of 19th Century wheat, flour, rice, sugar, coffee and tea formed about one-third and one-fifth of all Ottoman and Egyptian imports, respectively.

*Figure 1.3.2: Composition of Egyptian exports in 1879.*

![Composition of Egyptian exports in 1879](image)

*Source: Owen (1969:166-171).*

*Figure 1.3.3: Composition of Ottoman imports in 1897, values in millions of piastres.*

![Composition of Ottoman imports in 1897, values in millions of piastres](image)

*Source: Inalcik, Quataert (1996:833).*
Britain was the dominant trading partner for both areas (superseding France’s dominance which lasted until the revolution of 1789) and played a particularly important role as the exporter of cotton textiles both to the Empire and globally (see Table 1.3.3).

Table 1.3.3: British cotton goods and total exports to Turkey and Egypt, annual averages in British £.

<table>
<thead>
<tr>
<th>Year</th>
<th>Turkey Cotton goods</th>
<th>Turkey Total exports</th>
<th>Egypt Cotton goods</th>
<th>Egypt Total exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1825-6</td>
<td>465,761</td>
<td>600,543</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1827-9</td>
<td>326,497</td>
<td>428,655</td>
<td>27,939</td>
<td>49,377</td>
</tr>
<tr>
<td>1830-4</td>
<td>824,576</td>
<td>1,036,166</td>
<td>81,968</td>
<td>130,138</td>
</tr>
<tr>
<td>1835</td>
<td>1,062,781</td>
<td>1,331,669</td>
<td>131,672</td>
<td>269,225</td>
</tr>
<tr>
<td>1836-9</td>
<td>1,119,943</td>
<td>1,466,569</td>
<td>198,120</td>
<td>200,844</td>
</tr>
<tr>
<td>1840-4</td>
<td>1,365,657&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1,564,447</td>
<td>179,328&lt;sup&gt;1&lt;/sup&gt;</td>
<td>237,444</td>
</tr>
<tr>
<td>1845-9</td>
<td>1,833,197</td>
<td>2,350,184</td>
<td>307,114</td>
<td>494,824</td>
</tr>
<tr>
<td>1850</td>
<td>1,975,059</td>
<td>2,515,821</td>
<td>354,427</td>
<td>648,801</td>
</tr>
</tbody>
</table>

<sup>1</sup> Excludes 1841.


The fluctuations in Ottoman trade flows not only mirrored various fluctuations in the global economy, but were also influenced by the trade policy strategies adopted by the central authority in Istanbul (and consequently imposed onto Cairo). We can identify four different trade policy phases, following Inalcik and Quataert’s division (1996:762-3):

1. 1800-1826: Restrictive economic policy. This period was characterised by an extensive use of state monopolies and government interventions aimed at stimulating...
domestic production. Until the end of 18th Century the state levied duties of 3 per cent on both imports and exports, after which they rose five times or more, taking into account the fact that the Ottoman currency had depreciated in value. The state generated a series of prohibitions on imports and tried stimulating exports, following a mercantilist policy.

2. 1826-1860: Free trade and the gradual abolition of state monopolies, achieved through various trade conventions and domestic legislation, was implemented during the Tanzimat period. Moreover, the abolition of the Janissary corps (1826) eliminated the best organised group defending guild monopolies and protectionism. The 1838 Anglo-Turkish convention and the Hatt i-Serif (Imperial Script) of the following year represented another hallmark of Ottoman commitment to economic liberalism, fixing tariffs at 5 per cent and export duties at 12 per cent.

3. 1860-1908: A small raise in import duties, testifying to a gradual drift from free trade to domestic protection; restoration of some monopolistic privileges. Ongoing monetary instability, increasing treasury debt, as well as producers’ demands for protection reversed the trend toward freer trade: accords in 1861-2 raised import tariffs from 5 to 8 per cent and lowered export duties from 12 to 1 per cent.

4. 1908-1914: Rising protectionism; tariffs were raised to 11 per cent in 1914 and 15 per cent in 1915.

Despite the considerable expansion in trade volume and value, the extent to which the Ottoman economy came to be connected with the world market differed from area to area: in some regions the first signals of these changes became manifest in the early years of the 19th Century (and in some cases even in the last decades of the 18th Century) particularly in port cities like Salonika, Aleppo, Alexandria and Izmir. The expansion of cash crops grown for export, like cotton in Egypt and silk in Lebanon, brought millions of cultivators into contact with the global market, while other commodities such as tobacco in Syria, dates in Iraq and coffee in Yemen followed a slower path in the process of market expansion. On the other extreme of the spectrum, in Arabia and in parts of Sudan the vast majority of the population continued living in a subsistence economy.
1.3.1 Capital flows

Another important component of the Empire’s involvement in the world economy stems from its participation in the global capital market. During the long 19th Century the Ottoman Empire attracted a considerable amount of foreign capital, predominantly in the form of financial flows (see Table 1.3.4) through external borrowing: after the contraction of the first loans in the 1850s-60s borrowing intensified, particularly in the early 1870s. Before WWI state debt absorbed, respectively, two-thirds and one-half of Ottoman and Egyptian capital inflows. This made both regions the most highly indebted countries in the world between 1870 and 1914. The remainder of the capital inflows took the form of foreign direct investments, the amount of which rose considerably in the late 1880s.

Table 1.3.4: Public debt of the Ottoman Empire and Egypt 1876-1914.

<table>
<thead>
<tr>
<th>Year</th>
<th>Public debt in millions of £</th>
<th>Public debt per capita in £</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ottoman Empire</td>
<td>Egypt</td>
</tr>
<tr>
<td>1876*</td>
<td>210</td>
<td>98.7</td>
</tr>
<tr>
<td>1914</td>
<td>142</td>
<td>96.6</td>
</tr>
</tbody>
</table>

* Egypt’s data are for 1878.


Capital inflows were utilised in different ways in the two areas: borrowing in the Ottoman Empire was mainly directed at financing military expenditure or at imports, with a very small share of capital invested in agriculture or infrastructure. On the other hand, the Egyptian government used a large portion of the foreign loans to sponsor projects of agricultural modernisation, with a particular focus on developing the irrigation system.

Foreign direct investments were aimed at expanding agricultural exports, but were much higher in Egypt, both in absolute and per capita terms (see Table 1.3.5). Moreover, they were directed to different sectors: in the Empire, most FDIs were directed to railway construction, infrastructure in the coastal regions, banking, trading and mining (see Table 1.3.6). The most intense phase of foreign investments occurred between 1888 and 1896, at the time of the French and German inter-imperial rivalry, which took the form of railroad building. This period marks a steep decline in the involvement of British capital: its supremacy, established

33 The first Ottoman state loan from Europe was contracted during the Crimean War, while the first Egyptian loan was taken out at the time of the American Civil War.
during 1860-70 when Britain had the largest share of the Empire’s FDIs, declined sharply from 56 per cent in 1888 to 15 per cent in 1914.

*Table 1.3.5: Foreign direct investment in the Ottoman Empire and Egypt.*

<table>
<thead>
<tr>
<th>Year</th>
<th>FDI in millions of £</th>
<th>FDI per capita in £</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ottoman Empire</td>
<td>Egypt</td>
</tr>
<tr>
<td>1888</td>
<td>15.8</td>
<td>23.4</td>
</tr>
<tr>
<td>1914</td>
<td>74.3</td>
<td>111</td>
</tr>
</tbody>
</table>

*Source: Pamuk (1992:46).*

In Egypt the vast majority of foreign investments were connected with the land and cotton boom. Pamuk (1992:48) suggests that 75 per cent of FDI in Egypt were related to the purchase and reclamation or rural land, primarily cotton land. The highest level of external involvement in cotton, mainly British, started around 1893 and remained high at the turn of the century, owing to a spectacular rise in land prices. Foreign investment was considerable in railroad and other infrastructure as well, with the Suez Canal Company attracting 18 per cent of FDIs in 1913 (see Table 1.3.6).

*Table 1.3.6: Sectoral distribution of foreign direct investments in the Ottoman Empire and Egypt in 1914.*

<table>
<thead>
<tr>
<th>Sector</th>
<th>Ottoman Empire</th>
<th>%</th>
<th>Egypt</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railroads</td>
<td></td>
<td>63.1</td>
<td>Mortgage companies</td>
<td>50.4</td>
</tr>
<tr>
<td>Banking</td>
<td></td>
<td>12</td>
<td>Canals and transport</td>
<td>20.3</td>
</tr>
<tr>
<td>Commerce</td>
<td></td>
<td>5.8</td>
<td>Agricultural and urban land</td>
<td>11.4</td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td>5.3</td>
<td>Banks and other financial</td>
<td>5.5</td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
<td>5.1</td>
<td>Manufacturing, commerce, mining</td>
<td>12.4</td>
</tr>
<tr>
<td>Ports</td>
<td></td>
<td>4.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td></td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td>0.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Pamuk (1992:47).*

1.4 Landholdings and agricultural investments.

An analysis of the Ottoman landholding regime is a key factor in understanding the relations and methods of agricultural production in the Empire, as it constituted the framework around...
which agricultural commercialisation was structured. In most of the Empire rural holdings were based on small plots of land, with a similar situation in Egypt, even if production there in large or medium commercial farms was more widespread. Nevertheless, the creation of large estates (which began during Muhammad Ali’s rule) did not change the socio-economic structure of agricultural production: peasants remained in the small plots as sharecroppers or labourers. The following paragraphs discuss cultivation techniques, landholdings and agricultural investments in the Empire and Egypt, reflecting upon differences and similarities.

The Ottoman Empire

From the end of the 16th till the end of the 18th Century the Ottoman territory was divided into large properties organised according to the timar system, where the sipahi (cavalryman), when not performing military services in wartime, collected taxes on behalf of the state. Under this system the sipahi, who possessed tenure of state land in perpetuity, leased it to small peasants in exchange for rent paid in kind, cash or labour services (corvée). This land tenure pattern, called çift-hane, was structured around small holdings, the size of which was limited to the area that a pair of oxen could plough.

The timar system was abolished and replaced at the beginning of the 19th Century by the tax-farming system (iltizam) through which the Ottoman state organised auctions to sell the right to collect revenues for a period of three years. Thus a new class of tax farmers (mültüzim or ayan) emerged from the ranks of the wealthy merchants, bankers, state officials and notables to intervene between the state and the peasants. This particular structure of the Empire gave way to the formation of locally controlled units owned by a class of landed aristocracy who aimed at tax-revenue maximisation from their peasant tenants (reaya). In the years when productivity was low the peasantry were forced to borrow money to meet the tax farmer’s demands, and they often ended up working on his field as corvée labour or, more rarely, losing their land.

With the introduction of the tax-farming system, small ownership continued being the most prevalent form of land organisation (see Table 1.4.1): in 1859 smallholdings accounted for

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34 According to the çift-hane system, each peasant household (hane) held a right to tenancy on state-administered land as long as the latter was cultivated. The size of the peasant farm (çift), originally defined as the land that one farmer and two oxen could plough in one day, was deemed adequate for the subsistence of one family.

35 Large-scale landholdings, called çiftliks, were also present in the Empire, but they were not the most prevalent form of land tenure. The three main forms of çiftliks were:
82 per cent of cultivable land; in 1914 they numbered over one million and covered 75 per cent of the arable land (Issawi, 1980b).

Table 1.4.1: Land ownership, land distribution and forms of tenancy in the Asiatic provinces of the Ottoman Empire, 1869.

<table>
<thead>
<tr>
<th>Size of holding</th>
<th>Form of operation</th>
<th>Form of ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mülk -private property- (0.70)</td>
</tr>
<tr>
<td>Small: 2 to 20 ha.</td>
<td>Small peasant ownership; owners as direct producers</td>
<td>Av. 6 ha. per holding</td>
</tr>
<tr>
<td>(0.75 to 0.825)</td>
<td></td>
<td>kehr</td>
</tr>
<tr>
<td></td>
<td>Small owners to small tenants; mostly sharecropping, some fixed rent</td>
<td>Av. 8 ha. per tenant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>kehr</td>
</tr>
<tr>
<td>Large: over 20 ha.;</td>
<td>Large owners to small tenants; mostly sharecropping; some fixed rent, some year-round wage labourers; in addition 200,000 seasonal wage workers</td>
<td>Av. 8 ha. per tenant.</td>
</tr>
<tr>
<td>av. 120 ha. (0.175 to 0.25)</td>
<td></td>
<td>kehr</td>
</tr>
<tr>
<td></td>
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<td>kehr</td>
</tr>
</tbody>
</table>

*Note:* Figures in parentheses represent shares in total cultivable land. Percentages represent shares in total number of households in agriculture.


1) The *çiftlik* land leased to tenants;
2) Land cultivated using wage labour (with workers being paid in kind or in cash);
3) Land rented to the *reaya* on a sharecropping basis, the rent being in kind or sometimes in cash in the form of a lump sum. This was the most common practice and usually followed a 50-50 division, with the sharecropper paying the taxes before dividing the produce.

During the 19th Century these big landed estates, which employed dependent peasants, increased their involvement in the world economy through engagement in commercial agriculture. There is common agreement within the literature that the *çiftlik* were not large-scale managed units or plantation-like farms, that is to say, large agricultural lands organised as a production unit under a single ownership and management. Furthermore, the main aim of the *çiftlik* owners was not to increase profits from commodity trade, as they had access to a substantial share of the agricultural surplus. The *ayans* remained content to exploit the tax-collecting relationship, to consolidate and diversify their revenue basis and to increase the tax burden on the direct producers (Keyder, 1991). Therefore they did not interfere in the organisation of production, which was left to the peasants alone, nor did they attempt to reorganise labour either.
Land was cultivated in an extensive way and was left fallow every two or three years. In general, land prices followed fluctuations in world market conditions for agricultural commodities: they rose between 1840 and 1870 (they increased by 75 per cent between 1840-44 and 1859 and kept on increasing until the 1870s), declined during the great depression and rose again in the two decades before the First World War, particularly in the cotton areas of Izmir and Adana. The availability of marginal land meant that in times of high world demand the land could be brought under cultivation. The relationship between land and labour was favourable to the farmers: those who owned a pair of oxen and the most rudimentary implements (i.e. the most important means of production) could cultivate their own land. If land was not available, then they sharecropped for small or large landlords. If they didn’t have oxen and couldn’t borrow, they offered their labour as sharecropping tenants to large landowners.

Various governors, starting with Mahmoud II, attempted throughout the century to abolish tax-farmers and replace them with state employees; all these efforts (for example, the Gulhane edict in 1839, a rescinding order (firman) in 1842, the 1856 Hatt-i Humayun\textsuperscript{36}, another firman in 1880) did not bear any fruit and in the early 20\textsuperscript{th} Century tax farming accounted for more than 95 per cent of all the tithe revenues collected (Inalcik and Quataert, 1996). The continued prevalence of tax-farmers and the failure of the attempt to abolish them illustrate how the class of notables exerted great influential political, economic and social power.

The common features of the agricultural lands within the Empire have been identified by various economic historians as abundance of land, scarcity of labour and capital and high transport costs (Issawi, 1980b): reflection upon these characteristics can provide a quite useful insight for understanding the development of the Ottoman Empire’s participation in the global market. In fact, it was exactly this form of agricultural production, based on small peasant farms, that agricultural commercialisation was shaped upon.\textsuperscript{37} Tax-farmers obtained produce from the cultivators and directly sold it to export houses or merchant intermediaries: both landlords and merchants employed debt mechanisms to control the peasants and extract

\textsuperscript{36} The Hatt-i Humayun was an imperial edict of fundamental importance, proclaimed during the period of reforms (Tanzimat) initiated by the Ottoman government in the 1830s. It promised equality in education and government appointments, and administration of justice to all regardless of religious creed.

\textsuperscript{37} In Izmir, for example, the largest proportion of cultivated land was divided in small holdings of the size of three to twenty acres.
agricultural surplus, which led eventually to rural indebtedness, especially after 1873 with the onset of the global price decline.

Investments in farming were scarce: as mentioned above, tax-farmers did not have incentives to increase productivity and the peasants were usually small landholders who consequently did not have the financial opportunities to extend production and to improve the quality of the crop. Almost all peasants lived on subsistence and had to pay a tithe (دعاء) for the use of the land in the form of an agricultural tax; this was generally fixed at 10 per cent (until 1880) and then to 12.63 per cent (until 1914) of the land’s gross yield and was collected in cash or in kind either through tax-farmers or, less frequently, directly through the government. In addition to the tithe, the government imposed an animal tax (اغنام فيضيني), thus putting further pressure on the farmers’ income (animals constituted, in fact, their main capital asset). When the taxes were collected by tax-farmers, higher rates were often imposed and, owing to ineffective government controls, the cultivators were unprotected from the abuses of the iltizam system.

Other problems affected negatively affected farming output were related to a limited availability of credit, a lack of skilled farmers, an inadequate irrigation system and a scarcity of labour: the labour force was not commercialised and, as a result, was almost immobile. Moreover, until 1870 domestically produced goods transported within the Empire were subjected to a 12 per cent custom duty.

Big tax-farmers were also reluctant to make investments in cultivation because of the lack of property rights (Mihi and Mihi, 2002). The Ottoman political and legal system in fact never developed a category of alienable property rights. This factor, together with labour scarcity and the presence of a bad irrigation system, prevented the improvement of agricultural productivity and the development of a strong export market.

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38 When the tithe was collected by the government it was either sent to the military for consumption or sold at public auctions.

39 Until the Land Code of 1858 the legal framework for the landholding of agricultural lands in the Ottoman Empire was provided by the Islamic Law (شريعة) and the state laws (أخرى فضلي) issued by the Sultan. Absolute property rights for subjects were never recognised, and the Sultan owned the entire realm.
Together with the establishment of tax-farming, there are two other notable features of the land tenure system: the Land Code of 1858 and the granting of ownership rights to foreigners in 1867.

The former was aimed at maintaining stability of tenure and at taxing every plot of land, although, despite its granting of the right to hereditary possession and use of the land, it did not represent an entitlement to ownership which continued to belong to the state.

Some improvements in technology and capital investments occurred in the late 1860s mainly due to initiatives of foreigners who acquired property rights.

State involvement in the development of agricultural practices by investment was meagre; some achievements were attained only during the Hamidian period (in the late 1880s and at the beginning of the 20th Century) with the establishment of agricultural schools and model fields, through the practice of seed distribution and when, in 1888, the Agricultural Bank (Ziraat Bankasi) was founded; the latter provided cultivator loans and founded development programs.

**Egypt**

Until the end of the 18th Century Egypt was administered along the lines of the rest of the Ottoman Empire, and according to the tax-farming system. These relations of production changed when Mohammad Ali became the governor of Egypt in 1805: all iltizams and waqf40 (pious endowments) holdings were confiscated and the state’s right of ownership over the land was reasserted. All agricultural land thus became state property and was divided into plots cultivated by the various fellahin (farmers) who had to pay one single unified tax called the kharaj. The iltizam system was replaced by a monopoly system (ihtikar) which relied upon a centralised landed aristocracy, loyal to Ali personally. The ihtikar was aimed at developing an export-oriented economy in which the commercial power was in the hands of the state. This system was structured around three essential characteristics:

- Taxes were collected directly by government officials, who received a salary;
- All agricultural production had to be sold to government officials at a fixed price (below market price);
- Both internal and external trade were monopolised.

40 The waqf (pious foundations held in mortmain) were exempted from taxation in the Ottoman Empire, as their activities were directed to charitable purposes.
All agricultural production was organised according to the state monopoly system: Muhammad Ali fixed the price at which produce was bought by the farmers and then resold in the international market with a higher mark up. Most of the government’s efforts in agricultural development were devoted to long staple cotton, which became the leading Egyptian export and its cultivation expanded steadily over the century, stimulated by large-scale irrigation projects.

A major change occurred at the end of the 1830s, when the state monopoly system was undergoing a decline and was gradually abolished subsequent to the Anglo-Ottoman Commercial Treaty of 1838. A decentralisation process followed that gave birth to a new system similar to the previous one that had been centred on *iltizams*. This practice led to the rise of a new class of intermediaries acting between the state and the peasants who received land grants from the government in return for tax collection. These grants, which were at the basis of the creation of large estates (*çiftliks*), marked a change in the balance of rural power, thus weakening the position of the state and giving origin to a privileged rural class: estate holders (*muta‘ahhids*) and village *sheikhs* (religious leaders) were able to use the power previously exercised by the government. During this period a larger and larger portion of cotton was grown both by wealthy landowners and by members of the royal family. Roger Owen (1969) reports that the estates of ‘Abbas and Ibrahim alone, who both ruled Egypt after Muhammad Ali’s reign, produced three-eighths of the total Egyptian crop. The new class of intermediaries possessed the most easily irrigated land and paid a lower land-tax.

The change in tenurial relations was accompanied by a considerable improvement in infrastructure, aimed at a establishing a more efficient access to foreign markets. Between the 1850s and mid-1870s the length of the railroad tripled: in 1856 the Alexandria-Cairo railroad was built and the Cairo-Suez line was finished; harbour facilities at Alexandria harbour were improved and a large program of irrigation work was undertaken. The increase in government spending was financed by the imposition of heavier taxation on peasants or through external borrowing.

The land-tax, which supplied over half of total state revenue in the 1860s, began to rise as soon as the cotton boom was over and by 1868 the Consul of Alexandria was reporting that the *fellahin* (farmers) then paid 70 per cent more than what they paid in 1865 (Owen, 1969). The effect of rising taxation forced an increasing number of *fellahin* into debt, while others
had to give up their land thus swelling the numbers of landless workers; the latter formed roughly one-third of the rural population. This phenomenon was much more acute in Egypt compared to the rest of the Ottoman Empire.

Between 1882 and 1914, during the years of British occupation, European property laws were applied and thus land tenure underwent several changes: landowners reinforced their economic position and, aided by the eased availability of credit facilities and mortgage banks, enlarged the size of their estates. At the same time, the level of rural indebtedness continued to rise because of mortgages on land, the purchase of property on credit and the loans made to small cultivators by usurers.

A key difference between the Egyptian and Ottoman agricultural sector can be seen in the role of the state and its direct intervention in the economy. In Egypt export expansion was supported by a large number of infrastructure investments, (for example in the railroads and the irrigation system) initiated by the various governors who ruled the country. However, these far-reaching changes did not occur in the rest of the Empire where investments in production remained low. Furthermore, Egypt enjoyed a much more developed credit system, dominated by European capital.

Another crucial reason for the dissimilar development between the two regions can be linked back to the different power relations among various socio-economic agents. Both societies underwent a process of transformation and centralisation during the 19th Century, which led to a relative strengthening of the central government vis-à-vis other social classes such as large landowners, merchants and farmers. This phenomenon can be identified, in the Empire, by the government’s choosing to keep agricultural production based on small and medium-size farms with the aim of maintaining its tax base as well as of preventing the empowerment of large landlords or foreign investors. So, small peasant holdings were the main productive units that provided commodities for both the domestic and external markets. Obviously, farmers did not have the capacity to improve land productivity and, therefore, during the 19th Century, agricultural technology and organisation of production changed very little.

In Egypt, on the other hand, different social relations characterised agricultural production. Even though a large part of cultivation remained centred around small or medium-sized peasant farms, large estates, and particularly those belonging to the Royal family (that owned
the largest agricultural estates), played an essential role in increasing agricultural productivity through an active engagement in investments.

Thus, the dynamic involvement of the government in export promotion (predominantly directed towards cotton) allowed Egyptian agriculture to undergo a more far-reaching transformation than the rest of the Empire and to become a much more export-oriented economy.

1.5 Trade networks

The vital link connecting networks of production in the hinterland of the Empire with the world market was embodied by a large group of merchants: through the activities of these intermediaries, most of whom were also moneylenders, thousands of units of production dispersed throughout the Ottoman countryside came to be interconnected with a marketing system which responded to both domestic and global incentives.

Thus, merchants played a pivotal role in external trade as they formed the essential link between the domestic and the international market. During the 19th Century the Ottoman merchant community was made up of three main categories: local Muslim traders, local non-Muslim traders (Greek-Orthodox, Jews and Armenians) and foreign traders. The common perception was that import and export trade activities between the Ottoman Empire and the West were controlled by non-Muslim religious minorities, who, by the start of the 19th Century, dominated the Empire’s commercial life.\(^{41}\) This perspective is complemented by recent studies that outline the active role of Muslim big merchants (\textit{tujjar}) in the Ottoman international trade sector. Gilbar (2003), in particular, emphasizes that Muslim traders were prominent in specific regional areas, but not in all large commercial centres. They played a crucial role in what he defines as “the eastern crescent” (i.e. most of Iran, the inland region of \textit{bilad al-sham}\(^{42}\) and northern Iraq, the eastern regions of the Arabian peninsula and Sudan) where they competed intensively with other traders. On the other hand, their activities were limited in the “western crescent” (i.e. the Eastern Mediterranean, the Aegean and the Black Sea) where in major port cities of Istanbul, Izmir and Alexandria international trade was dominated by non-Muslim and foreign merchants.

\(^{41}\) See Hourani in Polk and Chambers (1968); Quataert (1993) and Kuran (2004).

\(^{42}\) The term \textit{bilad al-sham} pertains to the region comprising today’s Lebanon, Syria, West Bank and Gaza, Jordan and Israel.
Overall, foreigners and non-Muslim minorities enjoyed commercial advantages relative to their Muslim counterparts because of the different legislation under which they conducted business. Islamic legal pluralism was observed in the Empire: this system allowed minorities, unlike Muslim subjects, to choose which jurisdic
tional system to follow. While during the 18th Century non-Muslims tended to follow Islamic Law on commercial and financial matters, with the economic rise of Europe prompted by the industrial revolution, they switched to Western legislation. The privileges of foreign traders stemmed from the so-called system of Capitulation which granted them trade tax exemptions, consular protection and assured the non-interference of the Ottoman state in settling commercial disputes. Thus non-Muslims who acquired the protection of a foreign state (berat holders) gained favourable conditions for establishing networks with Western Europe. Through the adoption of European commercial codes one particular form of organisation emerged among minorities in the 19th Century: the merchant house. The latter embodied a form of partnership that included multiple members, with branches spreading into the whole Ottoman territory.

The commercial and maritime network of the Greeks represents a significant example of international trade dominance by a non-Muslim minority that played a fundamental role in promoting Ottoman trade in an increasingly integrated international economy. Greek trade activities were particularly prominent in large-scale international commerce which was structured around a network of cooperation with other Greek communities in the major Ottoman port cities, in the Mediterranean and the Black sea ports, in Western Europe and the US (see Map 1.5.1). The Ralli brothers were one of the most influential Greek families: their trade network involved mainly in bulk cargoes such as grain, cotton and wool, covered the principal Mediterranean ports (Constantinople, Izmir, Trieste, Venice and Alexandria) and had branches in London, Marseilles, Liverpool, Manchester and Odessa. The Liverpool Journal of Commerce reports that in 1850 the Liverpool branch of the Ralli Brothers (Schilizzi, Papayanni and Tymbas) handled 41 per cent of goods arriving at the port of Liverpool from the Eastern Mediterranean and the Black Sea. According to the London Custom Bills of Entry in 1860 the share rose to 57 per cent, taking into account all British ports.

Ottoman protégés gained the right to be judges in consular courts, even in a court on European soil, if Muslims were not involved in the dispute.
What made the Greek enterprises successful in promoting Ottoman globalisation and expanding international trade was not only their interconnected commercial establishments but also the trade strategy they adopted, which in turn was based on the organisational structure of the firms.

Map 1.5.1: The Greek commercial and maritime network, 1830-60s; number of families at the port cities of the network.

The structure of a Greek enterprise such as that of the Rallis’ bothers resembled that of a multinational, with one office fulfilling the function of a mother company, while others acted as branches. Family control and kinship were the primary characteristics of the network, upon which the trust between members was founded. Intermarriage was quite frequent as an instrument to strengthen trust among merchant families: all twenty-eight of the most powerful Greek trader families were, in fact, closely related by intermarriage (Harlaftis, 1996:52).

Another important factor that facilitated trade expansion stems from Greek methods of trading, designed to cut costs and control markets. The essential element of Greek strategy was the purchase of produce directly from the farmers or big landlords in order to avoid
intermediaries. Knowledge of local languages and customs made accessibility to the markets easier for the Greeks compared to European traders. Most merchants had the role of moneylenders as well. Money was lent at usurious terms to small farmers who often had to pre-sell their goods at a reduced price to repay the debt. This form of control reinforced the power of the Greeks over the internal networks in the hinterland of each port, thus working in parallel with the external network. At the same time, Greek firms also promoted the imports of Western European commodities in Ottoman cities.

The other major Ottoman non-Muslim minorities, the Armenians and the Jews, like the Greeks succeeded in building organisational skills and durable enterprises including complex partnerships, joint-stock companies and business corporations, which enabled them to remain competitive and to consolidate their position in import and export trade. On the other hand, the judicial constraints imposed by Islamic law, in particular linked to matter of inheritance practices, led to a fragmentation of the estates of big merchants, thus keeping Islamic commercial partnerships small. Nevertheless, it is important to emphasise that trade networks were not necessarily defined along religious or ethnic lines and sometimes saw the cooperation of minorities, Muslims and Europeans. For example, the Egyptian Kafr El Zayat Cotton Company was formed by Greeks, Jews, Lebanese, French and British traders.

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44 The Islamic inheritance system based on the Qur’an limits the individual’s testamentary privileges to one-third of his estate, while the remaining two-thirds were divided among children, spouses, parents and siblings.
2. The global development of the cotton market and its repercussions for the Ottoman Empire

This chapter undertakes an analysis of the global development of cotton trade and production during the 19th Century, based on an examination of the role that cotton played in the economic relations among nations during the first wave of globalisation. Attention will be focused on the impact of the changes in the world cotton industry on the Ottoman textile sector and, more generally, on its economic structure.

In the 19th Century cotton production and trade assumed a crucial significance for the world economy, owing to the fundamental role the raw material played in the process of the Industrial Revolution. Cotton became “the core input of the world’s most important manufacturing industry, in terms of amount of labour employed, value of output and profitability” (Beckert, 2004:1408). Moreover, many of the technological innovations of the 19th Century first appeared in the cotton textile industry, thus leading to unprecedented increases in productivity and to a rapid reduction in prices which transformed cotton into a mass commodity.

The amplified demand for textiles was matched by an expansion in supply through the creation of a large raw cotton market: thus, cotton became a global commodity, linking together peasants, merchants, mill workers, industrialists and consumers all over the world. This is how the cotton industry came to symbolise the changes that occurred in the structure of the global economy which gave rise to industrialised countries in Western Europe seeking both markets for their manufactured products as well as cheap sources of raw materials. The Ottoman Empire was one of these markets and fully participated in this process of global change during which its own political and economic structure was deeply affected and modified. The Empire moved from simple self-sufficiency in textile production to becoming, after the 1820s an exporter of cotton fibre and an importer of manufactured cotton goods, thus following a similar trajectory to that of other developing countries (for China see Grove, 1997; for Japan, whose experience differed from other non-Western economies, see
Tanimoto, 2005; and for the heavily-studied Indian textile sector see, for example, Ray, 2009; Peers, 2006; Roy, 2002 and Gekas, 2006). The Indian narrative provides the archetypical story of de-industrialization caused by the penetration of British imports. Thus, the impact of European industrialisation on both the Ottoman and Indian textile industries can be examined as a conceptual whole, the analytical framework of which rests on the effects of the triumph of mechanised production on patterns of trade and production globally, and on the consequences of industrialisation and de-industrialisation.

The chapter opens with an analysis of the dramatic expansion of global cotton production and trade and then explores Ottoman cotton commercialisation in order to provide an insight into the participation of the Empire in the transformation of the international economy. The last three sections of the chapter focus specifically on three major phases of development of the world textile industry during the long 19th Century and on their repercussions for the Ottoman Empire. The three phases examined are the American Civil War, the “great depression” and the years before the First World War.

2.1 Cotton production and trade during the Industrial Revolution: the making of an empire without parallel

“Whoever says Industrial Revolution says cotton”
E. J. Hobsbawm (1969:56)

“Flax and wool, silk and jute have each played their own role in history. They are, however, far surpassed in historical importance by the cotton fibre. That fibre, both as a raw material and as a manufactured product, came to exert an incredible degree of global influence.”
Farnie and Jeremy (2004)

The rapid development of the cotton market during the 19th Century, together with its international diffusion and its revolutionary impact on the structure of the global economy is
recognised as one of the most spectacular and significative stories of modern economic history.

Cotton (*gossypium*) as a fibre has been cultivated since the beginning of human history: pieces of spun cotton yarn have been found in various parts of the world, from the Indus Valley to Dacca, to China, pre-Inca Peru, Mexico and Arizona, dating back to between 3500 and 2500 BC. The earliest written accounts of the presence of cotton are reported in two ancient texts: the Chinese Shu-king and the Hindu Rig-Veda. From 500 BC cotton has been found in the Middle Eastern civilisations of Mesopotamia, Babylon and Egypt.\(^{45}\)

Despite the fact that cotton has been grown, spun and traded for centuries,\(^{46}\) its enormous significance was not recognised until roughly the end of the 18\(^{th}\) and the 19\(^{th}\) Century when it began to play a pivotal role in the development of the global economy which during that period was undergoing rapid and unprecedented transformation.

In the 19\(^{th}\) Century cotton became the emblem of a new era and impressed the imagination of the world owing to a peculiar combination of features. It has been identified as the cradle of industrial capitalism, as the archetype of modern industry; it has been indissolubly associated with the Industrial Revolution, with the “first industrial city”, Manchester, which acquired the nickname of Cottonopolis, and the “first industrial society”, Lancashire. Not only did cotton symbolise the rapid technological advances and increased productivity embedded in the age of the factory; it was also the icon of international economic integration, thanks to the worldwide expansion of its commerce.

Moreover, in the eyes of Karl Marx and Friederich Engels, cotton represented a potential engine for social change: to them the mill was not simply an engineering triumph, but was, rather, a typical model of how machinery and large-scale industry shaped the transformation in the mode of production that would yield a social revolution.\(^{47}\) Thus, Marx’s model sees the technology embedded in the capitalist system as the factor defining its “relations of production” and determining its social structure, inevitably leading to a class conflict between the proletariat and the bourgeoisie. For Engels the cotton industry represented the

\(^{45}\) The word cotton, derived from the Arabic *qutun*, began to be used around 1400.

\(^{46}\) The first record of English trade dates back to the late 15\(^{th}\) Century; by 1600 cotton was imported from Antwerp, Sicily, the Levant and Lisbon through London, the primary port, superseded later by Liverpool (1709); by 1795 the majority of British cotton imports passed through Liverpool (around 17000 bales).

\(^{47}\) Numerous visits to Manchester by Marx (and Engels) fed the reflections which gave birth to “Das Kapital”. 
embracing the capital and the “unjust generator of surplus capital” which would have led to a revolutionary social change.\textsuperscript{48}

The aim of this section of the chapter is to gain an understanding as to why the cotton industry has so often been held as a prime example of the 19\textsuperscript{th} Century global economy. To this purpose it is necessary to clarify the ways in which cotton was contributing to the rapid changes transforming the economic structure of the world during the so-called first wave of globalisation (1850-1914). It is, therefore, essential to examine the role that cotton, both as a raw material and as a manufactured commodity, played in the trade linkages among nations and in the establishment of new market networks.

Furthermore, an exploration of the global structure of cotton production will enable us to comprehend how the Ottoman Empire fitted into the world-wide web of cotton, and to understand the repercussions this had on the Empire’s own economic structure and orientation. The transformations that the world economy was undergoing impacted on the Empire in its trade relationships, in its role in the global division of labour and in its position as recipient of capital inflows.

It will be argued in this study that the pivotal role played by the cotton industry during the 19\textsuperscript{th} Century had two main aspects:

1) Its contribution in spurring the effects of the Industrial Revolution: the technological innovations applied to the cotton industry, coupled with those of the transport sector, led to dramatic improvement in productivity as well as to a very rapid expansion of the cotton industry’s market. Moreover, the pioneering adoption of power-driven machinery and improvements in factory organisation transformed cotton into a mass consumption commodity.

2) Its global expansion and the international trade linkages it created prompted by the influence of the new free trade creed: the cotton industry’s global outreach and the connections it engendered between farmers, traders, manufacturers and consumers all around the world made it a symbol of the “first wave of globalisation”.

\textsuperscript{48} Engels (1845).
The following analysis will explain in more detail this twofold process and will focus upon cotton’s contribution to both manufacturing, through the technology embedded in its production, and commerce, through the creation of global trade networks.

2.1.1 Technological progress and productivity gains

Up until the 18th Century world cotton trade and distribution occurred on a small scale; most cotton woven goods were imported into Europe from India and the Ottoman Empire (see Table 2.1.1), while European spinning and weaving industry was dominated by wool, silk and linen.

Table 2.1.1: Quantity of cotton and cotton goods utilised in Great Britain at the end of the 18th Century.

<table>
<thead>
<tr>
<th>Cotton provenience</th>
<th>Quantity in lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>British West Indian</td>
<td>6.600,000</td>
</tr>
<tr>
<td>East Indian</td>
<td>100,000</td>
</tr>
<tr>
<td>Izmir or Turkey</td>
<td>5.700,000</td>
</tr>
</tbody>
</table>

Source: Chapman (1904:143).

The period between 1450 and 1750 saw relatively few mechanical inventions introduced into the European textile industries: the stocking frame at the end of the 16th Century and the Dutch loom in the 17th appear to be the two main innovations during the period.

This scenario was reversed at the height of the Industrial revolution when a series of technological innovations laid the basis for unprecedented production and productivity increases. Most of the great inventions that ushered in the Industrial Revolution were connected with the cotton industry, hence it gained the label “icon of modern industrialisation”, linking together agriculture, manufacture and trade in an intricate worldwide web.

The outburst of discoveries which changed cotton’s methods of production started in the second half of the 18th Century when the newly-developed spinning and weaving techniques led to a dramatic increase in productivity: major contributions were the flying shuttle

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49 During the 16th Century England depended for its supplies of cotton and cotton goods upon the Levant and India. It is recorded that in 1641 merchants bought cotton wool in London which came from Cyprus and Smyrna (Johnson, 1926).

50 In the early 19th Century, the term productivity, defined as the relationship between output and the inputs utilised to produce it, came to be regarded as the optimal measurement of industrial performance.
invented by John Kay (1733) which began the modern development of looms; the spinning jenny, a multiple spinning machine created by James Hargreaves (1764). These two inventions had a decisive impact on productivity, but did not change the traditional organisation of the textile industry. It was the next major innovation in the textile sector, the spinning frame, invented in 1769 by Arkwright, which led to a re-organisation of the structure of the industry. This machine was initially horse-powered, but later it became water-powered, and therefore came to be known as the water frame: water wheels, providing most of the power for the cotton industry until the end of the 1820s, had a striking impact on the factory’s methods of production and division of labour. In 1779 Samuel Crompton invented the spinning mule which combined features of both the jenny and the water frame to produce finer cloth. In 1785 Edmund Cartwright patented the first mechanical loom which produced cloth of more even texture because of the uniform strength of the mechanical blows. Thus power-looms started being utilised on a larger scale, replacing hand loom weaving (see Figure 2.1.1).

Another contribution of major significance was achieved thanks to improvements brought about by James Watt whose steam engine was applied to cotton production at the beginning of the 19th Century. After 1835 steam was responsible for around 75 per cent of power used in the industry. The British, therefore, established a lead in the new factory age: cotton towns started developing around the main mills, and the process of urbanisation received a great push forward.

Other substantial improvements were achieved with the introduction of mechanised carding, spinning and weaving: their most important outcomes were not only the dramatic increases in output, but also the considerable enhancement in the quality of yarns, and the continuous trend in falling prices both in yarns and cotton manufactures.

The data on labour productivity described in Catling’s study of the spinning mule (1970), depicted in Table 2.1.2, provide an illuminating example of the effects of the improvements in technology during the first years of industrialisation. The trend in rising productivity continued all through the 19th Century (Table 2.1.3).

51 The first mill to adopt a steam engine was set up at Papplewick in 1785; in 1789 it was utilised in Manchester and in 1792 in Bolton and Glasgow.
52 Carding is the process involved in raking the cotton fibres parallel; it represents one of the four fundamental steps required for the production of yarn from raw cotton, i.e. cleaning, carding, roving and spinning.
Figure 2.1.1: Increase in the number of power looms in Great Britain in the long 19th Century.

Table 2.1.2: Labour productivity in cotton spinning.

<table>
<thead>
<tr>
<th>Spinning technique</th>
<th>Hours to process 100 lb of cotton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian hand spinners (18th Century)</td>
<td>50.000</td>
</tr>
<tr>
<td>Crompton’s mule (1780)</td>
<td>2.000</td>
</tr>
<tr>
<td>100-spindle mule (1790)</td>
<td>1.000</td>
</tr>
<tr>
<td>Power assisted mule (1795)</td>
<td>300</td>
</tr>
<tr>
<td>Robert’s automatic mules (1825)</td>
<td>135</td>
</tr>
</tbody>
</table>


Table 2.1.3: British cotton spinning productivity, 1820-1896.

<table>
<thead>
<tr>
<th>Year</th>
<th>Yarn spun (lb)</th>
<th>Workers employed</th>
<th>Yarn spun per worker (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1820</td>
<td>120,000,000</td>
<td>110,000</td>
<td>1,091</td>
</tr>
<tr>
<td>1850</td>
<td>588,000,000</td>
<td>191,000</td>
<td>3,079</td>
</tr>
<tr>
<td>1872</td>
<td>1,181,000,000</td>
<td>230,700</td>
<td>5,119</td>
</tr>
<tr>
<td>1896</td>
<td>1,637,000,000</td>
<td>212,463</td>
<td>7,705</td>
</tr>
</tbody>
</table>

Sources: Mitchell (1988a); Farnie (1979).
The progress achieved in spinning created the need for an increase in output in the early stages of production. The cotton from the bale had to be picked and cleaned, beaten to open the fibres, carded into a continuous sliver, “drawn” to lay the fibres parallel before it reached the spinning frame. This procedure became mechanised so that cotton was mechanically handled from the bale to the spindle where it was transformed into yarn. Similarly astonishing improvements were made in other sections of production, particularly in knitting, bleaching, dying and calico printing.\textsuperscript{53}

But cotton could not become a mass commodity without also the remarkable improvements achieved both in the infrastructure and telecommunication sectors which enhanced the efficiency of the cotton trade and its global diffusion (see Section 1.1). Their fundamental role in lowering trade costs among nations, thus enabling the process of global market integration, has been outlined many times by economic historians. Among them, O’Rourke and Williamson, in “Globalization and History” (1999), claim that developments in transport embodied the most crucial factor in connecting markets globally, to the extent that “all of the commodity market integration in the Atlantic economy after the 1860s was due to the fall in transport costs between markets, and none was due to more liberal trade policy”.

Thus, the fall in trade costs in the cotton market, largely due to the development of canals, the introduction of steamships and the building of railroads,\textsuperscript{54} mirrored the beginning of a new era for the global economy, the interconnections of which grew more and more complex thanks to the lowering in international transport costs.

Moreover, the 1840s saw the start of the Cunard transatlantic mail service which allowed traders to buy and sell cotton in the “arrivals’ market”: shipping and other expenses were added to the purchase price, plus 5 per cent for unloading, so that price increases generated by price fluctuations or exchange rate were all paid by the purchaser. Such dealings became more effective thanks to the introduction of the telegraph. The first line opened in 1864 for Britain via Russia, Persia and India, with cables passing through the Persian Gulf. One year later a new link via Asiatic Turkey was established. In 1866 the first underwater cable to North America was laid, and in 1870 a direct line to India. The cotton trade became the first

\textsuperscript{53} Chapman (1904) provides a very detailed description of the various technological innovations in all the different stages of cotton production.

\textsuperscript{54} One of the cornerstones of progress for the cotton trade was the Liverpool-Manchester rail line, opened in 1830.
to adopt the telegraph, well ahead of the grain trade. Thanks to this progress in telecommunications, producers’ demand adjusted quickly to changes in trading conditions, shipping dates were cut and it became normal to request deliveries to European ports at monthly or even weekly intervals. Commercial messages could be sent to India within three days, thus reducing time delay by 90 per cent.

The technological developments engendered by the cotton industry generated spill-over effects on a wide range of other industries, both textile and non-textile: linen, silk and wool adopted similar spinning and weaving techniques as well as improved factory organisation. The hosiery and lace industries benefited from finer yarns. Furthermore, Chapman (1987) outlines the linkages between cotton and the birth of new activities in non-textile industries: the first multi-storey cotton mills introduced the idea of iron-framed buildings and of illuminated factories. Also the idea of standardised production was born within the cotton industry (introduced in the 1830s by Richard Roberts) and was afterwards applied to other industrial sectors such as engineering.

Cotton was also the first commodity to use futures contracts. The futures market, initiated by New York traders in 1870, operated through cotton exchanges in New Orleans, New York, Liverpool, Bremen, Bombay and Alexandria. The whole process of buying, hedging and selling was accelerated at the end of the century, thanks to the introduction of the telephone.

2.1.2 The worldwide expansion of the cotton market

The reasons behind the unprecedented technical development of the cotton industry were not only based upon cotton’s physical qualities which made its fibres well suited to mechanical handling. According to Chapman (1987) and other economic historians, the root causes of its technological diffusion can be linked to the rapid increase in demand for textile goods and in the high elasticity of supply of raw cotton from the United States, which became the main global cotton producer.

The augmented consumption of cotton goods was initially stimulated by a rise in average income in England: Eversley\textsuperscript{55} illustrates that between 1750 and 1780 the number of

\textsuperscript{55} Eversley (1967)
households in the middle income range (£50 to £400 per year) rose from 15 per cent to 20-25 per cent of the English population. In his model he ascribes the foundation of the Industrial Revolution to the increased demand for normal goods by a growing “middle class”. The demand for cotton goods then started rising in the rest of Europe, prompted by the process of urbanisation, and later expanded beyond the Continent. The increased demand for textiles worldwide throughout the long 19th Century is consistent with the sustained rise in GDP per capita both in Western Europe and, to a lesser extent, in other areas of the world.56

The increased demand for cotton required an expansion of its supply. A shortage of raw material threatened to slow down the industry’s further development: supplies from the Levant, West Indies and India were inadequate to meet British demand. New cotton fields were eagerly sought, and America represented the best solution to satisfy this increasing need. Direct and almost unlimited access to the raw material from America has been unanimously cited as one of the most decisive factors in explaining British advantage in the textile sector. In the US cotton had been planted since 1621 by the earliest European settlers in the southern states, with seeds introduced from the Levant. To adjust to the rise in British demand, North American planters started, in the late 1700s, to import slaves to work in large-scale cotton plantations. Once the biggest bottleneck in large-scale production (i.e. the separation of the fibres from the seed) was overcome, raw cotton shifted from being a relatively minor crop to a dominant one which grew in importance faster than sugar and tobacco. Thanks to the invention of Eli Whitney’s cotton gin (1793) the bolls could be cleaned and separated from the seeds mechanically. Owing to the productivity gains prompted by the gin,57 the US replaced India and the Ottoman Empire as the leading cotton producers and established its price leadership. Cotton was grown mainly for export, though a part of it was kept for the domestic market.58

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56 According to Maddison’s estimates (2001), during the 19th Century per capita GDP was growing in Europe, North and South America, the Middle East, South and East Asia and Africa.
57 The mechanical gin could do the work of fifty men. Production of raw cotton expanded rapidly, from 10,000 bales in 1793 to 126,000 bales a decade later.
58 Some of the raw cotton was transformed into yarn with machine-driven yarn spinning methods introduced into the US from the UK, despite the existence of various British laws against the export of machinery. The further import of machinery led to the possibility of mechanically working cotton from raw input to final product: in 1813 Lowell’s Mill was the first mill where all operations, from the opening of the bales to the production of finished cloth, were conducted within the same factory.
Thanks to the saw-gin, by the 1820s cotton production in the US expanded its frontier and spread westwards into the mid-South, Texas and Oklahoma. US production thus came to dominate the global cotton industry and by the late 1850s it cultivated over 75 per cent of world crop, of which 70 per cent was exported to the UK. As depicted in Figure 2.1.3, the importance of America as a global cotton supplier continued throughout the 19th Century.

*Figure 2.1.3: Average annual share in world cotton exports, 1850-1914.*

<table>
<thead>
<tr>
<th>Year</th>
<th>US</th>
<th>India</th>
<th>Egypt</th>
<th>Anatolia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850-9</td>
<td>80</td>
<td>17</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>1860-9</td>
<td>37</td>
<td>51</td>
<td>8.3</td>
<td>0.4</td>
</tr>
<tr>
<td>1870-9</td>
<td>65</td>
<td>26</td>
<td>7</td>
<td>0.4</td>
</tr>
<tr>
<td>1880-9</td>
<td>63</td>
<td>27</td>
<td>8.6</td>
<td>0.3</td>
</tr>
<tr>
<td>1890-9</td>
<td>64</td>
<td>25</td>
<td>9.2</td>
<td>0.2</td>
</tr>
<tr>
<td>1900-9</td>
<td>72</td>
<td>13</td>
<td>13</td>
<td>0.3</td>
</tr>
<tr>
<td>1910-4</td>
<td>72</td>
<td>18</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

*Source:* Hanson (1980); Mitchell (1988b; 1988c); Todd (1915); for Western Anatolia: Mihiç and Mihiç (2002).

Increases in productivity, slave labour and cheap land created the perfect recipe for low prices in the US: from the maximum level reached in 1799-1801 the price of raw cotton experienced a steady decline. This unprecedented drop in the cost of the raw material promptly reduced the price of woven goods, thus giving the cotton industry an incomparable advantage over all other textiles. During the period 1800-1913 the cotton crop of the world increased more than three times as fast as world population. The average per capita consumption of cotton rose five times as fast as non-cotton fibre (Farnie and Jeremy, 2004).

Great Britain was the homeland of most of the inventions connected with the cotton industry, thus enabling her to hold a textile industry monopoly worldwide. This supremacy could be achieved and maintained during the years not only through Great Britain’s competitiveness, gained through mechanisation in spinning and weaving, but also through a continuous
expansion of trade: the capacity of the British cotton industry to grow beyond its own domestic economy was facilitated by its direct access to the external markets of its formal and informal empire. As Farnie and Jeremy (2004) outline, cotton “served as the mighty heart of the whole region (Lancashire) and radiated its dynamic influence throughout two-thirds of the world”.

Singleton (2004) also subscribes to the theory of the crucial role played by the presence of large markets for the prosperity of the British cotton industry. Through an investigation of the linkages between imperialism and cotton, he maintains that the fate of the British empire was closely interlinked with that of the cotton trade and that the rapid growth of the cotton industry in the late 18th and 19th centuries owed much to the favourable trading environment created by British naval supremacy.

It was thanks to these external linkages that Britain literally conquered the world cotton market, thus creating a prototype world economy, with Manchester as the hub. The primary achievement of creating a global market through the expansion of the volume of external commerce was enabled by the establishment of a dynamic relationship between the import of raw cotton, the manufacture of yarn and cloth, and the export of cotton manufactures. The proportion of the industry’s final output that was exported rose from about one half in 1820 to four fifths in 1900: such estimates are indicative of the strong dependence and reliance upon direct access to overseas markets.

Continental Europe and North America accounted for around four-fifths of British exports during the first decade of the 19th Century, but the relative importance of these markets declined briefly owing to the protectionist policies adopted by those governments to encourage their own cotton industries. New markets had to be sought and the economies of Asia and other less developed areas of the world represented the most attractive prospects. Asia’s share by volume of British cotton good exports rose from 5 per cent in the 1820s to 24 per cent in 1850 and 43 per cent in 1896. The most important markets were India and the Ottoman Empire: quite interestingly, in the previous century these were the main exporters of cotton and textiles to Britain. Both regions shared the same fate: from occupying a place of prominence on the global map of textile production, Indian and Ottoman cloth underwent a

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59 Other large markets were the white settlers colonies of Canada, South Africa and, especially, Australia.  
60 While the two regions share strong similarities, Indian textiles were much more competitive in the international market and therefore played a more important role at the global level (Pamuk, 1986).
phase of decline and were gradually substituted by cheaper machine-made textile imports. An increasing share of raw cotton cultivation was thus shifted from domestic handicrafts to the international market.

The cotton industry took advantage of the global expansion in trade associated with the spread of Western supremacy and facilitated by the spectacular erosion of transport costs and by the diffusion of a new free-market ideology. Thus, cotton facilitated that process that saw the rise of England as a new imperial power and, more generally, the role of Western Europe as the new “centre”, separating it from the rest of the world which became the “periphery” identifiable as the suppliers of the raw material and importers of manufactured textiles.

The adoption (sometimes the enforcement) of the free trade treaties opened the economies of the periphery to the manufactured cotton goods and satisfied the British quest for new markets following the saturation of the Continental ones.

The next table will show the decline in the importance of Europe as a recipient of British cotton exports and the shift in the direction of trade throughout the 19th Century.

<table>
<thead>
<tr>
<th>Table 2.1.4: Relative shares in British world cotton exports, 1820-1896.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value of exports of cotton manufactures</strong></td>
</tr>
<tr>
<td>Months of British pound sterling</td>
</tr>
<tr>
<td>1820</td>
</tr>
<tr>
<td>Europe</td>
</tr>
<tr>
<td>America</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
<td>Latin America</td>
</tr>
<tr>
<td>Levant*</td>
</tr>
<tr>
<td>Asia</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>China</td>
</tr>
<tr>
<td>Africa</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

* The Levant coincides with the geographical area of most of the Ottoman Empire. 

Source: Farnie (1979: 91).

British supremacy in the global market started being challenged in the 1870s by foreign competition from both in the Continent and the US, which in turn had been stimulated by imports of British yarn and machinery. It is important to remember that UK technology
exports only started in the early 1850s: before this Britain had a resolutely hostile attitude towards sharing its pioneering technology and it implemented a series of laws to this purpose. For most of the 18th Century, until 1824, the emigration of skilled artisans was prohibited; likewise, until 1843 the export of advanced textile machinery was banned.\(^6\)

The official change in the direction of the British attitude towards technology occurred 1851, the year of the Great Exhibition, which lifted the curtain on the industrial achievements and technological discoveries of countries from around the world. It then became clear that British primacy was not unchallenged anymore and that “when earlier there was one leader and a number of followers, now there were enclaves of technological leadership and a larger area of potential technological absorption.” (Jeremy, 2004).

Thus, from the second half of the 19th Century, the British share in the increment of world trade in cotton goods sank from over 80 per cent (1790-1883) to 54 per cent (1883-1912). Its share of the growth in world consumption similarly dropped from 36 per cent (1801-71) to 8 per cent (1872-1912). The centres of production multiplied, crushing British monopoly, rendering the supply of cotton textile global rather than Lancashire-dependent, and intertwining at a more complex degree world supply and demand. By 1894 twenty states became exporters of cotton goods and nine net exporters; among the latter were Belgium, France, the Netherlands, Germany, Spain, Russia and Italy. Figures 2.1.4 and 2.1.5 document the rise in mills spindleage, and power looms, respectively, in various areas of the world.

Hence, both the improvements in technology and the expansion of world cotton markets allowed the development of a global commercial chain: raw cotton fibres were purchased from colonial plantations in the US, processed into cotton cloth in the mills of Europe, and then re-exported to captive markets of the periphery in West Africa, India, the Ottoman Empire, China and Latin America.

\(^6\) Nevertheless, the presence of legal prohibitions did not prevent the diffusion of ideas and technology: hundreds of artisans, in fact, left Britain for other parts of Europe, or the US, in search of new opportunities. Not surprisingly, knowledge of new British textile technology quickly spread across the Channel and reached the French mills. British immigrants thus played a key role in diffusing cotton-manufacturing innovations and helped to establish infant textile industries in other parts of Europe and the US.
Thus, “King Cotton” became not only the backbone of the interdependence between the US and England (which remained the principal producer and consumer of cotton), but it also linked into its web millions of farmers, mill workers and merchants all over the world, from Europe to Asia, Africa and Latin America. The following figures show the global outreach of cotton consumption and production.
Figure 2.1.6: The cotton output of the main producers in the US, Asia, Africa and Latin America, 1905-1914 (in thousands of metric tons).


Figure 2.1.7: The world’s cotton consumption in thousands of quintals.

Source: Hanson (1980:72).
2.1.3 Cotton and industrialisation: was it all a myth?

The role played by cotton within the phase of British industrialisation has engendered a heated debate among economic historians. Particularly disputed is Rostow’s theory of growth, based on the notion of the “take-off” of leading industrial sectors.62 This theory identifies cotton textiles as the chief sector of British “take-off” which took place between 1783 and 1802. As one of the pieces of evidence used to support his analysis, Rostow cites the spectacular rise in British raw cotton imports (319 per cent between 1781-91 and 67 per cent between 1791-1801), as well as the contribution of cotton to national income in the UK (see Table 2.1.5).

This interpretation, which acknowledges the decisive role of cotton in the Industrial Revolution, has been criticised and widely debated by many economic historians. Deane and Cole calculated that cotton only contributed around 5 per cent of British national income; Habakkuk and Deane (1963) proved that iron was making an equivalent contribution to the economy in that period, reaching the conclusion that cotton alone cannot be labelled as the leading sector. A similar viewpoint, but based on a different analysis, came from John Clapham (1926) who does not deny the important contribution made by the cotton industry to national income growth, but considers that its role has been exaggerated to the point of erroneously identifying the Industrial Revolution with the development of a single industry.

Perhaps the most vehement criticism comes from Michael Fores, in his essay “The myth of a British Industrial Revolution” (1981) where he claims that cotton failed to generate an Industrial Revolution, as it did not engender considerable production increases.

All the above authors have mainly concentrated their analysis on the impact of the cotton industry within the boundaries of the British economy alone, disregarding the linkages it generated as an engine of external trade. This is an important aspect to reflect upon: despite its disputed role as the major contributor to growth, cotton has undoubtedly enabled Great Britain to shatter the global pattern of the cotton trade previously dominated by the East. From 1784 Great Britain became the largest producer of cotton goods in Europe; one year

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62 Rostow’s take-off theory, formulated in “The stages of economic growth” (1971), provides an explanation of the evolution of modern industrial societies which go through five stages of economic growth: the traditional society, the satisfaction of the preconditions for take-off, the take-off, the drive to maturity, and the age of mass consumption. In Rostow’s words, the take-off consists, in essence, of the achievement of rapid growth in a limited group of sectors where modern industrial techniques are applied.
later it became an exporter of cotton yarn to the Continent, and from 1877 a net exporter of cotton manufactures. Until the 1850s Britain maintained the largest number of cotton-spinning spindles in the world and until the First World War it successfully maintained its dominance in global export markets and profitability. Moreover, as Chapman (1987) underlines: “If the cotton industry didn’t lead the national economy, it certainly led the British and (until the early 1830s) the European and American textile industries in its technology, in the development of the factory system, and in standardised production for the popular market”.

Table 2.1.5: The cotton industry as an employer of labour and as a generator of income in Great Britain, 1801-1901.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of employees</th>
<th>% of population of Lancashire</th>
<th>% of labour force in the UK</th>
<th>Gross Product (£m.)</th>
<th>% of national income</th>
<th>Value Added (£m.)</th>
<th>% of national income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>242,000</td>
<td>35.96</td>
<td>5.04</td>
<td>15</td>
<td>6.52</td>
<td>11</td>
<td>4.78</td>
</tr>
<tr>
<td>1811</td>
<td>306,000</td>
<td>36.96</td>
<td>5.56</td>
<td>28.3</td>
<td>9.4</td>
<td>23</td>
<td>7.64</td>
</tr>
<tr>
<td>1821</td>
<td>369,000</td>
<td>35.04</td>
<td>5.95</td>
<td>29.4</td>
<td>10.10</td>
<td>23.2</td>
<td>7.97</td>
</tr>
<tr>
<td>1831</td>
<td>427,000</td>
<td>31.94</td>
<td>5.93</td>
<td>32.1</td>
<td>9.4</td>
<td>25.3</td>
<td>7.44</td>
</tr>
<tr>
<td>1841</td>
<td>374,000</td>
<td>22.44</td>
<td>4.45</td>
<td>46.7</td>
<td>10.33</td>
<td>34.3</td>
<td>7.58</td>
</tr>
<tr>
<td>1851</td>
<td>379,000</td>
<td>18.66</td>
<td>3.91</td>
<td>48.55</td>
<td>9.28</td>
<td>33.23</td>
<td>6.35</td>
</tr>
<tr>
<td>1861</td>
<td>446,000</td>
<td>18.36</td>
<td>4.13</td>
<td>77</td>
<td>11.53</td>
<td>47.7</td>
<td>7.14</td>
</tr>
<tr>
<td>1871</td>
<td>450,000</td>
<td>15.96</td>
<td>3.75</td>
<td>104.9</td>
<td>11.44</td>
<td>58</td>
<td>6.33</td>
</tr>
<tr>
<td>1881</td>
<td>520,000</td>
<td>15.06</td>
<td>3.97</td>
<td>94.5</td>
<td>8.99</td>
<td>62.7</td>
<td>5.97</td>
</tr>
<tr>
<td>1891</td>
<td>526,000</td>
<td>13.39</td>
<td>3.58</td>
<td>101.2</td>
<td>7.86</td>
<td>63.8</td>
<td>4.95</td>
</tr>
<tr>
<td>1901</td>
<td>544,000</td>
<td>12.44</td>
<td>3.26</td>
<td>89.2</td>
<td>5.43</td>
<td>57.2</td>
<td>3.48</td>
</tr>
</tbody>
</table>

Source: Farnie (1979: 24).

2.2 Cotton cultivation in two areas of the Ottoman Empire: Egypt and Western Anatolia

This section aims to analyse the raw cotton market in two areas of the Ottoman Empire, Egypt and the Western Anatolia, between the second half of the 19th and the beginning of the 20th Century. A study of the structure of the cotton trade and production is particularly significant within the context of the commercialisation of Ottoman agriculture: the latter, shaped by the relations established between the Empire and the industrialising world, was a
manifestation of the process of socio-economic change that was taking place within the whole Ottoman realm.

Our analysis thus describes the evolution of cotton production and trade in Egypt and Western Anatolia with the aim of investigating the extent and nature of Ottoman participation in the global economy. The Empire, together with India, was the principal exporter of cotton and cotton goods to Britain, and more generally to Europe, before the Industrial Revolution. Its domestic textile production was then severely undermined by the penetration of machine-made yarn and cloth so that the Empire, from being a producer of finished cotton goods, became an importer of cloth and an exporter of raw cotton. This Ottoman and Indian decline did not only affect domestic artisans\footnote{For an account of the decline of Indian industry see Ray (2009), Wendt (2005) and Sakis (2006).} but also the cultivation of the raw fibre which was replaced from the beginning of the 19\textsuperscript{th} Century by the cheaper and higher quality cotton coming from American slave labour plantations.

The analysis proposed in the following sections is centred upon the impact of the 19\textsuperscript{th} Century global economic transformations on trends in Ottoman cotton production, trade and price movements.

\textit{2.2.1 Trends in cotton production and trade in the Empire}

Raw cotton has been an important commercial commodity of the Ottoman Empire throughout the centuries. From the late 16\textsuperscript{th} century until the end of the 18\textsuperscript{th} Century it represented an essential crop for the Ottoman economy and was both used for the domestic market and shipped in large quantities to Europe.

By contrast, cotton cultivation only started playing an important role for the Egyptian economy only from the beginning of the 19\textsuperscript{th} Century. It was Napoleon who, during his Egyptian invasion, pointed out that Egypt had the potential to become a rival of India and the Carolinas in cotton production.\footnote{Earle (1926).}

With the advent of the Industrial Revolution and the consequent expansion of the British and Western European textile industries cotton production in Western Anatolia and Egypt took two separate paths and by the beginning of the 19\textsuperscript{th} Century Egyptian cotton cultivation
completely overshadowed that of the Anatolian lands. The reasons for this different evolution are discussed below.

**Western Anatolia**

Throughout the 18th Century Anatolian raw cotton supplied the domestic, regional and European textile markets (between 1720 and 1800 its cultivation tripled).\(^{65}\) Most of the traded cotton was exported from the coastal city of Izmir,\(^ {66}\) whose importance prevailed over Egyptian and Syrian ports. The main areas of cotton production were located around the Izmir region too where it was cultivated in the plains of Bakır, Gediz, Kırkağaç, Akhisar, Bergama, Kasaba and Manisa and along the valleys of the river Küçük and Büyük Menderes, and in the neighbourhood of the cities of Bayındır, Tire, Ödemiş, Aydın and Denizli;\(^ {67}\) (see Map 2.2.1); other significant production regions were located around Adana and Halep.

The Izmir region consists of a flood plain of large rivers only one hundred kilometres from the Mediterranean, where cotton could be grown without artificial irrigation. Summers are rainless, but humidity occurs due to sea breezes and heavy dew.

After the first quarter of the 19th Century raw cotton production in Anatolia started to decrease,\(^ {68}\) mainly owing to a drop in European demand for Turkish cotton (see Table 2.2.1). Turkish cotton (known as “yerli”) a variety of Indian *Gossypium herbaceum*, was a rough and short staple. Its supply was substituted by cheaper and higher quality cotton coming from the slave plantations in the United States. In addition to the cheap labour costs in the US and the abundant supply of labour, US cotton prices were lower than Ottoman and Egyptian prices (and also than Indian and Brazilian prices) at the beginning of the century, owing to the significant contribution towards increased productivity made by the invention of Eli Whitney’s cotton gin in 1793. Other contributors towards establishing American supremacy in the cotton market were an expanded trade infrastructure and the presence of sound credit networks.\(^ {69}\)

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\(^{65}\) Beinin (2001).

\(^{66}\) During the 18th Century Izmir was the biggest exporting port of the Empire with cotton being the main commodity traded until the beginning of the 19th Century.

\(^{67}\) Frangakis-Syrett (1991:97-98).

\(^{68}\) In 1857, according to British sources, the share of cotton in Izmir’s exports to the West was a mere 1 per cent in value (see Frangakis-Syrett, 1991).

\(^{69}\) By the late 1850s, the US cotton exports provided 77 per cent of cotton consumed in Britain, 90 per cent French cotton, 60 per cent of German cotton, 92 per cent of cotton manufactured in Russia. Beckert (2004).
Map 2.2.1: Cotton cultivation in the Ottoman Empire.

The shaded areas around the cities of Izmir (Smyrne)/Aidin, Adana and Aleppo indicate the presence of cotton crops.
Source: Todd (1915).

Table 2.2.1: Cotton exports from the port of Izmir, 1780-1858.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cotton exports (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1750</td>
<td>1.654</td>
</tr>
<tr>
<td>1760</td>
<td>2.400</td>
</tr>
<tr>
<td>1770</td>
<td>5.280</td>
</tr>
<tr>
<td>1780</td>
<td>8.800</td>
</tr>
<tr>
<td>1820</td>
<td>14.000</td>
</tr>
<tr>
<td>1834</td>
<td>5.456</td>
</tr>
<tr>
<td>1838</td>
<td>4.600</td>
</tr>
<tr>
<td>1840</td>
<td>3.000</td>
</tr>
<tr>
<td>1846</td>
<td>600</td>
</tr>
<tr>
<td>1851</td>
<td>2.000</td>
</tr>
<tr>
<td>1857</td>
<td>700</td>
</tr>
<tr>
<td>1858</td>
<td>1.200</td>
</tr>
</tbody>
</table>

The Ottoman Empire was thus replaced by the US as main supplier of raw cotton to the British textile industry. Cotton prices fell considerably in Anatolia and it was not profitable anymore to grow cotton for exports (Kurmuş, 1991). Furthermore, production for the local market diminished as well due to the escalating imports of cheap British cotton cloth and yarn. Nevertheless, the replacement of Ottoman yarn was not a uniform process: manual spinning persisted, especially in the areas of the interior which were not connected to the main ports or trading centres.

The technology used in cotton cultivation, as with other agricultural crops, was rudimentary. The adoption of iron ploughs gained momentum only after 1890, remaining limited to certain areas and fertilisers were not used regularly. In Anatolia productivity changed little over the 19th Century, if at all, and increases in output levels were derived from the extension of the cultivated area. Until the 1860s no foreign investment took place, as European capital was more interested in other sectors of the Ottoman economy (banking, mining, railways construction and in funding government loans).

The relevance of Western Anatolia as a cotton supplier was revived at the height of the outbreak of the American Civil War (1861-65) which coincided with the suspension of raw cotton shipments from US ports to Europe. The crisis, which came to be known as the “cotton famine”, gave rise to concerns about the interrupted source of supply and resuscitated interest in Anatolian cotton. A true production boom took place characterised by a considerable extension of the area cultivated for cotton, and by a spectacular increase in output and exports (the impact of the cotton famine will be explained in more detail in Section 2.3). This boom came to an end with the conclusion of the Civil War. By the end of the 1870s Anatolian cotton trade returned to playing a minor role in the Ottoman economy. The rise in prices caused by the drop in American supply, which stimulated exports from Turkish ports, was reversed (Table 2.2.2): the effects of the price depression (1873-96), which led to a wave of inflation in Europe, were

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70 During the early 19th Century England almost totally dominated the Empire’s imports of unbleached yarn. British yarn price fell by two-thirds between 1792 and 1812 and its production increased 250 per cent. Thus, to give one example, in 1870 British yarn represented 90 per cent of all yarns imported into Izmir. In 1901 the Ottomans were Britain’s third most important customer in both yarns and piece goods (Quataert, 1973).

71 For example, up to the mid-1840s Kayseri merchants were shipping Adana cotton to north Anatolian towns where large quantities of yarn were made. Other localities produced yarn from domestic cotton for several decades, while in others hand-spinning was present till the end of the Ottoman Empire.
hitting the Empire’s economy, too. (The impact of the great depression will be discussed more thoroughly in Section 4).

**Table 2.2.2: Cotton price index in Izmir, 1845-76. (1845-1849=100).**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cotton price index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1845-49</td>
<td>100</td>
</tr>
<tr>
<td>1850-54</td>
<td>118</td>
</tr>
<tr>
<td>1855-59</td>
<td>144</td>
</tr>
<tr>
<td>1860-64</td>
<td>442</td>
</tr>
<tr>
<td>1865-69</td>
<td>261</td>
</tr>
<tr>
<td>1870-74</td>
<td>194</td>
</tr>
<tr>
<td>1875-76</td>
<td>138</td>
</tr>
</tbody>
</table>

*Source: Kasaba (1988: 90).*

Thus, exports of raw cotton from the major cotton producers of the Empire followed a declining trend until the end of the century (Figure 2.2.1). A new stimulus in the production of cotton came in the early 20th century, prompted by an increase in both global and domestic demand and by the consequent rise in prices.

**Figure 2.2.1: Raw cotton exports from Izmir, Halep and Adana (1865-92); quantities in bales of 440 lbs.**

*Sources: Mihci and Mihci (2002); Kurmuş (1974); Issawi (1980b) Owen (1993).*
According to Owen (1969: xxiv) who wrote extensively on the Egyptian economy, “it would not be too much of an exaggeration to say that the economic history of Egypt during the 19th Century was almost wholly shaped by cotton”.

The earliest illustration of an Egyptian cotton plant was portrayed by Prosper Alpinus in his “De plantis Aegypti” (1592) where the author describes the existence of a perennial cotton tree. Later reports document the cultivation of other varieties of cotton irrigated by the Nile. However, it never represented a major crop in Egypt and until 1800 no export of raw cotton had been recorded.

At the beginning of the 19th Century, long staple cotton was introduced by the government of Muhammad Ali as a major crop: it was called Mako or Jumel, from the name of the French textile engineer who discovered it. Owing to its superior quality compared to the earlier cultivated cotton strains, it generated a major rise in exports to the external market, becoming the key export crop for the Egyptian economy. As a result, at the end of the 1830s raw cotton and cotton products reached roughly 94 per cent of the country’s total exports (Owen, 1969) and by 1860 Egypt had become the sixth most important supplier of the British market.

Until 1838 cotton was sold to the government at a fixed price according to a monopoly system organised by Muhammad Ali. With the enforcement of the 1838 Anglo-Turkish commercial Treaty a gradual shift to free trade took place, which partially lowered the state’s possibility of interfering in cotton’s sales. Nevertheless, the abolishment of the monopoly system was never definitive as the government attempted its re-introduction several times during the rule of both Muhammad Ali and his successors. For example, during the reign of Abbas in 1854 an order was issued forbidding the sale of produce to anyone but government officials.

Being a crop that required a large amount of irrigation, cotton farming was confined within the limits to which the waters of the Nile could be carried and managed through a system of

---

72 See Johnston (1926: 166).

73 Louis Alexis Jumel was collaborating with Muhammad Ali, working as the director of a project for the construction of a spinning and weaving mill at Bulaq. He discovered in a Cairo garden, a bush of a type of cotton stronger and of superior quality than any other type cultivated in the Middle East.
canals; more than three-fourths of the cultivation took place in the river’s Delta (see Map 2.2.2).

**Map 2.2.2: Cotton cultivation along the Nile.**

*Source: Todd John (1915).*
The first great spur to improve the Nile’s irrigation system was undertaken during Muhammad Ali’s rule within the framework of the agricultural revolution aimed at improving the productivity of Egyptian cotton and other crops. By 1833, 240 miles of new canals had been dug and a centralised irrigation administration was instituted in both Upper and Lower Egypt.

The distribution of cotton seed was carried out either by the government or by merchants (after the end of the era of state monopoly in 1838) who were also money-lenders. Cotton growing and picking was done by hand, with a large participation by children, women and old people. Unlike America where ginning was mechanised thanks to the invention of Whitney’s mechanical gin, the gins employed (called dulabs) were rolled by hand: they consisted of two wooden rollers through which the seed was removed from the lint. After being cleaned of seeds and other impurities, cotton was manually pressed into bales (usually made up of 700 or 800 pounds) and sent by train or river to the port of Alexandria, the country’s main commercial city, where it was sampled and exported. The whole system of baling, ginning, trading and exporting was concentrated in a few commercial houses.

From the 1840s large portions of the crop were sold before being picked, and sometimes before being sown. Some of the crop was sold in the interior to small dealers, and then to bigger merchants; in other cases brokers bought the crop directly from the peasants. Another way of selling cotton was through futures contracts which began in Alexandria in 1861.

Cotton cultivation started declining in the mid-40s, reflecting the continuous drop in world prices. The Alexandria price fell consequently, from an average of 18 dollars a qantar in 1835-9 to 10.4 dollars in 1840-4 and 8.7 in 1845-9 (Owen, 1969). But prices and exports starting rising again in the 50s, both as a reaction to the abandonment of the restrictions on cotton sales under the rules of Ibrahim and Abbas and as an answer to the rise in prices in Europe (see Table 2.2.5).

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74 The way to Alexandria was reached either by the State railways, the Delta light railways or the Mahmoudieh Canal.
75 Before that date Muhammad Ali established a system of state monopoly according to which cotton could be sold only to the government at a fixed price.
76 One dollar or talari was equal to 20 piastres. One Egyptian pound was equal to 100 piastres. One qantar equalled 98.9 lb.
Until the 1830s, a considerable quantity of the cultivated cotton was also used in domestic industries (up to one-fifth of total production). After this date, with the end of state monopoly, domestic production decreased dramatically and finally disappeared, substituted by cheaper imports of manufactured textiles, especially those from England.

Table 2.2.5: Value and price of Egyptian cotton exports, 1838-59.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value £</th>
<th>Alexandria price Dollar/quintal*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1838</td>
<td>716.670</td>
<td>15</td>
</tr>
<tr>
<td>1839</td>
<td>468.105</td>
<td>18.25</td>
</tr>
<tr>
<td>1840</td>
<td>414.722</td>
<td>13</td>
</tr>
<tr>
<td>1841</td>
<td>540.006</td>
<td>13.25</td>
</tr>
<tr>
<td>1842</td>
<td>390.882</td>
<td>10</td>
</tr>
<tr>
<td>1843</td>
<td>391.596</td>
<td>7.75</td>
</tr>
<tr>
<td>1844</td>
<td>230.046</td>
<td>8</td>
</tr>
<tr>
<td>1845</td>
<td>561.920</td>
<td>6</td>
</tr>
<tr>
<td>1846</td>
<td>404.808</td>
<td>10.25</td>
</tr>
<tr>
<td>1847</td>
<td>487.752</td>
<td>10</td>
</tr>
<tr>
<td>1848</td>
<td>167.961</td>
<td>7.25</td>
</tr>
<tr>
<td>1849</td>
<td>515.020</td>
<td>10</td>
</tr>
<tr>
<td>1850</td>
<td>839.176</td>
<td>11.75</td>
</tr>
<tr>
<td>1851</td>
<td>688.980</td>
<td>8.75</td>
</tr>
<tr>
<td>1852</td>
<td>1.341.128</td>
<td>10.25</td>
</tr>
<tr>
<td>1853</td>
<td>954.794</td>
<td>10</td>
</tr>
<tr>
<td>1854</td>
<td>764.740</td>
<td>8.8</td>
</tr>
<tr>
<td>1855</td>
<td>937.594</td>
<td>9.3</td>
</tr>
<tr>
<td>1856</td>
<td>1.295.724</td>
<td>10.6</td>
</tr>
<tr>
<td>1857</td>
<td>1.227.420</td>
<td>16.3</td>
</tr>
<tr>
<td>1858</td>
<td>1.091.027</td>
<td>12.7</td>
</tr>
<tr>
<td>1859</td>
<td>1.113.419</td>
<td>11.6</td>
</tr>
</tbody>
</table>

* One quintal equalled 98-99 lb. One tallari (or dollar) equalled Pt. 20. One £ (sterling) was equal to 97 1/2 Pt., according to the monetary tariff fixed by Muhammad Ali in 1835.


Apart from a few large cotton estates owned by Europeans, foreign capital played only a minor role in the cultivation of cotton. On the other hand, by the end of the 1850s, European capital began being engaged in another stage of production, i.e. ginning. Mechanised ginning,

---

77 Muhammad Ali aimed to develop the Egyptian economy, not only through the expansion of agriculture, but also through the creation of domestic industries such as cotton factories, those for weaving of woollen cloth and those for the fabrication of silk and sulphuric acid. This attempt of industrial development was abandoned at the end of the 1830s when the Ottoman Empire signed a series of free trade agreements with Western Europe.

78 Owen (1993).
which replaced the manual use of the *dulab*, was introduced in 1854-5 through the newly developed McCarthy gins. The latter could produce in ten hours the same amount of cotton ginned by a peasant in six or seven days. Ginning factories owned by Europeans thus multiplied as they were revealed to be quite profitable enterprises. Owen reports that such ginneries could make an average net return of capital of 20-25 per cent a year. The presence and influence of European capital, in particular British and French, grew stronger from the 1850s, when the degree of commercialisation of Egyptian agriculture intensified, as shown by the considerable increase in exports of agricultural goods (mainly cotton and wheat). As in Western Anatolia, foreign capital was not invested in the production of crops, but rather in banking, in construction and infrastructure which indirectly played a vital role in the country’s ability to expand cotton production. The creation of this commercial network in Egypt allowed a prompt response to the shortage in global supply experienced during the cotton famine.

In fact, the swirl of activities that transformed part of Western Anatolia and incentivised the process of commercialisation of agriculture at the height of the US Civil War affected Egypt as well. The enormous rise in prices 79 and the increased profitability of the cotton market was the engine for the development of massive investment projects aimed at the improvement of infrastructure and of irrigation facilities.

After the Civil War, when cotton prices had begun to decline, Egyptian production fell significantly though cotton remained a major export to the European market and in the 1870s Egypt’s output was two and half times as large as it had been before the Civil War. Its importance kept on growing during the 20th Century (see Figure 2.2.2) and it was the finer quality of the Egyptian lint, superior to the various American types, which led to its continued use.

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79 The Liverpool price of Middling Orleans (an average variety) rose from 7 ½ -8 d./lb. in 1861 to 31 ½ d./lb. in July 1864.
2.3 The impact of the American Civil War and the Lancashire cotton famine on the Ottoman Empire

“The American civil war severed in one stroke the global relationships that had underpinned the worldwide web of cotton production and global capitalism for at least two generations”

Beckert (2004:6)

“Whether the Turkish cotton boom was the beginning or only a stage of the integration of the Ottoman economy with the capitalist world is a subject of further debate. What is beyond doubt is that it was instrumental in linking the fortunes of large masses of peasant producers in Anatolia to the vagaries of market conditions in capitalist countries’.

Kurmuş (1987)

The outbreak of the American Civil War (1861-1865) was a crucial turning point in the history of cotton, modifying the structure of its production and trade. It instigated one of the world’s major “raw material crises” and led to a reorganisation of the global network of
labour and capital involved in cotton’s cultivation, manufacture and commerce. The primary impact of the defeat of the Southern states of the Confederacy, which enabled the liberation of almost four million slaves, was the disruption of the close interconnection between cotton and forced labour thus bringing about a search for new producers of the raw material. The latent problem of the existence of a single main supplier of cotton thus revealed itself in its entirety.

On 19 April 1861 the American states of the North enforced a blockade of the Southern ports after the bombardment of Fort Sumter, thus bringing to a halt the entire US cotton industry, which, since the first years of the 19th Century, had dominated the globe as the principal supplier of cotton in the world markets. The consequent halt of cotton shipments from American harbours caused a major negative shock to the textile industry in Europe, in particular for the manufacturers in Lancashire. The Civil War led to what became known as the “cotton famine” and was instrumental in creating rising concern about the future of an uninterrupted source of supply.

Nevertheless, the effects of the blockade were felt only at the end of 1861 and only partially; in fact, the unprecedented prosperity in the US of the four years between 1858 and 1861 had caused a rapid increase in the cultivation and production of the raw fibre which was not matched by the absorptive capability of the textile industry. The faster expansion of cotton supply compared to demand (the harvest of 1859 had been the largest in the history of the US, reducing the price of cotton to its lowest level) led to a large accumulation of stocks in European ports and mills and led to a market crisis.

The label cotton famine is therefore regarded as a misnomer by economic historians, as the crisis was not solely due to a halt in supply of the raw material, even during the climax of the war in 1862 (when cotton imports from the United States fell by 96 per cent), but was rather a crisis of overproduction.

---

80 The Civil War was initiated by the Confederacy, a group of eleven Southern states that seceded from the North and fought against the United States (the Union) to prevent the abolition of slavery.

81 In England alone it was estimated that the livelihood of between one-fifth and one-fourth of all people was based upon the cotton industry, one tenth of British capital was invested in it, and close to one half of all exports consisted of cotton yarn and cloth (Beckert, 2004).

82 Henderson (1969), Brady (1963), Farnie (1979) and others explain that the root causes of the cotton crisis do not lie in the American Civil War, but rather in the excessive expansion of production in the years prior to the conflict.
The main effect of the blockade was not only the one of partially lowering stocks, but also of raising freight rates, insurance premiums and cotton prices. The average price of Middling Orleans in Liverpool jumped from 6 ¼ d. per lb. in 1860 to 8 ½ d. in 1861, 17 ¼ d. in 1862, 23 ¼ d. in 1863 and 27 ½ d. in 1864. The dramatic increase in price was mainly caused by a rise in the cost of transporting the new material from the blockaded US southern ports to US northern ports and Europe.

As a consequence, factories in Great Britain resorted to shorter operating hours: from October 1861 mills started opening only a few days a week, operating part-time and even closing down. The average number of working days sank from six per week to four in December 1861 and to two and a third in November 1862, when unemployment reached its peak. Mill profits, which averaged 68 per cent in 1858-59 and jumped to 81 per cent in 1860, dropped to 40 per cent in 1861 and reached their lowest point at 18 per cent in 1862 (Farnie, 1979).

The losses incurred in manufacturing by mill owners and the high rate of unemployment were counterbalanced by a rise in profits in the financial market, reflecting the diversion of capital from the sphere of production into that of banking and finance. The uncertainty over the supply of raw cotton was manifested in a strong upswing in the amount of raw cotton sold to speculators (700,000 bales were sold in 1861 compared to 380,000 in 1860). Two categories of people, in particular, benefited from the crisis: brokers and speculators, who both increased in number during the Civil War, due to advent of high prices.

Concerns about the strong dependency on a single source of cotton supply had become manifest some years before the outbreak of the Civil War when the signs of hostility between the American North and South were becoming more apparent, and also when fears of a slave uprising or of a bad crop deemed realistic possibilities. Thus in 1857 the Manchester Cotton Supply Association (MCSA) was established which aimed at finding alternative sources of raw material. The main thrust behind its creation was an awareness of the dangers connected with the dependence on a single cotton supplier for the Lancashire cotton industry.

In this context a distinction between stocks at the mills and stocks at the ports must be made: the former declined by 55 per cent in 1861 while the latter increased by 17.6 per cent. This trend reflected a diversion within the cotton industry from manufacturing to commerce, especially speculative commerce. Middling was the most common variety of American cotton.

The MCSA was founded “in the prospective fears of a portion of the trade that some dire calamity must inevitably, sooner or later, overtake the cotton manufacture in Lancashire, whose vast superstructure had so
At the height of the war, when the volume of imports of raw cotton plummeted (see Table 2.3.1), the activities of the MSCA became frantic: when in 1862 stocks at the mills dropped by 80 per cent and at the ports by 38 per cent, it tried to encourage the growth of cotton both within the British Empire (mainly in India and the West Indies, but also in Natal and Australia) and elsewhere.

Table 2.3.1: British raw cotton imports and re-exports, in million lb.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total imports</th>
<th>From the US</th>
<th>Re-exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>1.391</td>
<td>1.116</td>
<td>250</td>
</tr>
<tr>
<td>1861</td>
<td>1.257</td>
<td>820</td>
<td>298</td>
</tr>
<tr>
<td>1862</td>
<td>524</td>
<td>14</td>
<td>215</td>
</tr>
<tr>
<td>1863</td>
<td>670</td>
<td>6</td>
<td>241</td>
</tr>
<tr>
<td>1864</td>
<td>893</td>
<td>14</td>
<td>245</td>
</tr>
<tr>
<td>1865</td>
<td>978</td>
<td>136</td>
<td>303</td>
</tr>
<tr>
<td>1866</td>
<td>1.377</td>
<td>520</td>
<td>389</td>
</tr>
</tbody>
</table>


India represented the first target of the MSCA as it was considered, in the British imagination, as the most suitable country to replace the US, but Indian cotton (surat) was different in quality from that of the American Southern states: it was short stapled and coarser, while the cultivation techniques used for its production were primitive and the infrastructure undeveloped. So, despite the rise in exports, Indian cotton could not replace the American varieties.

The most important producer outside direct British control was the Ottoman Empire: the Manchester Cotton Supply Association considered both Turkey and Egypt as two potential sources of supply and therefore started a campaign aiming to encourage its cultivation. The developments that took place in these two regions will be discussed in the sections which follow. An investigation of the changes in cotton production and trade during the period of the supply shock provoked by the American Civil War can provide some useful insights about the reactions of the Empire to the stimuli of the world economy: in both areas of the Empire the response was immediate, as reflected by their increased participation in the global

__long rested upon the treacherous foundations of restricted slave labour, as the main source of supply for its raw material__”. Fifth Annual Report of the Cotton Supply Association (Manchester, 1862), Earle (1926).

86 The contribution of Indian cotton jumped from 16 per cent of British imports and 1.1 per cent of French imports in 1860, to 75 per cent in Britain and 70 per cent in France in 1862.
network of suppliers, as well as by the rise in domestic cotton prices, the movements of which followed the world trend (see Figure 2.3.1). This prompt receptiveness and interconnected rapid adaptation to market changes have been held as clear evidence of the degree of integration of the Empire with the global economy (Pamuk, 1987; Kurmuş, 1987; Mihci and Mihci, 2002).

Figure 2.3.1: The movement of cotton prices in Liverpool, Alexandria and Izmir, 1857-1867, in pounds per metric ton.

2.3.1 Western Anatolia

The almost forgotten role of Anatolia as a cotton producer re-emerged in the 1860s through the active promotion of European manufacturers that enabled both the Izmir region and the Adana plain to benefit from the cotton boom in the wake of the American Civil War. The sensitivity of cotton cultivation and export to the abrupt change in foreign demand reflected the high marketing ratio of the crop. This sudden expansion in cotton production for export was part of a broader trend towards agricultural commercialisation that the Ottoman economy was witnessing (see, also, Section 2.2.1). In fact, during the three-quarters of a century preceding World War I, the commercial structure of the Empire began to shift towards agricultural commodity production for the world market, as reflected by the dramatic expansion of foreign trade and by the increased share of agricultural commodities in total exports. The years of the American Civil War were particularly important for this process of
commercialisation, during which cotton became one of the most important exports of the Empire.

The active campaign aimed at encouraging cotton production in Anatolia was initiated by European merchants and brokers, mainly from Lancashire, who were concerned about the dependency upon one single source of supply. Accordingly, the MSCA, working in collaboration with the British Foreign Office, sent a questionnaire to all British diplomatic agents in Turkey inquiring about the actual and potential state of cotton growing in their districts. One of the most promising replies came from Izmir, which, owing to its past as chief cotton exporter, had been dubbed “the New Orleans of the 18th Century”.

The campaign promoting cotton production necessitated the collaboration of the Ottoman government who was asked to subsidise and incentivise cotton cultivation through the distribution of American or Egyptian seeds, which were of superior quality to the native variety (yerli). In addition, the application of three fundamental measures, necessary for the improvement of cotton output, was suggested:

1) The abolition or reduction of the tithe on cotton, the weight of which was considered too oppressive for the farmers.
2) The improvement of the transport, and particularly the completion of the Izmir-Aydin railway line, in order to enable the creation of an efficient network between the fields and the port of Izmir.
3) Investments in machinery to increase productivity in the cultivation and cleaning of cotton.

Moreover, Lancashire cotton brokers founded three joint-stock companies⁸⁷ (the Asia Minor Company, the Asia Minor Cotton and the Ottoman Cotton Company) with the same aim to

⁸⁷ Cotton joint-stock companies were not the only joint-stock companies present in the Empire but they had the highest level of capital invested, as showed in the following table:

<table>
<thead>
<tr>
<th>Company</th>
<th>Capital (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smyrna Vineyard and Brandy Distillery Co.Ltd.</td>
<td>20,000</td>
</tr>
<tr>
<td>Asia Minor Tobacco Co.Ltd.</td>
<td>30,000</td>
</tr>
<tr>
<td>Ottoman cotton Co.Ltd.</td>
<td>100,000</td>
</tr>
<tr>
<td>Asia Minor Co.Ltd.</td>
<td>500,000</td>
</tr>
<tr>
<td>Asia Minor Cotton Co.Ltd.</td>
<td>100,000</td>
</tr>
<tr>
<td>Smyrna Fig Packers Ltd.</td>
<td>150,000</td>
</tr>
<tr>
<td>Ottoman Oil Co.Ltd.</td>
<td>30,000</td>
</tr>
<tr>
<td>Levant Trading Agency Ltd.</td>
<td>50,000</td>
</tr>
</tbody>
</table>

sponsor cotton production in the Empire: these companies controlled every stage of trade, from the planting of the crop to the retailing of the final product which consisted of cotton ginned and pressed into bales. Their efforts, together with those of the MSCA, received the attention of the Ottoman government who freely distributed seeds in various areas\(^\text{88}\) and granted privileges to cotton producers through the promulgation of the Imperial Command in 1862 which established that:

- Any piece of state wasteland could be taken gratis for the purpose of cotton cultivation.
- Such land would be exempt from taxation for five years.
- All grades of cotton would pay the same export duty which was fixed on the basis of the lowest quality cotton.
- Tools and machinery to be used in cotton growing and cleaning would be exempted from import duties.
- The government would distribute free seeds and provide free training in cotton cultivation.

However, reports by agents of the MSCA indicate that tax and other exemptions existed only on paper and that instead the Ottoman government resorted to the use of silver and gold medals as prizes for cultivators who met certain production requirements.

As shown in various reports from Agents of the Manchester Association the total area under cotton cultivation increased considerably in Anatolia: the substantial rise in production and exports to the European markets (see Table 2.3.3) led to a period of “cotton boom” and by itself cotton represented over 50 per cent of the value of total Izmir exports in 1864 (Kasaba, 1988). The area devoted to cotton around Izmir expanded four times between 1861 and 1862 and three times between 1862 and 1863. During these years the annual crop increased over tenfold, from 12,000 to 150,000 bales. However, despite the distribution of American and Egyptian seed, most of the planted and exported cotton was yerli which was of shorter staple, coarser and of inferior quality and therefore was not a good substitute of the American fibre.

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\(^{88}\) In 1862 74,040 lb. and in 1863 311,715 lb. of cotton seeds were distributed in Izmir.
Table 2.3.3: Total cotton exports from Izmir during the American Civil War.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cotton exports in cwt*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>78,000</td>
</tr>
<tr>
<td>1862</td>
<td>133,571</td>
</tr>
<tr>
<td>1863</td>
<td>234,000</td>
</tr>
<tr>
<td>1864</td>
<td>139,916</td>
</tr>
<tr>
<td>1865</td>
<td>328,640</td>
</tr>
</tbody>
</table>

* One cwt equals 112 lbs.

Sources: Kurmuş (1974); Kasaba (1988).

The overwhelming majority of plots newly brought under cotton cultivation were around the Izmir-Aydin railway line which enabled many towns of the interior to be connected with the main export market in Izmir: such movements of commodities were previously impossible owing to high camel rates. Thus, the old caravan routes were replaced by a new system of secondary caravan roads which developed around towns serviced by the railway. This represented important progress for the regional economy as it prompted linkages between smaller villages and main markets, allowing a transition from closed economies to market-oriented ones (see Map 2.3.1). According to a study conducted by Kurmuş (1974) the presence of the railway and the replacement of old camel routes generated a considerable social saving for the Western Anatolian economy owing to the improvement of existing traffic conditions, the stimulus to the creation of new trade and the reduction in inventory costs and in cargo losses.

The Izmir-Aydin train line was financed by a massive dose of British investment injected into the economy of the Ottoman Empire on an unprecedented scale and created enormous stimulus for the development of exportable crops. It was supplemented by another infrastructure investment, namely, the construction of the Izmir harbour, financed by French capital.

Thus, during the cotton boom production for the market led to the cultivation of cash crops which substituted for traditional ones and as a result of this process of commercialisation hand spinners and weavers suffered as Ottoman and foreign merchants re-routed raw cotton supplies away from them in favour of exports.
The years of the cotton boom attracted the interests of British merchants in regard to the process of ginning and pressing. The files of the British Foreign Office have recorded the activities of a prominent merchant, J.B. Gout, who opened ten mills in Western Anatolia where 266 ginning machines were powered by ten steam engines, four hydraulic presses and five water turbines.

Thanks to the higher productivity of Gout’s machines compared with the country’s average, he enjoyed a significant advantage in cotton cleaning and was therefore able to produce a remarkable share of Izmir’s cotton exports. The partial failure of the 1865 crop, coupled

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89 Gout’s share if Izmir cotton exports rose from 7.1 per cent in 1862, to 15.8 per cent in 1863 and reached 21.8 per cent in 1864. Kurmuş (1974).
with the end of the Civil War, proved disastrous and forced Gout into bankruptcy; his fate was shared by most of the other merchants who invested in this area of production.

After the passing of the 1867 law which granted the right of private ownership to foreigners, British capital began to be directed towards the purchase of land. Nevertheless, the substantial increase in British landownership did not lead to a dramatic change in the relations of production. According to Kurmuş (1974): “the British found it quite difficult to institute a capitalistic system on their holdings” and sharecropping remained the prevalent type of agreement between landlords and peasants. On British holdings the utilisation of wage labour increased compared with native holdings, but remained minor, overall. Under conditions of abundance of land and scarcity of labour, farmers did not have the incentive to work as wage earners and tended instead to concentrate their efforts on their small holdings.

When the Civil War was over the boom came to an end, the price of clean cotton dropped (see Table 2.3.4) and its production shrank dramatically. Both the government and the European companies lost interest in cotton cultivation: by the end of the 1870s although Ottoman raw cotton exports did not completely disappear they did not play any significant role in the global market and rarely reached 5 per cent of total Ottoman exports.

**Table 2.3.4: Cotton price index in Izmir, 1845-76; (1845-1849 = 100).**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cotton price index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1845-49</td>
<td>100</td>
</tr>
<tr>
<td>1850-54</td>
<td>118</td>
</tr>
<tr>
<td>1855-59</td>
<td>144</td>
</tr>
<tr>
<td>1860-64</td>
<td>442</td>
</tr>
<tr>
<td>1865-69</td>
<td>261</td>
</tr>
<tr>
<td>1870-74</td>
<td>194</td>
</tr>
<tr>
<td>1875-76</td>
<td>138</td>
</tr>
</tbody>
</table>

*Source: Kasaba (1988).*

The primary significance of the re-introduction of cotton to Anatolia during the 1860s falls within the framework of the process of large-scale transition to a cash crop economy that the Empire was undergoing during the 19th Century. The region of Izmir was second only to Istanbul in terms of commercialisation and the efforts to revive cotton cultivation and export intensified this development. Thus, the impact of the American Civil War acted as a catalyst
in the commercial development of the Empire and accelerated the pace of production for the external markets.

The failure to extend production after the post-cotton boom can be attributed to four main factors, already identified in Section 2.2: the heavy taxation imposed on production; the landholding structure of the Empire based on small plots; the paucity of both domestic and foreign investments and the absence of a sound credit system. The scarcity of available credit, coupled with very high interest rates (from 33 per cent to 50 per cent per year in Izmir), severely handicapped growth in production, investment in machinery and improvements in infrastructure and in the irrigation system.

2.3.2 Egypt

The sequence of events unfolding in reaction to the short supply of cotton in the 1860s is considered as one of the major turning points in the history of Egypt in the 19th Century. These years marked a definite change in the structure of the country’s economy during which cotton consolidated its position as the dominant export commodity: it shifted from comprising a share of around 30 per cent of total exports in the 1860s to comprising more than 90 per cent at the beginning of the 20th Century. According to Earle (1926), during its “economic revolution”, Egypt was transformed from a “more or less self-sufficient agricultural region, to a one-crop country dependent for its existence upon a flourishing export and import trade”.

The metamorphosis generated by the cotton famine took place during the initial rule of Sa’id Pasha (1854-1863) and by his successor Isma’il (1863-1879). Both rulers followed the path established four decades earlier by Muhammad Ali and centred their policies on the modernisation of the Egyptian economy, focusing on the “white gold”. To this purpose, they embarked on grand projects of infrastructure and irrigation development which were focused upon the completion of the Cairo-Alexandria railroad (built between 1851 and 1856), the Cairo-Suez line (completed in 1857), the improvement of the harbour facilities in Alexandria and the construction of new canals to facilitate the transport of the raw material from the plantations to the export port of Alexandria (Table 2.3.5 shows Isma’il’s spending on the

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90 Earle (1926); Owen (1969); Yousef (2000); Beckert (2004).
country’s infrastructure). At the same time, a number of cotton presses were bought and ginning factories had been built to improve productivity.

Both Sa‘id and Isma’il, like other members of the royal family, increased the proportion of land devoted to cotton production and engaged actively in importing new machinery (see Table 2.3.6) to improve methods of production. By 1864, 40 per cent of all fertile land in Lower Egypt had been converted to cotton cultivation.

Table 2.3.5: Expenditure in public works during the reign of Isma’il.

<table>
<thead>
<tr>
<th>Work</th>
<th>Cost in thousand £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suez Canal</td>
<td>12.000</td>
</tr>
<tr>
<td>Canals</td>
<td>12.600</td>
</tr>
<tr>
<td>Bridges</td>
<td>2.150</td>
</tr>
<tr>
<td>Alexandria harbour</td>
<td>2.542</td>
</tr>
<tr>
<td>Port of Suez</td>
<td>1.400</td>
</tr>
<tr>
<td>Alexandria waterworks</td>
<td>200</td>
</tr>
<tr>
<td>Railways</td>
<td>13.361</td>
</tr>
<tr>
<td>Telegraphs</td>
<td>853</td>
</tr>
<tr>
<td>Lighthouses</td>
<td>188</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45.159</strong></td>
</tr>
</tbody>
</table>


Table 2.3.6: Egyptian imports of steam engines and other machinery, 1860-66. Values in British pounds.

<table>
<thead>
<tr>
<th>Year</th>
<th>Steam engines</th>
<th>Other engines</th>
<th>Coal and cylinders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>38.070</td>
<td>69.457</td>
<td>55.216</td>
</tr>
<tr>
<td>1861</td>
<td>9.208</td>
<td>62.362</td>
<td>58.458</td>
</tr>
<tr>
<td>1862</td>
<td>59.540</td>
<td>74.854</td>
<td>78.831</td>
</tr>
<tr>
<td>1863</td>
<td>161.195</td>
<td>252.521</td>
<td>266.482</td>
</tr>
<tr>
<td>1864</td>
<td>312.884</td>
<td>402.071</td>
<td>405.071</td>
</tr>
<tr>
<td>1865</td>
<td>369.717</td>
<td>311.974</td>
<td>237.918</td>
</tr>
<tr>
<td>1866</td>
<td>101.204</td>
<td>105.428</td>
<td>57.551</td>
</tr>
</tbody>
</table>


Consequently, as a result of the government’s projects and of British pressure through the Manchester Supply Cotton Association and the Manchester Chamber of Commerce, Egyptian cotton exports multiplied five times during the years of the American conflict, reaching unprecedented levels (see Table 2.3.7)
Table 2.3.7: Volume and value of Egyptian cotton exports from Alexandria, 1860-6.

<table>
<thead>
<tr>
<th>Year</th>
<th>Qantar*</th>
<th>£E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>501.415</td>
<td>-</td>
</tr>
<tr>
<td>1861</td>
<td>596.000</td>
<td>1.430.880</td>
</tr>
<tr>
<td>1862</td>
<td>820.119</td>
<td>4.920.660</td>
</tr>
<tr>
<td>1863</td>
<td>1.287.000</td>
<td>9.354.490</td>
</tr>
<tr>
<td>1864</td>
<td>1.740.000</td>
<td>14.842.700</td>
</tr>
<tr>
<td>1865</td>
<td>2.597.000</td>
<td>15.443.120</td>
</tr>
<tr>
<td>1866</td>
<td>1.785.000</td>
<td>11.424.000</td>
</tr>
</tbody>
</table>

* One qantar of cotton is equivalent to 98-99 lbs. (44.928 kg.).


The majority of the cotton cultivators were peasants who owned small plots of land, but there were also a considerable number of large landholdings owned predominantly by the Viceroy and the royal family (by 1864 the Pasha and his entourage owned between one-eighth and one-ninth of the total cultivated area in Egypt).

The money needed for growing cotton came from a variety of sources: the fellahin borrowed it from village usurers and money-lenders, while large estate owners obtained advances from banks and credit institutions using land or cotton as collateral. The easy availability of credit was crucial to the development of the cotton market compared to the opposite scenario in the Western Anatolian region where lack of credit and high interest rates prevented its flourishing in the long term.

The cotton boom greatly accelerated European economic activities in Egypt as demonstrated by the large inflow of foreigners during these years, most of whom were involved in commercial or banking activities. European capital was also present in the country’s four main companies established during Isma’il’s reign: the Anglo-Egyptian Bank, the Medjidiah (Egyptian Steam Navigation Co.) which provided steam navigation in the Red Sea, the Eastern Mediterranean and the Nile, the Egyptian Commercial and Trading Company which offered crop loans to cultivators at 15 or 20 per cent per year, and the Société Agricole et Industrielle which offered to the farmers a system of cheap irrigation.

The massive projects embarked on by the government to improve the infrastructure and transportation network to promote cotton production required labour and capital: the former was often supplied in the form of corvée (forced labour), while the latter was obtained by borrowing abroad and by increasing taxation. The combination of these measures had a
profound impact on the social structure of the country, especially when the cotton boom came to an end.

In the summer of 1864, when the price of cotton reached its peak, a crisis affected the whole cotton sector whereby most of the firms made losses and various peasants lost their land, unable to repay their debt to the moneylenders. In a very interesting essay the historian Alan Richards (1987) explains the connection between the rise of cotton cultivation and peasants’ land losses, outlining how the former was responsible for the transition of the Egyptian economy into the capitalist system. The change in the relations of production brought about by the expansion of a cash-crop economy dependent on cotton exports is at the basis, according to the author, of a profound modification of the country’s social structure which led to the consolidation of power of the pashas (big landowners) and village sheikhs (religious leaders) and to the creation of a class of dispossessed fellahin. Thus, the booming cotton export industry: “destroyed the quasi communal form of land tenure, broke up the protective web of village social relations, replaced them with private property in land and individual tax responsibility and helped create four classes: large landowners, rich peasants, small peasant landowners and a landless class”. Egypt followed a similar pattern of social change to that which occurred in India, Brazil and other suppliers of the periphery engaged in cotton production during the years of the cotton famine, and thus experienced an increase in migrant labour (tarahil) leading to a wave of “peasantisation” and enlargement of the agricultural proletariat.

The cotton trade had remained steady during 1865 despite the drop in prices fuelled by the end of the Civil War in the US. This stability was mostly achieved thanks to the possibility of obtaining loans from Europe and its precariousness was revealed at the height of the London stock market crash in 1866 when credit availability froze and most firms and commercial houses went bankrupt: the Anglo-Egyptian Bank lost 205.000 pound while the Egyptian Commercial and Trading Company and the Société Agricole et Industrielle suspended their activities.

1866 marked the end of the cotton boom, thus heralding dark times in Egyptian cotton history: exports slumped, generating a considerable loss for an economy which had become

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91 Richards, 1982.
increasingly dependent on white gold. As a consequence of a worsening in the country’s balance of payments Isma‘il Pasha resorted to further borrowing and, at the same time, imposed a rise in the land tax thus erasing from the fellahin’s pockets most of the gains achieved during the previous boom years.

Nevertheless, Egypt did not follow the same path as that of Western Anatolia where cotton cultivation was dramatically reduced. Here, the area placed under cotton cultivation diminished, although production remained stable in successive years. The main factors preventing a further decline were: the active involvement of the government in the promotion of cotton production, the superior quality of the Egyptian fibre and the fact that prices, despite having dropped considerably, remained above pre-war averages (Table 2.3.8). This rapid recovery from the negative effects of the boom provides a strong evidence of the leading role assumed by the cotton industry in the country’s economy,92 which remained until the Second World War, one of the country’s main export commodities.

Table 2.3.8: Price of Egyptian cotton, 1860-1870

<table>
<thead>
<tr>
<th>Year</th>
<th>Price (£ per metric ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>54.82</td>
</tr>
<tr>
<td>1861</td>
<td>63.5</td>
</tr>
<tr>
<td>1862</td>
<td>104.15</td>
</tr>
<tr>
<td>1863</td>
<td>165.85</td>
</tr>
<tr>
<td>1864</td>
<td>205.55</td>
</tr>
<tr>
<td>1865</td>
<td>142.06</td>
</tr>
<tr>
<td>1866</td>
<td>161.25</td>
</tr>
<tr>
<td>1867</td>
<td>106.20</td>
</tr>
<tr>
<td>1868</td>
<td>93.644</td>
</tr>
<tr>
<td>1869</td>
<td>98.897</td>
</tr>
<tr>
<td>1870</td>
<td>94.329</td>
</tr>
</tbody>
</table>


---

92 Between 1876 and 1879 cotton and cotton seeds made up 70 per cent of the country’s exports earnings.
2.4 A demand shock: the 1873-96 depression and its repercussions on the Empire

The consequences of the turmoil caused by the American Civil War prolonged themselves after the termination of the conflict, reverberating in the following decades. The negative supply shock which stimulated cotton cultivation in the “new” loci of production cannot be considered as an isolated episode in itself owing to the long-lasting effects it had on the whole industry, both on raw material production and on trade and manufacturing. The massive inflation of prices experienced in the years of the cotton famine during which prices skyrocketed to unprecedented levels was followed by a long deflationary trend: cotton prices started to fall at the end of the conflict and underwent a protracted decline which lasted until 1899, interrupted only in 1869 and in 1872 (Figure 2.4.1).

Figure 2.4.1: Trend in world cotton prices, 1873-1896, in British pounds per metric ton.

The downturn that the cotton industry was experiencing followed a common trend in the global economy which between 1873 and 1896 underwent a secular depression in prices: this worldwide period of deflation gained the label “great depression” or “price depression”. However, the effects of the deflationary crisis were felt more strongly in the cotton industry as an inevitable reaction to the price upsurge caused by the American Civil War and were not merely a reflection of the general worldwide decline in the price of primary commodities. Thus, between 1873 and 1896, cotton prices sank 50 per cent more than other wholesale prices.
The main reason for the decline in prices has been identified as stemming from an over-expansion of cotton supply which was not matched by an equivalent rise in demand for yarn and cloth. The over-expansion was determined by a set of factors: increased production in Egypt, India, Brazil and China, the more widespread use of future contracts (which expanded existing supply) and, above all, the re-entry of the American “cotton kingdom” as a global producer, where the cotton belt expanded further eastwards, especially into Texas.

Another important factor leading to the deflationary period has been traced back to mounting foreign competition and the lost monopoly of Britain as the main cotton manufacturing country: this trend was reflected in the declining global share of British raw material consumption (as depicted in Figure 2.4.2) and in Britain’s declining rates of export volumes and values which were matched by a parallel rise in the Continent, particularly in Germany (unified in 1871), the US and Asia.

*Figure 2.4.2: Shares of world raw cotton consumption, 1856-1883.*

![Pie chart showing cotton consumption shares](image)


Thus, the initial competitive advantage of Lancashire textiles had been challenged by rival centres of production in Europe, America and Japan, where the development of the industry
was facilitated by a protectionist trade policy. Competition came also from China and India where tariffs were absent until 1917 and 1932, respectively. Consequently, the share of British spindles and raw cotton consumption decreased as foreign industries expanded. Also, the export value of cotton manufactures, both yarn and cloth, entered a period of decline, particularly the share of exports shipped to Europe and the US which sank by more than one-third between 1873 and 1896 and accounted for 60 per cent of the loss of exports by the industry in Britain in 1873-9.

During the first phase of the price depression the contraction of American and European demand for British textiles had been compensated for by an expansion of the Asian and Ottoman markets (Table 2.4.1). However, the latter jointly decreased in importance over time and, as a result of these combined trends Britain’s share of the world trade in cotton goods declined from 81.9 per cent in 1882-4 to 77.6 per cent in 1891-3 and to 69.9 per cent in 1909-13.

Table 2.4.1: Percentage distribution of cotton piece goods exported by Great Britain.

<table>
<thead>
<tr>
<th>Years</th>
<th>Europe</th>
<th>US</th>
<th>Turkey, Egypt</th>
<th>India</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>1820</td>
<td>51</td>
<td>10</td>
<td>4</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>1850</td>
<td>16</td>
<td>8</td>
<td>14</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>1880</td>
<td>8</td>
<td>2</td>
<td>13</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>1900</td>
<td>6</td>
<td>1</td>
<td>14</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>1913</td>
<td>6</td>
<td>1</td>
<td>14</td>
<td>42</td>
<td>16</td>
</tr>
</tbody>
</table>

*Source: Kindleberger (1961: 296).*

The continuous slump in prices combined with the absence of changes in wage rates led to a reduction in profitability: returns to capital underwent a downward trend which was not reversed until 1904. Average capital returns fell by 5.1 per cent between 1850-72 and 1873-96, but if the anomalous years of the cotton famine are excluded the rate of profit decline increases sevenfold, reaching 35.4 per cent (see Table 2.4.2). The nadir took place in 1891-3 when the volume of imports of raw cotton dropped by 29 per cent, the value of yarn exports by 36.6 per cent and the value of cotton manufactures sold to the Far East shrank by 27 per cent.
Table 2.4.2: Average annual gross returns to capital in the British cotton industry, 1820-1896.

<table>
<thead>
<tr>
<th>Years</th>
<th>Pence per lb. of cotton consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819-21</td>
<td>25.66</td>
</tr>
<tr>
<td>1829-31</td>
<td>13.57</td>
</tr>
<tr>
<td>1844-6</td>
<td>8.2</td>
</tr>
<tr>
<td>1850-72</td>
<td>6.49</td>
</tr>
<tr>
<td>1850-72 (excluding 1862-3)</td>
<td>16.99</td>
</tr>
<tr>
<td>1873-96</td>
<td>6.16</td>
</tr>
</tbody>
</table>


The decline in profitability, together with the increase in protectionist policies by competitors, especially Germany and the US, led to a disruption of the cotton trade and a fragmentation of the previously established global commerce of the fibre. The search for new markets and the protection of established ones, both as sources of raw material and as recipients of manufactured goods, led to a wave of competition among European nations and to the division of the world economy into spheres of influence. The Ottoman Empire, which still preserved its territorial integrity, represented one of these captive markets.

As described in previous sections, cotton production in the Empire started declining after the end of the American Civil War; the global slump in prices which was transmitted to both Western Anatolian and Egyptian producers had opposite impacts in these two areas. In the Izmir region, cotton cultivation experienced a strong negative impact brought about by the great depression whereby the volume and value of its cotton exports showed a persistent decrease. In Egypt, on the other hand, raw material production recovered quickly after the post-boom downturn and started to flourish again, reconfirming cotton’s primary position in the country’s economy.

The developments of the cotton trade and production during the great depression in Egypt and Western Anatolia will be outlined in the following sections.

2.4.1 Western Anatolia

For the Ottoman Empire the first years of the price depression entailed a period not only of economic crisis but also of political and social changes of extraordinary significance: the 1873 market crash in Europe put to a halt to the flow of European loans to Istanbul; in 1876 a new constitution was proclaimed and in the same year a state insolvency on external
borrowing was declared; the 1877/8 war with Russia ended with considerable territorial losses (Bosnia, Herzegovina, Bulgaria, Kars, Batum and Cyprus).

The entire duration of the depression was characterised by slower rates of commercial growth and diminished foreign capital inflows, while the most remarkable effect of the negative financial and trade conjuncture was a relative slowdown of the Ottoman economy’s world market orientation.

This negative downturn also affected cotton farming and almost the entire period of the global price deflation, when the Ottoman Empire was ruled by Sultan Abdul Hamid II (1876-1909), was characterised by the virtual absence of government intervention in the promotion of cotton cultivation. The loss of interest in production of the crop was principally due to the fall in domestic prices (see Table 2.4.3). This trend reflected the drop in world prices due to the decrease in global cotton demand and the difficulty in competing with the higher quality American and Egyptian fibre. With the re-entry of the US into the cotton market, the demand for Turkish yerli cotton dropped: Britain was replaced as the main importer by Austria and Spain whose mills utilised a coarser fibre and they became the main recipients for the inferior quality Turkish cotton.

**Table 2.4.3: Annual average cotton prices in Izmir, 1876-1900.**

<table>
<thead>
<tr>
<th>Years</th>
<th>Price (piastres per okke*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876-80</td>
<td>8.11</td>
</tr>
<tr>
<td>1881-85</td>
<td>7.61</td>
</tr>
<tr>
<td>1886-90</td>
<td>6.67</td>
</tr>
<tr>
<td>1891-95</td>
<td>5.34</td>
</tr>
<tr>
<td>1896-1900</td>
<td>4.88</td>
</tr>
</tbody>
</table>

* One Turkish lira (=1.10£) comprised 100 piastres; 39.58 okkes were equivalent to one cwt which was equal to 112 lbs.  
**Source:** Quataert (1973).

There were only two pre-1900 Hamidian efforts to promote cotton production in Anatolia in the 1880s. In 1885 cotton seeds from Selanik were exempted from interior custom duties and distributed to the Izmir and Adana areas. Six years later, the Agricultural Bank imported American cotton seeds and distributed them to five Anatolian provinces, providing booklets to the farmers with instructions on cultivation methods. The results achieved were limited and both the quantity and value of cotton exports experienced a downward trend during the entire length of the great depression (see Figure 2.4.3). The only satisfying results were obtained in
the Çukurova plain on the south-eastern coast of Anatolia: in the early 1870s the state gained control over the nomadic yörük tribes, drained the delta and established private property rights; cotton plantations were started there on large estates during the depression and began to flourish during the successive phase of economic expansion (1896-1914), thanks to the active involvement of German capital.

The Levant times of Istanbul published an article about the decline in cotton production in the 1870s indicating government lack of effort to encourage its cultivation: “It is very regrettable that a decline in cotton production in Turkey is being observed. The local governments have neglected to distribute fresh seeds among farmers, to train the farmers in such methods as
best apply to growing cotton in those areas, to build dykes to divert rainwater and prevent swamps, and to take other similar measures”.  

The negative conjuncture that afflicted cotton production reflected the more general phenomenon of declining terms of trade in the whole Ottoman economy. During the great depression the rates of growth of foreign trade dropped thus reversing the previous favourable trend of unprecedented increase in both exports and imports, which began in the aftermath of the Napoleonic wars and was further stimulated by the establishment of trade treaties with Europe in the late 1830s. Exports, measured at 1880 constant prices, declined from 6.2 per cent per year during 1857-73 to 2.7 per cent in 1879-99. Also imports, measured in constant prices, dropped from 5.2 per cent to 2.5 per cent during the same years. The decline becomes even more pronounced with the use of current prices (Pamuk, 1987).

The worsening of the terms of trade and the overall negative performance of the Ottoman economy put a further strain on the Empire’s finances, the negative balance of which had been lightened by recourse to large borrowings from Europe since the mid-century. An inability to pay back the borrowed funds led to a substantial increase in state debt and eventually to the collapse of Ottoman finances in 1873, coinciding with the stock exchange crisis in Europe and the US. The halt in capital inflows from Europe which inevitably led to state bankruptcy in 1876, and the inability to repay government debt, marked the beginning of European control over Ottoman finances, through the establishment of the Ottoman Public Debt Administration. The depression-induced decline in prices had the effect of increasing the burden of the outstanding debt and further exacerbated the fiscal crisis.

The period of price deflation was also marked by the weakening of Britain’s position in Ottoman trade, followed by a major change in the partitioning of the Empire into spheres of influence among European powers whereby the 1870s saw a virtual cessation of British investment which was replaced by German, Austrian and, to a lesser extent, French investments. The inter-imperialist rivalry among the European powers took the form of competition in railroad and infrastructure building. From the perspective of commerce, the

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94 According to Pamuk’s calculations (1984) the index of Ottoman terms of trade with industrialised countries (major European states and the US) declined from 105.6 during 1870-72 to 86.6 during 1887/9 and 91.8 in 1894-6.
95 Measured in current prices, the average rate of export growth dropped from 5 per cent to 1.2 per cent and average import growth declined from 4.9 per cent to 0.6 per cent between 1857-73 and 1879-99.
British share of Ottoman trade diminished considerably but continued to be dominant till the dissolution of the Empire. Table 2.4.4 portrays the declining role played by British exports and the corresponding ascent of Germany and Austria whose growing presence was reflected in the increase in number of merchant houses.

A revived interest in Anatolian cotton came at the end of the price depression following a renewed increase in global demand outstripping existing supplies which led to an upsurge in raw cotton prices, as will be described in detail in Section 2.5.

Table 2.4.4: Distribution of Izmir’s imports.

<table>
<thead>
<tr>
<th>Years</th>
<th>U.K.</th>
<th>Austria-Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>1877-80</td>
<td>45.2</td>
<td>14.1</td>
</tr>
<tr>
<td>1881-84</td>
<td>44</td>
<td>15.2</td>
</tr>
<tr>
<td>1885-88</td>
<td>37.7</td>
<td>18</td>
</tr>
<tr>
<td>1889-92</td>
<td>33.2</td>
<td>19.4</td>
</tr>
<tr>
<td>1897-1900</td>
<td>32.8</td>
<td>23.1</td>
</tr>
</tbody>
</table>


2.4.2 Egypt

“My country is no longer in Africa, it is now in Europe”

Isma’il the Magnificent

The years of the great depression afflicted also Egyptian raw cotton prices which underwent a downward trend for the entire period (1873-96) as depicted in Figure 2.4.4. Nevertheless, cotton continued to maintain a prominent role in the Egyptian economy, and during the price deflation it was the primary recipient of government investment. The major export country remained Great Britain, followed by Russia and France.

Cotton production remained stable after the post-boom decline and started increasing in the early 1870s, and by 1875/6 the quantity of exports surpassed the glorious years of the American Civil War. This rapid recovery from the post-boom decline, despite the period of

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96 Cleveland (2004: 95).
price deflation, together with the government stimulus for production, reconfirmed cotton’s predominant position in the Egyptian economy. The high quality of its fibres which allowed the weaving of finer fabrics created a constant demand, even during the depression years.

Figure 2.4.4: Trend of Egyptian raw cotton prices during the great depression 1873-96, in British pound per metric ton.


During the entire duration of the depression cotton and cotton seeds continued to constitute over 70 per cent of the country’s total exports earnings, with the only exception being 1878/9 when the crop was damaged by the extremely low level of the Nile in 1877. Figure 2.4.5 illustrates the increasing trend in the country’s cotton exports in volume, which was nearly sufficient to counteract the long downward trend in prices. The value of exports, after a quick recovery from the bad crop in 1878, dropped slightly until the mid-1880s and then rose again, reaching levels superior to the pre-depression era.

Figure 2.4.5: Trend in Egyptian raw cotton exports, 1873-96.

The port city of Alexandria, the central hub of the cotton trade, underwent improvements and became the fourth most important harbour in the Mediterranean (in terms of tonnage of incoming and outgoing ships): new docks, jetties and wharves were built; the streets connecting the railway station with Miniat-al-Bassal, where most of the cotton was sold, were paved; both a rail and telegraph connection were established with the towns at the centre of the main Delta producing districts; the Egyptian post office started to provide a secure method for sending funds to all branch offices in Middle and Lower Egypt through the transmission of money orders, gold and silver. Table 2.4.4 shows government expenditure in improving the country’s infrastructure during Isma’il’s reign.

Table 2.4.4: Estimates of expenditure on public works by the Egyptian government, 1863-79.

<table>
<thead>
<tr>
<th>Public Works</th>
<th>Thousands £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railways</td>
<td>13.361</td>
</tr>
<tr>
<td>Canals</td>
<td>12.600</td>
</tr>
<tr>
<td>Bridges</td>
<td>2.150</td>
</tr>
<tr>
<td>Telegraphs</td>
<td>853</td>
</tr>
<tr>
<td>Alexandria waterworks</td>
<td>200</td>
</tr>
<tr>
<td>Alexandria harbour</td>
<td>2.542</td>
</tr>
<tr>
<td>Cairo/Alexandria (general improvements)</td>
<td>5.000</td>
</tr>
<tr>
<td>Lighthouses</td>
<td>188</td>
</tr>
<tr>
<td>Suez Canal</td>
<td>12.000</td>
</tr>
</tbody>
</table>


The number of ginning factories, which had closed down after the end of the Civil War, expanded again. Commercial houses, like the Greek Planta’s, which originally traded all sorts of commodities, started concentrating mainly on cotton and opened branches in Liverpool to market their produce.

Because of the great depression which saw a general decline in foreign investments, the cotton sector did not experience any major change in terms of the involvement of external capital, not even in the first phase of the territorial occupation by the British forces in 1882. Foreign capital continued to play a minor role in the cultivation of cotton itself and, as in the previous periods, remained concentrated in the ginning factories and merchant houses. Direct contact between Muslim fellahin and European ginners and merchants continued to be limited and trade transactions were facilitated by intermediaries, mainly Armenians, Greeks and Jews, who at the same time owned most of the commercial houses and also played the
role of village usurers. The increased involvement of foreign capital, mainly in the processing of cotton, took place after the price depression at the beginning of the 20th Century.

Despite the consolidated, fundamental role played by cotton in the national economy thanks to which the country enjoyed a favourable balance of trade, cotton revenues could not keep pace with the large amount of government funds expended. Hence, the latter were mainly acquired through heavy domestic taxation and external borrowing: increases in the land tax started soon after the end of the cotton boom and were coupled with a series of rises in other forms of taxation both direct (poll tax, tax on date trees, a house tax, a salt tax, an animal tax) and indirect (bridge and ferry tolls) and by the corvée, which continued to be used for government works. Due to the decline in export prices, increased fiscal burden, the consequent indebtedness and recruitment for the corvée, rural poverty rose steadily and many peasants lost their land, thus swelling the numbers of landless workers that in the early 1870s constituted about one-third of the rural population.

The mounting debt had to be supplemented by the resorting permanently to international borrowing, which accelerated in the late 1860s during the rule of Isma’il Pasha whose ambitious schemes to transform Egypt into a European country, coupled with his lavish and extravagant personal expenses, proved disastrous. In 1875 Egypt sold to the British government 44 per cent of the Suez Canal Company which had been opened six years earlier at the completion of the Suez Canal. This, together with other measures aimed at decreasing the country’s debt, proved ineffective. In 1876, the same year of the Ottoman default, the Pasha declared the suspension of interest payments and the (subsequent) state bankruptcy.

The consequences of the default proved to be more severe for Cairo than for Istanbul as the latter continued to maintain formal political independence. In Egypt, the Caisse de la Dette Publique (Public Debt Commission) was established, thus marking the beginning of European direct control over the country’s finances. Using Jacques Berque’s words (1968),

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97 From 1863 to 1872 exports had approximately doubled imports. Berque (1968).
98 Owen (1969) reports that in 1874 150,000 men were taken away from their villages to build roads. They received no pay, had to provide their own food, and were expected to work on the Khedive’s cotton fields when they returned home. Jacques Berque (1968) states that the number of fellahin who worked as corvée increased to 173,000 in 1882 when labourers were used by the government for 151 days.
99 In 1872 Isma’il issued a muqabala law which allowed landholders to pay six times their annual land tax in advance in exchange for being exempt from it in the future.
the whole country became “a mortgaged security in the service of the Public Debt”. The Caisse was composed of four representatives from the European creditor nations whose role was to make sure that public debt was serviced, and by two controllers, one French and one British, who directed Egyptian government expenditure. This system gave origin to the term dual control, used to designate the period that preceded British military occupation of the country.

During the time of dual control the area devoted to cotton showed almost no advance, both as a result of the lower price it fetched in Alexandria and as a consequence of the Urabi rebellion of 1879-1882 when canals were blocked and ginning factories plundered. Urabi, a peasant raised to the rank of army colonel, started a national campaign to prevent European financial control over Egypt. He gained the support of both the army and the peasants who looked upon him as the leader who would relieve them of the burden of taxation and indebtedness. A widespread national movement ignited by the slogan “Egypt for the Egyptians” arose creating a real threat to the rule of the Pasha. The Urabi revolt was shouted down by English military intervention, which, with the bombardment of Alexandria in 1882, marked the beginning of the British occupation. However, London did not formally define its relationship with Egypt: the latter was not officially declared a colony or a protectorate but remained, in theory, an autonomous province of the Ottoman Empire that continued to be ruled by a hereditary khedive100 (viceroy) who at the time was Tawfiq Pasha (he governed from 1879 until his death in 1892), the son of Isma’il.101 His exercise of power was limited greatly however by the advice of British agents and by the consul general who became the de facto ruler of the country.

The period of relative stagnation of the cotton sector that characterised the first decade of British rule in Egypt was followed at the beginning of the new century by an expansionary phase and an upturn in cotton production, trade and investments, as will be thoroughly explained in following section.

100 The term khedive is of Persian origin and means lord or master, implying something closer to royalty than the position of governor. The title of khedive of Egypt, self-proclaimed by Muhammad Ali, was officially recognised by Isma’il Pasha in 1863 on the occasion of his visit to Cairo. In addition, Egypt was granted the right to expand its own army, to issue its own currency and to contract foreign loans.

101 Isma’il Pasha was deposed in 1879 by the Ottoman Sultan Abdul Hamid under pressure from the British and French, after he dismissed the controllers of the Public Debt Administration.
2.5 The 20th Century: growth after the depression

“The world cotton industry came to be structured more by imperial states and their colonies and less by the workings of the markets organised by the capitalists themselves”

Beckert (2005: 1431)

The end of the great depression (1873-96) brought to a close an era of price deflation in the major global commodity markets and slower rates of economic growth internationally. The new century marked the beginning of an expansionary phase for the world economy which lasted uninterrupted until the outbreak of the First World War. These global developments affected the cotton industry and were reflected in a considerable rise in both production and mill consumption (see Figure 2.5.1). The technological improvements in the textile industry increased cotton’s substitutability for other raw materials so that at the beginning of 1900 table and bed “linen”, shirts, handkerchiefs and collars were almost entirely made of cotton. Moreover, the development of the process of mercerising which allowed the creation of a silk-like thread further increased the usage of cotton for superior goods.

Figure 2.5.1: World cotton production and mill consumption in thousands bales of 500 lbs, 1890-1913.

Source: Todd (1915).
Todd in “The World’s Cotton Crops” (1915) stresses that one of the crucial factors of the rise in cotton demand was connected with the considerable improvement in the quality of cotton goods which were made available at affordable prices for an enlarged middle class. An unprecedented rise in the standard of living of the working class also dramatically contributed to the expansion of cotton demand. According to Williamson (1996), the improvement in the living conditions of the periphery was at the basis of a higher demand for textiles, too.

Hence, the faster growth in demand for the raw fibre compared to its supply, due to the consumption of more and better clothing worldwide, led to a steady price rise in all cotton varieties, as depicted in Figure 2.5.2.

Figure 2.5.2: Trends in global cotton price movements, 1896-1914 (Liverpool prices).

Source: Todd (1915).

One of the main consequences of the price surge in all cotton types was the mobilisation of most European powers in the search for new and cheaper sources of supply. The hunt for untapped raw material sources intensified the imperialist rivalry among nation states, leading to a consolidation of state power and to the increasing role of governments in securing external markets. Both Africa and the Ottoman Empire became the epicentre of the revived interest in cotton-growing activities brought about by the positive economic conjuncture that came with the new century. Manufacturers and merchants in Great Britain, Germany and France founded cotton-growing societies aimed at incentivising production in the respective

\[102\] According to the US Department of Agriculture, in 1906 one-half of the estimated 1,500 million of world population was only partially clothed, while 250 million wore no clothing. Nine-tenths of the clothing worn was made of cotton.
colonies: the British Cotton Growing Association (BCGA), like its German and French counterparts, the Kolonialwirtschaftliches Komitee (KWK) and the Association Cotonière Coloniale (ACC), encouraged state involvement in the territories where cotton was grown. Thus, both manufacturers and imperial states favoured colonial cotton production: the British in India, Egypt, Sudan and West Africa, the French in Mali, Algeria and the Ivory Coast, the Germans in Togo, Cameroon and Uganda, the Portuguese in Angola, the Italians in Eritrea and the Russians in Central Asia.

Parallel to these developments, European states started rising their import tariffs on textiles so that exports to the respective formal and informal colonies became of paramount importance. As mentioned in Section 2.1.2, British textile exports by the end of the 19th century were mainly directed to Asia, Latin America and Africa (76 per cent in 1896), while seventy years earlier Western Europe and the US were British major export recipients (73 per cent in 1820). Furthermore, another process interconnected with these developments was underway in the new century: the locus of cotton manufacturing shifted from the developed core of the Continent to both Southern and Eastern Europe and to some areas of the periphery, namely India, Japan, Latin America and Turkey. Thus, cotton mills moved slowly from Manchester, the former “Cottonopolis” of the world, to areas with lower labour costs.

Egyptian and Western Anatolian cotton fields became one of the targets of the European thirst for new resources, but the two areas of the Empire underwent different paths: Egypt was militarily occupied by Great Britain in 1882, while Anatolia maintained its formal political independence, like the rest of the Empire. During the years of British rule the dominance of cotton as an export crop intensified, influenced by the political and financial strength of large cotton interests in Egypt and their counterparts in Lancashire. The further development of the cotton economy was prompted by two joint factors:

a) A series of government projects aimed at improving the system of irrigation, transport and drainage.

b) The intensification of market linkages, visible through the investment of private British capital in the development and financing of land purchases, in the extension of credit to cultivators and in the development of cotton processing (ginning and pressing).
In Anatolia the new century was characterised by intensification of the inter-imperial rivalry, both in the economic and in the political arena. The most acute struggle to gain mastery over Turkish trade was between England and Germany and ended with the victory of the latter. Britain lost a considerable share of its exports of cotton cloth and yarn to Germany, which in turn also incentivised Anatolian raw cotton production.

Another crucial difference between the two areas of the Empire lies in the foundation of mechanised mills in Turkey, so that a portion of raw cotton was used by the domestic sector. Such developments did not occur in Egypt where cotton remained predominantly an export crop.

The outcomes of the experiences of the two Ottoman regions will be illustrated in the following sections.

2.5.1 Western Anatolia

The end of the price depression prompted a new stimulus in the production of Anatolian cotton, driven by the increase in both global and domestic demand and by the consequent rise in cotton prices; between 1896 and 1900 raw cotton prices in Izmir increased by 33 per cent and in the 1906-1908 period they rose again by 5 per cent (Quataert, 1973). Figure 2.5.3 depicts price trends in Izmir between 1876 and 1914.

*Figure 2.5.3: Cotton price movements in Izmir, 1896-1914, in British pounds per metric ton.*

![Cotton price movements in Izmir, 1896-1914](image)

*Source: Quataert (1973).*

The beginning of the new century signified the inauguration of a situation roughly analogous to the American Civil War, characterised by a drift in the involvement of the Ottoman
government in cotton production and by a rise in the state’s investment. Cultivation was encouraged by the subsidizing of cotton seeds and the building of new infrastructure. Moreover, the Istanbul Chamber of Commerce initiated a program urging farmers to shift from cereal to cotton farming.

Government intervention was coupled with the decisive role of German capital engaged in the promotion of cotton, in an attempt to establish dominance over the Ottoman Empire in a continuous struggle with Great Britain. In particular, cotton cultivation was promoted by the activities of the Deutsche Levantinishe Baumwolle Gesellschaft (German Levantine Cotton Society) through the construction of railways, the distribution of American and Egyptian seeds and the provision of low-interest loans to farmers. Its involvement, mainly concentrated in the Adana region, led to a substantial increase in cotton production and exports. Particularly determinant for these improvements was the Mersin-Tarsus-Adana railway line incorporated into the German-controlled Baghdad Railway. According to a consular trade report: “the advent of the Baghdad Railway into remoter parts of the (Adana) vilayet has had the effect of bringing large tract of good arable land under the plough”.

Furthermore, the German government, motivated by its domestic needs for the raw material, intervened directly in the processing of cotton and sent to both Izmir and Adana a group of American cotton experts it had hired to develop cotton farming in its African colonies: these experts provided advice on farming methods and on ginning and baling techniques. The German involvement in the cotton sector could also be seen in the activities of the once vice consul Herr Raffauf: in 1897 he was appointed advisor to the Finance Ministry by the Sultan and proceeded to design a detailed program to develop Anatolian cotton production aimed at increasing state revenues.

The impact of these policies was different in the two Anatolian regions: while in Adana cotton exports increased over time, in Izmir production edged upwards (Quataert, 1973; Todd, 1915) but exports rose slowly to an annual average of 30,000 bales in the post-1900 era, a

103 At the beginning of the 20th Century Germany completed its Industrial Revolution and was considered as the biggest rival for Britain in the world markets.
104 The Ottoman Railway Company of Anatolia was founded by a group of German banks led by Deutsche Bank. A direct railway connection was built between Berlin and Istanbul. Furthermore, the Ankara-Eskisehir branch and the main line from Scutari to Konia were completed in the early 1890s. In 1902 the line was extended to Baghdad.
105 Henderson (1948).
level lower than that reached in the late 1870s (see Table 2.5.1). Most of these exports were
directed to Spain, France and Austria. Hence it appears that an increasing proportion of
cotton production was directed to the domestic market to satisfy the needs of a nascent
mechanised cotton textile industry.

Table 2.5.1: Annual average cotton exports in Izmir, 1876-1908 (one bale = 440 lb.)
1901-05= 100.

<table>
<thead>
<tr>
<th>Time increment</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876-1880</td>
<td>38.186</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td></td>
<td>315.606</td>
</tr>
<tr>
<td></td>
<td></td>
<td>141</td>
</tr>
<tr>
<td>1881-1885</td>
<td>30.534</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>280.770</td>
</tr>
<tr>
<td></td>
<td></td>
<td>125</td>
</tr>
<tr>
<td>1886-1890</td>
<td>26.850</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>236.878</td>
</tr>
<tr>
<td></td>
<td></td>
<td>106</td>
</tr>
<tr>
<td>1891-1895</td>
<td>22.076</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>190.045</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85</td>
</tr>
<tr>
<td>1896-1900</td>
<td>20.431</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>169.702</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>1901-1905</td>
<td>27.439 (38,333)*</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>223.777</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>1906-1910</td>
<td>33.476 (41,666)*</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>248.708</td>
</tr>
<tr>
<td></td>
<td></td>
<td>111</td>
</tr>
<tr>
<td>1911-13</td>
<td>55.000 (36,147)*</td>
<td>200</td>
</tr>
</tbody>
</table>

*In brackets: average annual production. Todd (1915:85).

Sources: Quataert (1973); Owen (1993).

The rate of expansion of the domestic industry at the end of the 19th Century was much more
rapid than in the years of the price depression when the declining world price of yarn
favoured the growth of imports and the substitution away from domestic hand-spun yarn.
Moreover, according to Pamuk estimates (1987), two trends can be observed after 1896: the
share of textiles imports declined and the level of domestic production expanded at the same
pace as the size of the domestic market and of the volume of imports. A rising portion of
Anatolian raw cotton was in fact employed in a series of new modern factories which used
imported technology for yarn production (see Table 2.5.2).

Table 2.5.2: Estimates of consumption and production of cotton textiles in the Ottoman
Empire, 1820-1910 (annual averages in tons).

<table>
<thead>
<tr>
<th>Consumption (kg)</th>
<th>Imports</th>
<th>Hand made</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita</td>
<td>Total</td>
<td>Cloth</td>
<td>Yarn</td>
</tr>
<tr>
<td>1820-2</td>
<td>0.90</td>
<td>12’150</td>
<td>450</td>
</tr>
<tr>
<td>1840-2</td>
<td>1.00</td>
<td>15’000</td>
<td>4’100</td>
</tr>
<tr>
<td>1870-2</td>
<td>1.52</td>
<td>28’050</td>
<td>17’300</td>
</tr>
<tr>
<td>1880-2</td>
<td>1.65</td>
<td>33’700</td>
<td>24’400</td>
</tr>
<tr>
<td>1894-6</td>
<td>1.87</td>
<td>42’100</td>
<td>26’950</td>
</tr>
<tr>
<td>1909-11</td>
<td>2.66</td>
<td>67’900</td>
<td>49’350</td>
</tr>
</tbody>
</table>

The expansionary phase experienced by the Ottoman economy after 1896 is reflected in the considerable increase in per capita cotton textile consumption which grew by 40 per cent between 1894-6 and 1909-11, at an average annual rate of 2.4 per cent. These rates were much higher than those of the last years of the great depression when per capita cotton textile consumption rose by 14 per cent (i.e. at 0.9 per cent per year). Another remarkable comparison between the two phases can be made from an analysis of the change in the volume and composition of imports: the period between 1880-2 and 1894-6 saw a much higher pace of growth in yarn than in cloth imports, which increased by 8 per cent and by 70 per cent, respectively. On the other hand, in the following period (between 1894-6 and 1909-11) an opposite trend was underway: imports of cloth jumped by 85 per cent while imports of yarn grew by only at 13 per cent. These phenomena can be explained in the light of the changes in income levels over time: the great depression was a phase of relative stagnation and agricultural incomes were not growing fast owing to the unfavourable terms of trade; hence yarn was imported and hand woven within rural households. On the other hand, as agricultural incomes began to rise after 1896 in connection with the improvements in the terms of trade, rural households shifted their preferences from hand-woven to imported cloth. Moreover, yarn imports declined owing to the emergence of modern mills which used locally grown cotton and imported machinery: the first factories were established in Salonika around 1879 and in Macedonia at the end of the 1880s. In the following years cotton spinning mills were founded in Adana, Izmir, Istanbul and elsewhere in the Empire. Before the First World War the Izmir region saw the founding of several textile factories: the Menderes plain had 12 spinning mills with 270 gins: in Magnesia there were the largest factories with 20 gins: in the Kaystros plain 6 mills with 90 gins and in Izmir itself two large spinning and weaving factories processed cotton. One of these factories, endowed with 20,000 spindles and 100 looms, could process 6,000 bales per year and employed 600-700 workers. The other one had 800 spindles and 300 looms and processed around 4,000 bales per year. Izmir cotton was also used in the mills of the neighbouring Greek islands (two mills in Mytilene with their 4,000 spindles) and Salonika.

2.5.2 Egypt

The last decade of the 19th Century was characterised by relative stagnation of the Egyptian cotton sector both as a result of domestic political instability (the Urabi revolt, and the British
military occupation, as mentioned in Section 2.4) and as a reflection of the European price depression. During the 1880s and early 1890s the share of land under cotton cultivation showed almost no change, mirroring the sharp drop in prices, which went from 13½ dollar a qantar (= 98/99 lbs) in 1889-90 to 6 ½ dollars in December 1894.

An upturn in cotton production began in 1898 when the area of cotton cultivation expanded under the provision of a series of government reforms, most of which were initiated by British officials after the country’s occupation in 1882. The policy of the first consul general, Lord Cromer (1882-1907), who was the de facto ruler of the country, was aimed at increasing Egypt’s revenues by expanding cotton production to pay government debt and, at the same time, at avoiding the development of any local industrial base that may have been in competition with the British textile industry. He therefore pushed the Khedive Tawfiq to enact a series of government reforms designed to improve cotton farming. The main focus was on irrigation and transport: canals were cleaned, dykes repaired and 2,000 kilometres of new roads were built. Two massive irrigation projects were conducted during the years of British rule: the construction of the Assuan Dam, concluded in 1902 and the rebuilding of the Delta Barrage.

Moreover, the enormous growth in the size of the cotton harvest was achieved through considerable investment in the construction of new ginning factories and in advanced machineries which increased productivity. During the years of British occupation most private investment continued to occur in the processing rather than in the farming of cotton. This renewed stimulus to expand and improve production came from an increase in the demand of finer lint, prompted by the improvement in spinning methods in Western Europe. One particular improvement was connected with the process of mercerising which, initially, gave satisfactory results only when Egyptian cotton was used. This and other innovations led to the production of superior goods that began to replace other more expensive fabrics like silk and linen.

As a result of increased demand, Egyptian cotton prices started rising (see Figure 2.5.4) and the premium of the Egyptian staple over the American mounted to higher levels, reaching 63 per cent in 1906/7. Table 2.5.3 illustrates the increase in cotton output and exports.

106 Apart from cotton, other sectors that attracted increased foreign direct investment were credit and land speculation.
Table 2.5.3: Volume of cotton production and exports, 1880-1913 in thousands qantars, annual averages.

<table>
<thead>
<tr>
<th>Years</th>
<th>Output</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1880-4</td>
<td>2856</td>
<td>2480</td>
</tr>
<tr>
<td>1885-9</td>
<td>2924</td>
<td>2701</td>
</tr>
<tr>
<td>1890-4</td>
<td>4759</td>
<td>4008</td>
</tr>
<tr>
<td>1895-9</td>
<td>5959</td>
<td>5124</td>
</tr>
<tr>
<td>1900-4</td>
<td>6093</td>
<td>5280</td>
</tr>
<tr>
<td>1905-9</td>
<td>6379</td>
<td>5935</td>
</tr>
<tr>
<td>1910-13</td>
<td>7463</td>
<td>6206</td>
</tr>
</tbody>
</table>


Figure 2.5.4: Trend in Egyptian cotton prices, 1896-1914, in British pounds per metric ton.


The new expansionary phase of foreign involvement in the cotton sector extended also to mechanised yarn and cloth production, but involvement was very limited and had unsuccessful results. In 1899 two cotton mills were established, the Egyptian Cotton Mills Co. and the Anglo-Egyptian Spinning and Weaving Co. which both used low quality Egyptian cotton and produced coarse yarn, 20 per cent of which was consumed domestically by handloom spinners. The remainder was woven into cloth and was either sold locally or exported to Turkey where it enjoyed tariff protection. Nevertheless, both mills went bankrupt and suspended their operations following the Egyptian financial crisis of 1907.

The upturn in cotton production saw not only an extension of the land devoted to the raw material but also an increase in productivity beginning in 1894 when the extra summer water from the Delta barrage and the widespread introduction of a new variety of cotton, the Mit Afifi, generated an increase in yield from 3.06 qantar per feddan in 1889 to 5.3 in 1892.\footnote{One qantar was equal to 44.928 kg or 99 lbs. One feddan corresponded to 4.200, 833 m$^2$ or 1.038 acres.}

\footnote{One qantar was equal to 44.928 kg or 99 lbs. One feddan corresponded to 4.200, 833 m$^2$ or 1.038 acres.}
Mit Afifi’s qualities included higher ginning turnout, earlier maturity, lower propensity for being attacked by cotton worms and superior suitability for the process of mercerising. As a consequence of the improvement in productivity the value of land rose steadily (see Table 2.5.4).

<table>
<thead>
<tr>
<th>Year</th>
<th>Average feddans cultivated</th>
<th>Average yield (qantar/feddan)</th>
<th>Land value per feddan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1871</td>
<td>718.997</td>
<td>2 ¾</td>
<td>-</td>
</tr>
<tr>
<td>1874</td>
<td>871.847</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>1883-4</td>
<td>823.500</td>
<td>3.43</td>
<td>20</td>
</tr>
<tr>
<td>1885-9</td>
<td>869.763</td>
<td>3.43</td>
<td>40</td>
</tr>
<tr>
<td>1890-4</td>
<td>965.545</td>
<td>5.21</td>
<td>55</td>
</tr>
<tr>
<td>1895</td>
<td>977.735</td>
<td>5.38</td>
<td>60</td>
</tr>
<tr>
<td>1896</td>
<td>1.050.747</td>
<td>5.6</td>
<td>70</td>
</tr>
<tr>
<td>1897</td>
<td>1.128.804</td>
<td>5.8</td>
<td>70</td>
</tr>
</tbody>
</table>

*Sources: Owen (1969); Schanz (1913: 44, 74).*

The years of British occupation undoubtedly saw a further consolidation of the role played by cotton in the domestic economy which increased the country’s dependency on the export of a single crop, reinforcing a trend started in the 1860s.

As described above and in the previous sections, cotton stood at the centre of Egypt’s economic life. It led to an increase in agricultural production owing to the intensified use of the land and the cash income generated from its trade stimulated the proliferation of merchants and money lenders who mainly belonged to non-Muslim minorities: large estate proprietors, owners of ginneries and exporters all enjoyed considerable profits from its sale. Moreover, its commercialisation engendered a further monetisation of the economy, fuelled the construction of more efficient infrastructure and radically ameliorated the irrigation system.

Nevertheless, the “white gold” did not lead to a transition from an export-oriented economy to a more complex and diversified one in that Egypt remained an agrarian country and did not undergo a process of industrialisation. The increase in cotton exports failed to start a process of structural change or to create a modern economy. Thus, the impact of the ever-growing trade did not produce spill-over effects in other spheres of the economy and were contained within the cotton sector itself. As Owen (1969) puts it: the cotton trade of Egypt “was an engine of growth, not of development”.

108
3. The Ottoman Empire and market integration

“It is a big mistake to focus exclusively on trade volume when measuring globalization. Being endogenous and determined by many factors, the volume of trade is hardly a perfect index of commodity market integration.”

Williamson, 2002:61

Most economic historians analysing the political and socio-economic structure of the Ottoman Empire during the 19th Century unanimously agree that it underwent a process of integration with the global economy. Most of the available studies utilise qualitative data and justify the use of the term integration on the basis of the considerable intensification of the linkages between the Empire and the world market evidenced by the substantial expansion of trade volume and value achieved by the region and facilitated by the stipulation of free trade agreements. Other factors, like the commercialisation of agriculture, specialisation in the export of raw materials and the consequent decline in manufacturing have been identified as elements which describe the process of Ottoman international economic integration.

How should we measure integration? This chapter undertakes a critical discussion of the relevant methodologies and aims to understand if the analyses used by economic historians can be theoretically backed by the economics of market integration. In fact, while data on trade volumes and on the ratio of exports to GDP are very informative, in order to assess the process of commodity market integration price data for homogenous goods are needed. As pointed out by Findlay and O’Rourke (2003:13): “Commodity market integration implies that prices (of identical goods in separate markets) should be converging over time; such price convergence will, other things being equal, drive up the volume of trade”.

The first part of the chapter is dedicated to an analysis of the different approaches used in the literature to describe the process and extent of market integration of the Empire with the global economy. The second and third sections discuss the economics of market integration and the econometric techniques used to measure it.
3.1 Various approaches by Ottoman economic historians to the Empire's integration with the global economy

The study of the process of market integration has engendered lively interest in the literature on historical and contemporary commodity markets, giving birth to a wide range of theoretical and empirical studies. Most economic historians indicate that the Ottoman Empire became progressively more integrated with the global economy and thus followed the same pattern experienced by many regions of the world at the time of the so-called first wave of globalization. On the other hand, fewer studies have been conducted to investigate the extent of intra-regional integration. Nevertheless, there is common agreement that the empire became incorporated in the world economy at an uneven pace and that some of its regions were touched only marginally by the changes brought about by the global intensification of trade.

When referring to the Ottoman Empire, most economic historians justify the use of the term integration on the basis of the considerable intensification of the linkages between the Empire and the world market, evidenced by the substantial expansion of trade volume and value achieved by the region. As described in Chapter One, this process was facilitated by free trade agreements with European powers which directed the Empire’s trade policy towards economic liberalism and signalled the government’s formal commitment to abolish industrial, commercial and agricultural monopolies.

The exponential growth of Ottoman trade during the 19th Century is widely documented within the literature and is directly associated with the concept of market integration. This growth in trade is taken to be a strong indication of the Empire’s participation in the swift transformations that took place during the first wave of globalisation. Historians describe the incorporation of the Ottoman state into the European-dominated world economy as a process which increased in intensity over time but which did not involve the Empire in its entirety. Within the geographical diversity of the Ottoman realm, some areas, especially the coastal regions on the Mediterranean and the Black Sea, became more and more interconnected with the global economy; on the other hand, the economies of the regions in the interior and of those further away from the Mediterranean remained oriented towards self subsistence or maintained the trade routes of the previous centuries.
Moreover, it is of fundamental importance to remember that, despite the presence of international trade agreements that favoured trade liberalization, the flow of goods in the various parts of the empire was subjected to internal duties of 8 per cent. Most internal duties on overland commerce were abolished only in 1874, while those on sea transport were eliminated by the Istanbul Chamber of Commerce in 1894, thus easing intra-empire grain trade. Other sea-transported goods shipped within the empire continued paying 8 per cent duty until there was a reduction to 4 per cent in 1889, and 2 per cent in 1900.

The main factors that have been identified in the literature to describe the process of Ottoman international economic integration can be narrowed down to five:

- the increase in the volume and value of exports;
- the ratio between the rise in exports in the Empire and the behaviour of average world trade;
- the change in the economic structure of the Empire which led to the commercialisation of agriculture and specialisation in the export of raw materials;
- the fact that price movements in the Empire responded to shocks of global demand and supply;
- the participation in the global capital market through European financial penetration.

The specific contributions of the major Ottoman economic historians will be outlined in the following paragraphs.

Charles Issawi, whose pioneering works on Ottoman economic history represent a constant source of reference for many scholars, considers the level of Ottoman integration with world commodity and financial markets to be a result of the interaction of various elements: the increase, in real terms, of the value of foreign trade, the improvement of mechanical transport and the presence of vast capital flows in all the regions of the Empire.

In an article centred on Middle Eastern economic development (Issawi, 1970), the author examines the contribution of all these factors to the process of integration, comparing the region with the experiences of India and Japan during the same century and reflecting on the reasons for the different patterns of growth and development. In the Ottoman Middle East the flow of foreign investment was considerable and not inferior to other regions; but, rather than
being used for financing economic development, foreign capital was mainly utilized to pay
the enormous state debt or was spent by the sultan and the royal apparatus in various
unproductive ways. Another similarity with other regions of the periphery lies in the
unprecedented developments in the transport system: in particular, the introduction of steam
navigation led to the establishment of coastal ports like Alexandria, Izmir, Beirut and
Trabzon, whose economic power continued growing over the century. On the other hand, the
Ottoman railway system, with the exception of Egypt, lagged behind most other areas of the
world.

suggests that another evaluation of the degree of Ottoman participation in the world system
originates from a comparison of the rates of Ottoman and international trade expansion: while
between 1800 and 1913 the Ottoman Empire experienced unprecedented growth in
international trade (ranging between twenty and fifty-fold in real terms) this growth was less
than the global average.

The author adds to his analysis of market integration four additional factors which illustrate
the effects of the Empire’s participation of the area in the global economy:

- the change in patterns of production: new crops were raised, or old ones expanded, in
  response to European demands; the production of cotton, tobacco, silk, opium and
cereals for the export markets expanded several-fold;¹⁰⁸
- the development of a modern banking system which began to replace traditional
  moneylenders;
- the considerable reduction in domestic manufacturing owing to the mounting
  competition of European factory goods;
- the change in land tenure due to the commercialisation of agriculture: communal
  lands were replaced by private property and subsistence farming gave way to
  production for the market, following the reforms on land ownership adopted within
  the Tanzimat (see Chapter 1.4); nevertheless these transformations did not affect the
  actual scale of operations or the techniques used for production which remained
  rudimentary: the increase in production was achieved through the utilisation of larger
  amounts of land, rather than through enhanced productivity.

¹⁰⁸ Egypt represents the most extreme example of export specialisation: short-staple cotton had been grown for
many centuries but it was only during the rule of Muhammad Ali in 1818 that cotton became the dominant
export commodity: its share of total exports rose from one-third in 1840s-50s to over 80 per cent in the 1880s
and to over 90 per cent in 1910-14.
The author outlines how these developments affected various parts of the region in an asymmetric way: the Nile Delta and the Izmir and Istanbul areas were the fastest growing parts of the Middle East, while other areas like Iraq or the Hejaz were affected by European penetration to a lower degree, as reflected by a relatively smaller increase in exports (mainly fostered by the opening of the Suez Canal).

Şevket Pamuk, one of the leading contemporary scholars in Ottoman economic history, describes the 19th Century as a period characterised by two major trends: on the one hand, the implementation of Western-style reforms in the fields of education, law and justice, in fiscal, monetary and economic matters, as well as in the administration; and on the other hand, the process of “integration into world markets and rapid expansion in foreign trade, particularly with Europe” (Pamuk, 2009). This process was accelerated both by the development of the state’s infrastructure, enabled by European direct investment, and by the establishment of a modern banking system, financed mostly by European capital. Pamuk also explains how the process of integration with the global economy can be clearly connected with the impact that world trade had on the Ottoman patterns of production: the Empire rapidly increased the share of agricultural production for the export markets as a response to augmented European demand for foodstuffs and raw materials. Another consequence of the commercialisation of agriculture, a result of the involvement in the global economy, was de-industrialisation and the gradual disappearance of local manufactures.

The author specifies that, when analysing the process of global market integration, the Ottoman Empire cannot be considered as a uniform whole, but rather as an entity with pronounced regional differences which responded in uneven ways to the penetration of capitalism. Moreover, the change in the structure of the Ottoman economy and the commercialisation of agriculture were induced mostly by world market demand, and not by domestic requirements: this implies that the increase in agricultural production was directed to exports rather than to the internal market. Pamuk (1987) thus concludes that integration among markets within the Empire did not considerably improve.

In another paper which places the Middle East in a comparative framework with Egypt, Iran and the Asiatic provinces of the Empire,109 the author defines the rate of integration with the

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109 Pamuk, 1990: “The Middle East in the nineteenth century world trade” in Esfandiari and Udovitch (eds.).
world markets as “the volumes and rates of growth (of commodity exports) compared with the corresponding levels for world trade and for other underdeveloped regions of the world economy”. Providing data on per capita commodity exports in the three areas, the author indicates that Egypt was the most integrated region as “per capita exports were two and half times as high as those from the Ottoman Empire and four times as high as per capita exports from Iran”.

In a more recent study on price movements in the Empire, Pamuk (2004) provides evidence that commodity prices in the main Ottoman cities moved together with European prices, thus attesting the existence of an effective linkage with the global economy.

Roger Owen, who has extensively written about Ottoman and Middle Eastern economic history, explains how the expansion of trade with Europe played a fundamental role in bringing the Middle East within the scope of the world economic system; the interrelation with the European market was achieved through two main channels: a commercial one, which led to the abolition of monopolies and the establishment of free trade treaties which facilitated the free flow of goods; and a financial one, started in the 1840s, characterized by the penetration of European capital in the Ottoman credit system through lending. According to the author, the process of integration is clearly visible through the direct impact on the level of agricultural and commercial activity of the European business cycle, of the movements in international prices and on the availability of credit in the area. At the same time, he stresses that the degree of the European influence on the local market was uneven, the most affected areas being the fast-growing coastal cities like Alexandria, Izmir, Beirut and Trabzon. On the other hand, internal areas like the central Anatolian plateau or the mountains of north-east Iraq were less, if at all, affected by the increased international trade.

Owen (1993:111) specifies that, despite the scarce availability of reliable statistics which represents a serious obstacle in the analysis of the effects of the expansion in trade with Europe and consequent change in trade patterns on intraregional trade, “port cities prospered, many older trading centres in the interior suffered a significant decline in commercial importance”; at the same time “...some districts of the interior must also have been influenced by the pull of rising European prices such as wheat and barley, opium, wool and mohair”. 
The author identifies some crucial factors that attest to the immediate effects of the integration of the Empire with the global economy:

- the rise in production of cash crops for export markets: cotton in Egypt, silk and cotton in Syria and Mount Lebanon, fruit and wool in Anatolia, oranges in Palestine.
- the impact of European imports on local manufactures, which led to a contraction of the Middle Eastern textile industry: faced with the flood of cheap European fabrics, many Ottoman spinners, weavers and dyers were forced out of business.
- the response of the domestic market to external shocks: for example, the repeal of the Corn Laws and the impact of the Crimean War later, led to a rise in wheat world prices which were transmitted in the Ottoman economy and hence stimulated exports. Another example is provided by the rise in cotton prices owing to the American Civil War which caused increased production for the European market in the Ottoman territories, and a consequent extension of the cultivated area devoted to cotton.
- the increased influence exercised by international prices: Istanbul prices of most of the major Anatolian commodities fell in the 1880s and 1890s in line with international price movements. This downward pressure had a negative impact on exports.

A different approach to the analysis of Ottoman participation in the global economy is offered by Reşat Kasaba who refers to the process of integration as “incorporation into the world economy and consequent peripheralization”. This incorporation manifested itself in two ways: through the establishment of links between the production process of the Empire and production and consumption loci in the capitalist world economy; and through the integration of the Empire’s political structures into the interstate network of the world system. Trade represents the mediating process of incorporation both in commodities and in factors of production: particularly decisive was the shift in orientation of foreign trade networks from Asia towards Europe and the United States; this was accompanied by capital inflows, 90 per cent of which was in the form of government loans, while the remainder was invested in infrastructure that supported commercial links.

The author identifies the root cause of the disruption of the Empire as the process of integration: the latter threatened territorial integrity of the Ottoman state and it encouraged the decentralisation of the socio-economic networks in its various regions. Despite the inauguration of a program of reforms, the Tanzimat, aimed at reinforcing and centralising the
imperial structure, centrifugal forces prevailed in many regions and succeeded in circumventing the imperial apparatus.

The main factor that enabled the process of integration, more than government policies, was, according to Kasaba (1988), the activity of a large group of intermediaries: thousands of peddlers, storeowners, petty bankers, moneylenders as well as bigger tax-farmers, merchants and bankers were crucial in connecting local networks of production in the hinterland with the global economy. It was fundamentally through their involvement that the transmission of increased European demand and prices to the interior was possible, so that: “hundreds of units of production dispersed in the Anatolian countryside were interwoven with commercial threads in a marketing network that was readily responsive to the opportunities in domestic and export markets” (Kasaba, 1988:65).

Inalcik and Quataert (1996) in their volume “An Economic and Social History of the Ottoman Empire”, illustrate how in the 19th Century “Ottoman and Western economies were intertwined to an unprecedented degree” (Inalcik and Quataert, 1996:4). Providing detailed figures about the growing rates of imports and exports with Europe, they strongly affirm that the economic and social life of the Empire was fundamentally shaped by the trends of the international economy.

According to the authors, the major evidence for the participation of the Empire in the global market was the economic restructuring which gave way to the commercialization of agriculture for international export. They identify two fundamental hallmarks of the integration of the Ottoman and European economies: the first was the abolition of the Janissary corps in 1826, the one-time professional soldiers who became artisans and guildsmen and represented the strongest advocates of protectionism; the second was the famed Anglo-Turkish Convention of 1838 whereby the Empire embraced a trade policy of economic liberalism.

These steps towards free trade had a considerable impact on the growth of foreign trade, the behaviour of which, compared to global trends, is regarded as another sign of the Empire’s involvement in an increasingly globalised world. During the period between 1840 and 1870 the trade boom was felt most strongly and thus this period represented the phase of highest
participation in the world market: both imports and exports grew at 5.5 per cent per year, and export growth rates exceeded those of global trade. But after the 1870s boom stagnation followed, prompted by both domestic dynamics (a fiscal crisis, government bankruptcy and the Russo-Turkish War) and international factors (the European price depression of 1873-1896), so that, according to the authors, the participation of the Empire in the global system decreased. Another period of trade growth followed which nevertheless did not reach the previous level: the share of imports increased compared to exports (which grew below global average), thus creating a large trade deficit that was financed by foreign loans which became essential for the survival of the Empire. The penetration of European capital is, therefore, considered another sign of the Ottoman integration in the global economy.

Another point outlined by the authors is that despite the substantial increases, foreign trade remained a minor fact of Ottoman economic life. The volume and value of domestic trade surpassed that of international commerce: 75 per cent of all crops grown actually remained within the empire. Thus, despite the rising importance of international trade, by the end of the century exports formed only 14 per cent of the GNP, while the ratio of imports to GDP was around 18 per cent.

Like most scholars, Inalcik and Quataert reflect upon the fact that the absence of reliable statistics on intra-regional trade creates a significant obstacle in the analysis of the level of internal integration. The authors offer some data on trade of locally-produced goods and suggest that intra-regional traffic in Ottoman-produced goods remained fundamental until the dissolution of the Empire: “Most food crops travelled only short distances to the final consumer. The market for highly perishable products, such as fruits, was even more restricted and generally remained so, given the nature of the Ottoman transport network” (Inalcik and Quataert, 1996:848).

Two commonalities emerge from this broad overview which attempted to synthesize the major contributions provided by Ottoman economic historians:

1) There is clear agreement about the uneven character of globalisation in the Empire, with the coastal region experiencing a higher level of integration with the international markets. At the same time, there appears to be a shared view that once a region started being linked with the world economy the process was strengthened over time, until the outbreak of the First
World War: this means that the onset of intensified commercial linkages was not reversed by an opposite trend.

2) The process of Ottoman international economic integration is described through the use of qualitative data, focusing on the surge in volumes of trade or ratios of trade to output. However, trade volumes, despite being instructive for understanding the changes in the socio-economic structure of the Empire, can rise (or decline) owing to factors unrelated to integration (or disintegration); trade expansion can in fact be triggered by shocks in supply and demand not necessarily brought about by “globalisation”.

The above-mentioned approaches appear problematic, the main shortcoming stemming from a quantitative approach to economic integration; both assertions may be correct, but they need to be backed by economic theory. Hence, in the following sections we will define the concept of commodity market integration in economic terms and we will describe some of the econometric techniques used to measure it.

### 3.2 Market integration: economic theory

This section presents basic concepts of market integration and the econometric techniques used for its measurement in the literature.

#### 3.2.1. Definition

There are several definitions and approaches used to describe the concept of market integration. In general terms, it has been identified with the Law of One Price (LOP) and used to define the extent to which shocks are transmitted among spatially separated markets, thus leading to a process of price convergence.

The cornerstone analysis for spatial market integration and the LOP appears in the pioneering work of Takayama and Judge (1971). They specify the relationship between prices of homogeneous goods \( P^1_t \) and \( P^2_t \) in two spatially different markets at a point of time, \( t \), by the following equation:

An exception is provided by Pamuk (2004) who conducted an empirical study to measure the co-movement in the CPI of the main Ottoman and European cities.

For an excellent review of the theoretical and methodological approaches to market integration see Federico (2011).
where $c$ represents trade costs.

The above relationship has subsequently formed the basis for broader discussions of price relationships between spatially separated markets and has come to be known as the “strong form” of market integration; LOP (defined in a common currency unit when relevant) holds through arbitrage across markets. However, empirical testing of the LOP shows that it rarely occurs in practice, particularly in the short-run. In a review of the literature on this Isard (1977:492), for example, concludes that “in reality the law of one price is flagrantly and systematically violated by empirical data”, while Williamson (1986:168) noted that: “the law of one price has probably been the most thoroughly discredited by empirical evidence than other propositions in the history of economics”. As a result, economists treat price integration as a long-run relationship, and consider LOP as an example of a long-run steady-state equilibrium. This has led to the specification of a “weak form” of the LOP, whereby, if trade costs are constant, the weak form of market integration exists if the rate of change of prices between two markets are identical, i.e. the proportional change in $P^1$ is equal to the proportional change in $P^2$.

The following equation (a total differentiation of the previous equation) represents the weak form of LOP:

\[
\frac{\Delta P^1}{P^1} = \frac{\Delta P^2}{P^2}
\]

where the \(^\wedge\) denotes percentage change ($dP/P$).

With the aid of a simple example (see Figure 3.2.1), we will now illustrate the workings of market integration. Let us assume that the cotton world price is $P^*$ and that supplier “S1” can supply cotton at $P_1=P^*$. Supplier “S2” has trade costs $t$ per unit (that do not change with the volume traded for simplicity), so that $P_2+t=P^*$. As long as $t$ does not change, the rate of change of $P_2$ is the same as the rate of change of $P^*$.

On the other hand, if $t$ is falling we have:

\[
\alpha \cdot \frac{\Delta P_2}{P_2} + (1-\alpha) \cdot t = \Delta P^*
\]
where the \(^\wedge\) denotes proportional rate of change and \(\alpha = \frac{P2}{P^*}\).

In the case of exogenous trade costs we can rearrange:

\[
\hat{p}_2 = \alpha \hat{p}_2 - \alpha \hat{p}^* (1 - \alpha) \hat{\xi} + e_1
\]

where \(e_1\) measures shocks that affect the degree of integration that otherwise binds \(p_2\) to \(p^*\).

Supply shocks for “S2” will only be reflected in output, not in price. On the other hand, world demand shocks affect \(P^*\) and therefore \(P2\).

Let us now introduce a third supplier, “S3”, where trade costs are very high, so that \(P3 + t > P^*\). In this case trade costs (including tariffs) provide protection for the domestic cotton textile industry. In fact, small demand or supply shock for “S3” will cause the domestic cotton price to vary independently of world price \(P^*\).

**Figure 3.2.1: Market integration.**

According to the weak form of the LOP, even if observed prices at a particular point of time diverge (i.e. violate the strong form of integration), they will tend to converge due to spatial arbitrage, provided trade costs do not change. This allows a dynamic specification of price changes that can allow for lagged adjustment of prices in markets, so that, for example, while prices in two spatially separated markets may not adjust instantaneously to a shock, thus
widening price differentials in the short-run, arbitrage will cause this divergence to be temporary and not permanent.

As a consequence, the concept of spatial market integration in the literature encompasses a spectrum of market relationships ranging from perfectly integrated markets, which embody the strong form of the LOP, through markets which are imperfectly integrated in the short-run but move towards price convergence over time through spatial arbitrage (weak form of LOP), to completely insulated markets.

International commodity market integration can be hampered by a series of factors, which can lead to incomplete price transmission, different speeds in price adjustment or lack of convergence with the global economy. The range of causes impeding a complete or instantaneous pass through of price differences can be divided into three categories:

a. Non-competitive market structure.

b. Distortions introduced by governments through protectionist trade policy, such as import tariffs, tariff rate quotas, export subsidies or export taxes, intervention mechanism, exchange rate policies, and so on.

c. High trade costs: both physical and transaction costs.

In the following sections we will provide a theoretical illustration of these factors, linking each of them with the structure of the cotton market in the Ottoman Empire in order to understand the extent to which they may have hindered the full pass through of world prices. Finally, we will briefly describe another element which may have affected the dynamics of price transmission: exchange rate stability.

A. Absence of perfect competition

The existence of a non-competitive market structure inhibits market integration with other markets (Dornbusch, 1987; Krugman, 1986) as will be discussed in some detail later. Monopolistic or oligopolistic behaviour among exporters, as well as the presence of monopsony or oligopsony power among traders, can generate a process of incomplete price transmission, thus preventing a complete pass through of world prices.

We will therefore illustrate the impact of both types of non-competitive market structures on price transmission, comparing them with a situation of perfect competition and will consider the case of a monopsony or monopoly for simplicity of exposition.
(a) *Monopsony power in the domestic market only*

Consider the case of monopsony power in the domestic market, with a single buyer, a large number of sellers, and zero trade costs. The monopsonist faces a perfectly elastic demand function \(D\) at world price \(P^*\) as he/she holds market power only domestically and not internationally but faces an upward sloping supply curve. Profit maximisation establishes quantity \(Q^m\) bought and the price paid to producers, \(P^m\), where \(MR=MC\). Thus, the domestic price is lower than the international price. Now consider the impact of an exogenous increase in international price to \(P^{1*}\). If the domestic market was perfectly competitive, the domestic market price would immediately move up to the new international price. But, as can be seen under a domestic monopsony, though the domestic price rises to \(P^{1m}\) this increase is proportionately less than the increase in international price, because of the slope of the MC curve. Thus price transmission from the international market to the domestic is less than perfect.

*Figure 3.2.2: Monopsony power in the domestic market.*

Monopsony power leads to an incomplete transmission of world prices because a profit-maximising trader with monopsony power would not fully pass through an international price change to internal producers.

Even if the market is not a monopsony, but an oligopsony with several large buyers, this basic insight remains valid, though the extent of price transmission varies depending on the
firms’ strategic behaviour, on their degree of market power and of the functional form of the supply curve.\textsuperscript{112}

\textbf{(b) Monopoly power in the export market}

In our second example we hypothesize the existence of monopoly power in the export market: if the share of exports of a country is large enough to influence global prices, then the country is said to have monopoly power in trade. Let’s first compare monopoly and perfectly competitive outcomes with the aid of the figure below.

\textit{Figure 3.2.3: Monopoly power.}

Price in a perfectly competitive market is given by the intersection of global demand (D) and supply (S) at $P^\ast$. If the world market had a single exporter, then his/her marginal cost curve would be exactly the same curve as the supply curve in the industry when it was competitively organised.\textsuperscript{113} The profit maximiser monopolist would set his/her price at $P^m$ where marginal cost equals marginal revenue.

In case of both a shock in supply (Case a) and a shock in demand (Case b), the existence of monopoly power generates an incomplete transmission of price changes, as depicted in the


\textsuperscript{113} The industry supply curve in a perfectly competitive market is the sum of the marginal cost curves, above the average variable cost, of all the individual firms in the industry.
following figures. The degree of price pass through is, in fact, determined by the change in the industry mark up over marginal costs required to restore equilibrium; the rise in prices caused by a negative supply shock ($S^2$) and by a positive demand shock ($D^2$) is transmitted by a lesser amount of what would happen with perfect competition: $p^{2m} - p^{1m} < p^{2*} - p^{1*}$.

Figure 3.2.4: Price transmission in the case of monopoly power.

Like monopoly, oligopoly constitutes another important possibility for incomplete or asymmetric\footnote{As Meyer and von-Cramon-Taubadel (2004) note, asymmetric price transmission caused by the presence of market power is not always clear cut. For example, Griffith and Piggot (1994) detected asymmetries in the Australian lamb and beef markets, but not in the pork market in spite of the fact that the Australian pork market is more concentrated than the other meat markets.} pass through of international prices. In the presence of an oligopoly both the magnitude and speed of price adjustment depend on three factors: the degree of market power, the firms’ strategic behaviour, i.e. the way firms compete with each other, and the functional form of the demand curve.

B. Export taxes
As described in the previous section, a national economy is considered to be integrated with the world market when an excess demand or supply shock in the international market leads to the same price change in the domestic market. The presence of direct price intervention, like
an export tax, may or may not hinder the full shock transmission process, depending on the nature of the tax.

All types of export taxes have the effect of reducing the volume of exports and are therefore a form of export restriction: the immediate consequence of an export tax is, in fact, one of lowering the domestic price of an exportable below the world price. Hence, in a small country, if an export tax is applied, for example, on cotton, then the domestic price of cotton will be lower than the world price by the amount (or the percentage) of the tax.

Export taxes are levied by governments for three main reasons: to depress domestic prices to protect internal buyers or consumers, to generate revenue for the government and, in the case of a “large country”, to improve national welfare through the imposition of an optimal export tax.\footnote{An export tax can lead to the improvement of a large country’s welfare if the terms of trade effect generated by the rise in the export price outweighs the negative production and consumption distortions.}

The impact of an export tax depends on three main factors:
(a) the role that an exporting country plays in the global market, i.e. whether the country is “small” (price taker) or “large” (price maker).
(b) the structure of the domestic market, i.e. whether it is perfectly or imperfectly competitive.
(c) the typology of the tax: ad valorem or specific.
In the following analysis of export taxation we will consider the effect of the imposition of an export tax, illustrating the impact of the factors specified above.

First we will consider the simple case of the imposition of an export tax in a small country (i.e. a price taker in the world market) in a perfectly competitive market.
Before the export tax, the domestic price ($P$) corresponds to the exogenously given world price ($P^*$), the exported quantity being $Q^1Q^4$. After the application of an export tax, the domestic price ($P'$) will be equal to the world price minus the export tax: $P^*-t$.
Thus, the imposition of an export tax has the effect of reducing the domestic price by the amount of the tax and of decreasing the quantity exported ($Q^2Q^3$).
In our second example we will consider the effects of the imposition of a specific export tax in a small country with market power in the domestic market (monopsony).

With the aid of the above figure, we can conclude that in a monopsonistic market, at the exogenously given world price ($P^*$), in a free trade scenario (absence of taxes on exports), production occurs at $Q_1$, where demand (marginal revenue) meets marginal cost. The demand is perfectly elastic as the country, being small, has no power over world price determination.
The marginal cost slope is twice as steep as the supply because of the presence of market power. Domestic price is equal to $P^m$.

The new equilibrium generated by the specific export tax causes a decrease in both the domestic price $P^{im}$ by the amount of the tax ($P^*-t$) and in production ($Q_2$). If the rate of the tax was as high as the difference between $P^*$ and the domestic price in autarky, exports would cease (prohibitive export tax); therefore changes in the international price would not be transmitted to the domestic market: domestic prices will be set at the autarky level, thus negating the possibility for arbitrage to take place.

In our third example we consider the case of a large country with monopsony power in the domestic market. As shown in the figure below, the application of an export duty leads to a fall in domestic prices and to a rise in global prices.

*Figure 3.2.7: Export tax in the case of monopsony power (large country).*

The equilibrium price in the absence of trade barriers and in the case of perfect competition in the domestic market takes place at A. Because of the presence of monopsony power in the domestic market the equilibrium world price is at $P^*$, while $Q_1$ indicates the quantity exported and $P^m$ is the domestic price. The demand curve is downward sloping and not perfectly elastic as the country, being large, is not a price taker. The imposition of an export tax reduces the amount of exports (to $Q_2$), as in the small country case, as it becomes more expensive to export. The export tax causes a drop in domestic prices ($P^{im}$) and, because a
large country influences world prices, it leads to an increase in world prices \((P^{1*})\) owing to the fall in global supply. As in the small country case, the imposition of a prohibitive tax induces a halt in exports. Note that the new equilibrium price post-tax would have been at B, had the domestic market been perfectly competitive.

Finally, we will analyse the impact of an export tax according to its type. The extent to which world prices are passed through a market where export duties are imposed is contingent on the typology of the tax: *ad valorem*, specific, or compound (i.e. a mixture of both: see Appendix 1 for a mathematical explanation). An *ad valorem* tax constitutes a percentage unit price of the exported commodity; if the world price of cotton is denoted by \(P_{c}^{*}\), and the rate of the *ad valorem* export tax by \(t_{a}\), then the post-tax domestic price will be:

\[
P_{c} (1+t_{a}) = P_{c}^{*}
\]

On the other hand, if the duty is specific \((t_{s})\):

\[
P_{c} + t_{s} = P_{c}^{*}
\]

The following examples illustrate two cases in which the degree of price transmission generated by export duties changes according to the nature of the tax: in a scenario of inflation and rising prices, an *ad valorem* export duty will increase domestic prices at the same pace as the global ones, while a specific tax will entail a lower degree of transmission. On the other hand, in the case of recession or of lower world prices, the impact of a specific tax will be more severe.

Let’s suppose that the world price of cotton is £100 per bale at \(P_{c}^{*}\), the specific export tax is 20£, while the ad valorem tax is 20 per cent. The quantity of cotton exported decreases when the tax is applied: the imposition of a specific or *ad valorem* export duty will have the same effect on the quantity exported and on the final price of a specific tax, which will be equal to 80£. In the case of a 50 per cent rise in world cotton prices \((P_{c}^{**}=150£)\), an *ad valorem* export duty will cause a greater reduction in exports and have a more severe effect on the post-tax domestic cotton price \(P_{c}^{1a}\) (120£) compared to the specific duty \(P_{c}^{1s}\) (130£). On the other hand, a decrease in prices of 50 per cent with a new world price of 50£ at \(P_{c}^{**}\) will generate a lesser drop in the quantity exported and the post-tax internal price will be equal to
$40 if an *ad valorem* duty is applied and $30 in the case of the imposition of a specific export tax.

The previous example reveals that an *ad valorem* tax reflects proportionally the behaviour of world prices, while a specific duty involves a fixed level of change, independent of global swings: hence, with an *ad valorem* export tax the percentage change in price transmission terms is unchanged even when prices change. On the other hand, with a specific duty the degree of transmission varies whenever prices change, because the percentage rate of the tax changes.

The same principle applies also if we analyse the effect of an export tax in a general equilibrium framework, where the relaxation of the *ceteris paribus* clause shows the cross-market effects arising from protection.\(^{116}\)

**C. Transport costs**

One of the factors which played a fundamental role in determining the incidence of trade costs before the first wave of globalisation was transport costs which are also another factor hindering a complete price transmission between markets. Poor infrastructure, transport and communication services can translate to high costs of delivering imported commodities to domestic markets for consumption, as well as export goods to the border for export. The presence of trade costs which exceed price differences may, in fact, inhibit integration or prevent a complete transmission of price signals so that domestic prices can be only partially (if at all) adjusted to shifts in world supply and demand.

Moreover, adjustments following shocks may generate a process of asymmetric price transmission, leading to a different extent of pass through of a world price increase compared to a decrease.\(^{117}\)

\(^{116}\) In a two-sector model where, for example, food and cotton are produced, the imposition of an export tax on cotton has implications for both quantity and price of food. The duty causes a decrease in the relative price and quantity produced of cotton and a rise in the relative price and quantity of food. The diversion of resources from their most productive use has welfare-reducing consequences, thus causing a production loss. Consumers also consume a different mix of goods, and because of the production loss they can’t attain the same level of utility. Increased production in food and decreased consumption in cotton have an overall effect of reducing of the volume of trade.

\(^{117}\) The recognition of the presence of transaction costs, the impact of which may lead to asymmetric price adjustments, has led to the development of empirical approaches that explicitly include the role of transaction costs in the analysis of market integration (see: Faminow and Benson, 1990; Baulch, 1997; Goodwin and Grennes, 1998; Goodwin and Piggott, 2001, among others).
3.3 Market integration: econometric measurement

This section will provide a description of the various econometric methodologies utilized to measure price transmission in order to reach a deeper understanding of the concept of market integration. The issue of price convergence in commodity markets, both at national and international level, has been extensively investigated through the use of different techniques adopted to evaluate the extent to which prices in spatially separated markets are linked through trade and arbitrage. Overall, the various methods employed can be grouped into two main groups:

1) Static analysis, relying on coefficients of variation, correlation coefficients, regression tests;
2) Dynamic analysis based on bivariate and multivariate co-integration tests and structured around ARDL, VAR and VECM models.

The existence of a wide variety of approaches to analyse the concept of market integration reflects the lack of consensus as to the appropriate methodological/analytical framework to adopt. The following paragraphs will provide a brief description of the principal theoretical methods utilized by the literature.

3.3.1 Static framework

**Coefficient of variation:** this has a long tradition in historical analysis (Metzer, 1974; Latham and Neal, 1983; O’Rourke and Williamson 1994; Federico, 2007). It is a measure of price dispersion across markets and is obtained by dividing the standard deviation by the mean of prices in different markets. The underlying idea is founded on the argument that if markets are integrated then the LOP holds, so that the standard deviation of the prices of the same commodity in different markets will be zero. This method offers a simple and intuitive indicator; nevertheless it does not incorporate dynamic relationships, so that the patterns of covariance in commodity prices are not exploited (Uebele, 2011).

**Bivariate correlation coefficients and OLS regression:** the computation of simple bivariate correlation or regression coefficients to test for market integration has been widely used in the literature, with higher and statistically significant values indicating market integration. For example, Persson (1994) shows the existence of an integrated grain market (wheat, rye,
barley) in Europe between 15th and 19th Century, using correlation coefficients. Other examples of market integration based on regressions and correlation analysis can be found in the studies of Gilbert, 1969; Ilori, 1968; Cummings, 1967; Lele, 1967, 1971; Jones, 1972; Stiegler and Sherwin, 1985; Latham and Neal, 1983; Protopapadakis and Stoll, 1986; Mundlak and Larson, 1992; Shiue and Keller, 2004; Studer, 2008). In the majority of these studies the relationship between prices has been analysed using the following type of regression:

\[ P_1^t = \mu + \beta_1 P_2^t + \varepsilon_t \]

where \( P_1^t \) and \( P_2^t \) represent the prices from the two origins of the commodity under consideration. What is usually tested is if the slope coefficient equals unity and the intercept equals zero. Under the null hypothesis \( \beta_1 = 1 \), so that, if it is not rejected, \( P_1^t = P_2^t \); the price differential, \( P_1^t - P_2^t \), is an i.i.d \((0, \sigma^2)\) term: hence the law of one price holds.

This approach has been extensively criticized as it has three main shortcomings:

1. It can generate spurious correlations or regressions\(^{118}\) which makes conventional inference procedures devoid of meaning;
2. There is a high likelihood of serial dependence in the residuals: regression equations that have low Durbin Watson statistics (i.e. highly correlated residuals) have been proven to imply the existence of variables which are non-stationary and near random walks (Granger and Newbold, 1974);
3. It does not allow for long-run equilibrium being a static model: all correlations are assumed to be simultaneous and contemporaneous.

Further criticism of the use of correlation coefficients and simple OLS regressions to draw conclusions about market integration appears widely in the literature (Harris, 1979; Goodwin, 1992; Werden and Froeb, 1993).

Hence, from the 1980s market integration analysis started dealing with the widespread and systematic problems of serial correlation through the adoption of a dynamic framework. Dynamic models of spatial price differentials incorporating time lags were introduced by the pioneering work of Ravaillon (1986).

\(^{118}\)For example, variations in the cost of or a demand for two products may induce a correlation in their prices directly if the cost of or demand for the two products is itself correlated: this is a spurious correlation as it doesn’t stem from any economic interdependence between the two products, while from the fact that common exogenous influences could dictate a common trend.
3.3.2 Dynamic framework

The study of market integration within a dynamic framework originated from the need to analyse the stationary properties of the data: the distinction between a stationary and a non-stationary variable is, in fact, crucial for choosing the appropriate econometric techniques to test for and to measure market integration. For this purpose it is necessary to introduce and clarify the meaning of some specific terminology used in the econometric literature: the concept of integration refers to a single variable and describes the relationship between the series itself and its own lagged values; on the other hand, the term co-integration indicates the relationship among two or more integrated variables which do not drift apart too much from each other and are therefore “tied” together in their long-run development.

Hence, the first step for understanding the relationship among variables in order to detect the presence of market integration is to test for the level of integration of each single variable, a procedure which takes the form of stationarity tests. A series is considered stationary if it fluctuates around a constant long-run mean: this implies that it has a finite variance which does not depend on time. On the other hand, a non-stationary variable does not show any tendency to return to a long deterministic path and therefore has a variance which is time-dependent: it is permanently modified by random shock and hence follows a random walk.

Stationarity tests
The most basic procedure used to identify stationarity, i.e. the order of integration of a variable, is the Dickey Fuller (DF) test which involves testing for the presence of a random walk:

\[ y_t = y_{t-1} + u_t \]  

Although Equation (1) has a constant mean, the variance is non-constant and so the series is non-stationary. If a constant is added, it is termed a random walk with drift. To produce a stationary time series, the random walk needs to be first-differenced:

\[ \Delta y_t = u_t \]  


132
To overcome the problem of autocorrelation in the basic DF test, the test can be augmented by adding various lagged dependent variables. This would produce the following test:

\[ \Delta y_t = (\rho - 1)y_{t-1} + \alpha_1 \sum_{i=1}^{m} \Delta y_{t-i} + u_t \]

(3)

The correct value for \( m \) (number of lags) can be determined by reference to a commonly produced information criteria such as the Akaike criteria or Schwarz-Bayesian criteria in order to generate a white noise error term \( u \). The ADF is a standard test for unit root, hence it tests the null hypothesis \( H_0: \rho - 1 = 0 \) (equivalently \( \rho = 1 \)). The rejection of \( H_0 \) indicates that the series is stationary.

As with the DF test, the ADF test can also include a drift (constant) and time trend.

In the case of non-stationarity, the ADF test is repeated with differenced series. If the null hypothesis is rejected, then the variable is said to have a unit root, or to be integrated of order one, i.e. I(1); otherwise the test is repeated again with second differenced series.

Other statistical tests to detect unit roots are the Phillips-Perron, the DF-GLS, the KPSS and the Leybourne-McCabe test.

Two (or more) variables which are non-stationary can have a long-run equilibrium (can be co-integrated), i.e. wander extensively when taken by themselves, but form a stable equilibrium when combined. In practice this means that market integration can be viewed as a long-run dynamic process whereby prices of integrated markets tend to converge through trade-related short-run adjustments.

In what follows we will describe the various typologies of co-integration analysis utilized in different theoretical and empirical studies which capture both long and short-run adjustment dynamics.

**Bivariate co-integration approach**

After detecting stationarity, a simple test for co-integration between two non-stationary time series with unit root can be performed through Engle and Granger bivariate procedure (1987). It only requires estimating an OLS regression between the price series, saving the residuals.
and then running the ADF test on the residuals to determine if they are stationary. The time series are said to be co-integrated if the residuals themselves are stationary.

\[ y_t = \beta_0 + \beta_1 x_t + u_t \]  

(4)

where \( y \) and \( x \) are non-stationary price series. To determine if they are co-integrated, a secondary regression is estimated:

\[ \Delta u_t = \lambda u_{t-1} + \eta_t \]  

(5)

If \( \lambda = 0 \), a unit root in the residuals is present, so the time series are not co-integrated. On the other hand, rejecting the null (i.e. the t-statistic for testing the hypothesis \( \lambda = 0 \) is lower than the corresponding critical value) proves the stationarity of the residuals, thus indicating co-integration between \( y_t \) and \( x_t \).

The two-step Engle and Granger bivariate procedure offers a seminal contribution to the analysis and testing of co-integration, but it has also been criticised, on various grounds. One criticism is that this test can, in fact, provide only limited information (the presence or absence of co-integration) and it does not allow any hypothesis testing on co-integrating parameters. Moreover, if the time series contains a structural break, the test may produce the wrong result (see, among others, Noriega and Ventosa-Santaularia, 2006).

Therefore, despite constituting a useful instrument to detect co-integration, it just represents an intermediate step, as it doesn’t offer enough information to test the hypothesis of market integration embodied in the definition of the Law of One Price.

**Co-integration tests in a multivariate framework**

The shortcomings of the bivariate approach have been overcome, initially, by Johansen’s multivariate co-integration method (1988) which allows price determination to occur through interdependencies between several markets (and not simply two markets) and tests if a “shock”, i.e. a change in price in one market, can be transmitted to other markets: this technique is therefore aimed at dealing simultaneously with multiple co-integration
relationships as well as testing restrictions on co-integrating parameters. The Johansen procedure involves a specification in the following form:

\[ \Delta x_t = \pi x_{t-1} + u_t \]  

(6)

where \( x_t \) is a vector of non-stationary random variables, \( \pi \) is an \( n \times n \) matrix which tells us about the number of co-integrating vectors, and \( u_t \) is a vector of normally distributed disturbances. Johansen’s procedure consists in estimating \( r \), the rank of \( \pi \), which determines the number of co-integrating vectors present in the system.

This approach to test for co-integration in a multivariate system is similar to the ADF test, but requires the use of a VAR approach (a detailed analysis of VAR appears in the following section):

\[ x_t = A_1 x_{t-1} + u_t \]
\[ \Delta x_t = (A_1 - I) x_{t-1} + u_t \]
\[ \Delta x_t = \pi x_{t-1} + u_t \]

where:
\[ \pi = (A_1 - I) \]

\( A_1 \) is a \( n \times n \) matrix of parameters
\( I \) is a \( n \times n \) identity matrix

---

119 Two locations can, in fact, be well integrated even though they do not trade with each other, in cases where they both trade with a third market.

120 Johansen’s approach for multivariate co-integration testing requires Vector Autoregressive (VAR) models which utilize a set of distributed lag equations to shape each variable as a function of lagged values of variables in the system. This assumes all the variables in the model are endogenous, although it is possible to include exogenous variables as well which do not act as dependent variables. A VAR system can be written as:

\[ \Delta x_t = \Gamma_0 x_{t,1} + ... + \Gamma_{k-1} \Delta x_{t,k+1} \cdot \Pi x_{t,k} + v_t \]

where \( x_t \) represents a \( p \times n \) vector of \( p \) variables observed over \( n \) periods. If the variables contained in \( x_t \) are non-stationary but are co-integrated, the matrix given by:

\[ \Pi = I_r \cdot A_r \cdot ... \cdot A_k \]

will be some rank \( r \) such that \( r > 0 \) and \( r < p \).
Johansen’s test relies on the relationship between the rank of the matrix and its eigenvalues or characteristic roots: for this purpose it tests if $\pi$ equals zero (null hypothesis). If $\pi$ consists of all zeros, as with the ADF test, the rank of the matrix equals zero, hence all of the $x$ are unit root processes, implying the variables are not co-integrated.

A rejection of the null implies stationarity in the residuals: if $\pi$ is not equal to zero (one or more co-integration relationships exist) the system exhibits symmetric adjustments around $x_t = 0$; for any $x_t \neq 0$, $\Delta x_{t+1}$ always equals $\pi x_t$. Johansen derived the distribution of two test statistics for the null, called Trace and Eigenvalue tests.\textsuperscript{121}

As mentioned, $r$ is the rank of $\pi$ which determines the number of co-integrating vectors: if $r = 0$ there are no co-integrating vectors; moreover, if there are $n$ variables in the system of equations, there can be a maximum of $n-1$ co-integrating vectors.

$\Pi$ is defined as the product of two matrices: $\alpha$ and $\beta'$, of dimension $(n \times r)$ and $(r \times n)$, respectively. $\beta'$ gives the long-run coefficients of the co-integrating vectors, $\alpha$ is known as the adjustment parameter and provides information about the degree of market integration.

The relationship can be expressed as:

$$\pi = \alpha \beta'$$

The Johansen method, unlike the bivariate approach, can be used to apply certain restrictions to the long-run $\beta$ coefficients,\textsuperscript{122} as well as to the $\alpha$ coefficients.\textsuperscript{123}

Standard multivariate co-integration tests, based on Johansen’s procedure, have then been coupled with the analysis of the dynamic properties of spatial price adjustments: the rationale

\textsuperscript{121}The trace statistics tests if $r$ co-integrating vectors are present in the system against the alternative that the system is already stationary. This implies that $\pi$ has a full rank ($r = n$). Equivalently, the max statistics tests whether the rank is $r$ against the alternative that the rank is ($r + 1$).

\textsuperscript{122}For example, testing $\beta$ parameters can be done to investigate the presence of markets not constrained to the co-integration relationship: this can be achieved by testing whether $\beta_{ij} = 0$ for all $j$ ($j = 1...r$) co-integrating vectors for the $i$th market ($i = 1...n$), using likelihood ratio test statistics.

\textsuperscript{123}Testing the $\alpha$ coefficients can be useful to detect weak endogeneity: this implies checking for markets which do not respond to the deviations from the long-run relationship and can be identified as one of the forces that “guides” the system. The test is done examining if $\alpha_{ij} = 0$ for all $j$ ($j = 1...r$) co-integrating vectors for the $i$th market ($i = 1...n$), using likelihood ratio test statistics.
behind this approach rests on the idea that, depending on market characteristics, two price series can behave in a variety of ways, with prices adjusting less than completely, slowly, or in an asymmetric manner.

More recent research has relaxed the assumption of constant market structure through the sample period, thus allowing for a higher degree of flexibility in the process of price transmission. Thus, the relationship between prices has been summarized as the product of three different processes (Rapsomanikis, Hallam and Conforti, 2004):

1. Complete adjustment between prices, indicating full price transmission from one market to another: this represents the strong form of market integration.
2. Varying speeds of adjustment between markets: changes in prices in one market are not passed through instantaneously; price transmission may not be complete in the short-run, but is complete in the long-run. This type of analysis can be based on the calculation of half-life persistence indicators, defined as the reaction time to remove disequilibria after a shock (i.e. defined as the number of periods required for the response of a time series, to its own shock, to be halved). Another methodology adopted to define the degree of market integration is provided by the study of impulse response functions.
3. Asymmetric responses between markets: non-linear adjustment in the extent and speed owing to policies and market power. (See Abdulai, 2000 and Rapsomanikis, Hallam and Conforti, 2004 for a review of the reasons for asymmetric price transmission).

**Vector Error Correction Models**

When two or more price series are co-integrated, their relationship can be explained through the use of Vector Error Correction Models (VECM). They are the basic VAR, with an error

\[ \Delta z_t = \lambda z_{t-1} + \epsilon_t \]

where \( \epsilon_t \) represents a normally distributed random variable with a mean of zero and a constant variance of \( \sigma^2 \). The parameter \( \lambda \) embodies the convergence speed by which deviations from equilibrium are eliminated and can assume values between 0 and -1. Larger absolute values of \( \lambda \) represent faster rates of convergence, thus quicker elimination of deviation from an efficient equilibrium. This speed of convergence is referred to as “half life” of deviations, i.e. the period of time required for one half of the deviation to be eliminated. Half life is given by \( \ln (0.5) / \ln (1 + \lambda) \).
correction term incorporated into the model. Such dynamic models, aimed at capturing the various forms of a co-integration relationship among variables, have been widely utilized in the literature.\textsuperscript{125}

VECMs explicitly account for the dynamics of short-run adjustment towards long-run equilibrium: in a VECM the error term from the OLS regression between two price variables, lagged once, acts as the error correction term.

A basic vector error correction model between two variables appears as follows:

\[
\begin{bmatrix}
\Delta P_{1t} \\
\Delta P_{2t}
\end{bmatrix} = \begin{bmatrix}
\mu_1 \\
\mu_2
\end{bmatrix} + \begin{bmatrix}
\sigma_1^1 \\
\sigma_2^1
\end{bmatrix} (P_{1t-1} - \beta P_{2t-1}) + A_2 \begin{bmatrix}
\Delta P_{1t-1} \\
\Delta P_{2t-1}
\end{bmatrix} + ... + A_k \begin{bmatrix}
\Delta P_{1t-k} \\
\Delta P_{2t-k}
\end{bmatrix} + \begin{bmatrix}
\nu_{1t} \\
\nu_{2t}
\end{bmatrix}
\]

where:
1. \(v_{1t}\) and \(v_{2t}\) are the residuals from the co-integrating relationship (i.i.d disturbances with zero mean and constant variance).
2. \(\Delta P_{1t}, \Delta P_{2t}\) indicate that the price variables have been differenced once to obtain stationarity.
3. The parameters of the matrices \(A_2, A_k\) measure the short-run effects.
4. \(\beta\) is the long-run co-integrating parameter.
5. \(P_{1t-1} - \beta P_{2t-1}\) correspond to the lagged residual.
6. \(\begin{bmatrix}
\sigma_1^1 \\
\sigma_2^1
\end{bmatrix}\) are the error correction coefficients reflecting short-run disequilibria; they represent the correction of the error within the adjustment process of \(P_{1t}\) and \(P_{2t}\) towards the equilibrium. The speed of adjustment is reflected by the level of proximity of \(\alpha_i\) to 1.\textsuperscript{126}

In the above equation, current changes in \(P_1\) (\(P_2\)) are a function of current changes in \(P_2\) (\(P_1\)) and the degree to which the two series are outside of their equilibrium in previous periods. The presence of parameters for both short and long-term adjustments provides a structure that allows examining the process of price convergence both instantaneously and gradually.

\textsuperscript{126} \(0 < |\alpha_i| < 1, i = 1, 2\)
Moreover, long-run Granger causality can be detected by testing the null that the error correction coefficients in a VECM are equal to zero.  

**Vector Autoregressive models**

A VAR represents an extension of a univariate autoregressive (AR) model to include more than one variable, each of which depend on lags of itself, and on the lags of all the variables present in the system. If the model is made up of three variables with p lags, it can be so written:

\[
P^1_t = \alpha_1 + \phi_{11} P^1_{t-1} + \cdots + \phi_{1p} P^1_{t-p} + \beta_{11} P^2_{t-1} + \beta_{1p} P^2_{t-p} + \delta_{11} P^3_{t-1} + \delta_{1p} P^3_{t-p} + e_{1t}
\]

\[
P^2_t = \alpha_2 + \phi_{21} P^1_{t-1} + \cdots + \phi_{2p} P^1_{t-p} + \beta_{21} P^2_{t-1} + \beta_{2p} P^2_{t-p} + \delta_{21} P^3_{t-1} + \delta_{2p} P^3_{t-p} + e_{2t}
\]

\[
P^3_t = \alpha_3 + \phi_{31} P^1_{t-1} + \cdots + \phi_{3p} P^1_{t-p} + \beta_{31} P^2_{t-1} + \beta_{3p} P^2_{t-p} + \delta_{31} P^3_{t-1} + \delta_{3p} P^3_{t-p} + e_{3t}
\]

Thus in a VAR all the explanatory variables, lagged once or more, are used to explain the current value of the dependent variable.

All variables in the VAR are endogenous (but exogenous variables can be added, too) and are assumed to be stationary; in cases where they exhibit a unit root, they need to be differenced once, in order to be used in the model. If the variables happen to be co-integrated, a vector error correction model should be used instead (see previous section).

VARs can also shed light on the existence and direction of a particular kind of causality, called Granger causality, between two variables. If, for example, the past and present values of \(P^2\) provide some useful information to forecast \(P^1_{t+1}\), at time \(t\), it is said that \(P^2\) Granger causes \(P^1\). Granger causality can be investigated by testing the null that the coefficients of the lagged \(P^2\) terms are equal to zero.

**ARDL co-integration approach**

An alternative approach to co-integration testing was developed by Pesaran and Shin (1995, 1998) and further developed by Pesaran, Shin and Smith (1996, 2001). It is based on the ARDL (autoregressive distributed lag) model and is known as the ARDL bounds test. The principal advantages of this method lie in its capability to include variables with different

\[\text{Under } \alpha_1 = 0, \alpha_2 \neq 0, P_2 \text{ Granger causes } P_1; \text{ Under } \alpha_2 = 0, \alpha_1 \neq 0, P_1 \text{ Granger causes } P_2; \text{ while under } \alpha_1 \neq 0, \alpha_2 \neq 0, P_2 \text{ both series Granger cause each other.}\]
degrees of integration, to add different lags to the various series and its better suitability to small datasets.

According to Pesaran and Shin (1998), the ARDL procedure can be explained by the following equation:

\[
\Delta \ln y = \alpha_0 + \sum_{j=1}^{n} b_j \Delta \ln y_{t-j} + \sum_{j=0}^{n} c_j \Delta \ln x_{t-j} + \sum_{j=0}^{n} d_j \Delta \ln z_{t-j} + \delta_1 \ln y_{t-1} + \delta_2 \ln x_{t-1} \\
+ \delta_3 \ln z_{t-1} + \epsilon_{tt}
\]

The parameters \( \delta_1, \delta_2 \) and \( \delta_3 \) represent the long-run multipliers, while \( b_j, c_j \) and \( d_j \) are the short-run dynamic coefficients.

The co-integration test consists of testing the null hypothesis \( \delta_1 = \delta_2 = \delta_3 = 0 \), which attests the absence of co-integration, against the alternative, using the F-test with critical values computed by Pesaran, Shin and Smith (2001). If the estimated F-statistics is greater than the upper bound critical value, the null hypothesis is rejected; while in case it exhibits values inferior to the lower bound critical value, the variables show a co-integrated relationship. If the computed F-statistics lies between the two bounds, the results are considered inconclusive.

Hence, the tests of Engle and Granger and Johansen and the ARDL bound tests can shed light on the existence of co-integration relationships among variables, thus presenting evidence for the presence or absence of price transmission and therefore providing an initial framework to study the interdependencies among prices in a market.

After performing a co-integration test, a further step in the analysis of market integration consists of constructing an analytical model which is able to estimate the various aspects of the co-integrated relationship within a system of variables. Such models usually take three forms: VAR (vector autoregressive), VECM (vector error correction) and ARDL (autoregressive distributed lag). These models will be briefly discussed in what follows.

*Autoregressive Distributed Lag Models*

In the case of stationary series or of variables exhibiting different degrees of integration, the ARDL represents one of the most widespread models adopted by the literature.

In ARDL models the dependent variable can be explained by lags of itself as well as by other explanatory variables and their lagged values:
\[ P_t = \alpha + \varphi P_{t-1} + \ldots + \varphi_p P_{t-p} + \beta_0 P_{t-1}^2 + \beta_1 P_{t-1}^2 + \beta_q P_{t-q}^2 + e_t \]

This example portrays the long-run relationship among price variables: the dependent variable \( P \) can be explained by \( p \) lagged values of itself, by the price \( P^2 \) and \( P^2 \)'s \( q \) lagged values. Therefore this is labelled an ARDL \((p, q)\) model.

A study of the short-run dynamics of the price relationship takes the form of an error correction model where the error correction term is given by the residuals of the long-run model lagged once. The model has the differenced form:

\[ \Delta P_t = \alpha + \gamma_1 \Delta P_{t-1} + \ldots + \gamma_p \Delta P_{t-p+1} + \omega_1 \Delta P_{t-1}^2 + \ldots + \omega_q \Delta P_{t-q+1}^2 + \theta ECT_{t-1} + e_t \]

where

\[ ECT_t = \ln P_t - \alpha_0 - \sum_{j=1}^{\alpha} b_j \ln P_{t-j} - \sum_{j=0}^{e_1} c_1 \ln P_{t-j}^2 - \sum_{j=3}^{d_1} d_i \ln P_{t-j}^2 \]

This format of the ARDL allows us to understand the relationship between long and short-run price dynamics through an interpretation of the coefficient of the error correction term; \( \theta \) (the coefficient of the ECT) shows that the short-run convergence converges to long-run equilibrium and therefore it describes the speed of adjustment effect.

### 3.3.3 Co-integration in the presence of structural breaks

The unit root and co-integration tests described so far are based on the constancy of parameters such as the mean, variance, trend and co-integration parameters and coefficients. These tests become problematic if the parameters change over time or, in other words, if the economic variables exhibit trends that change stochastically. All these approaches assume a constant market structure and behaviour throughout the entire sample period without allowing for policy or other kinds of shocks which may alter the degree of market integration.

A structural break can thus be identified as “an intermittent shock with a permanent effect on the series” (Hendry, 1996). Hence, unit root tests lack power to distinguish between the null hypothesis of non stationarity (I(1)) and the stationary alternative (I(0)) if structural breaks are not taken into account, thus running the risk of incorrectly failing to reject the unit root
null. Further problems arise in the bivariate/multivariate context if potential changes in the co-integrating vectors and parameters are not taken into consideration. This may lead to the classification of time series with breaking trends as integrated, thus generating incorrect inferences.

Many econometricians have attempted to deal with both issues. In univariate analysis, time series have been considered as driven by a deterministic trend subject to breaks, rather than as following the stochastic trend of the unit root process: a large body of research has been undertaken to detect structural breaks in time series with single/multiple and/or known/unknown breaks.

The classical test for structural change is the Chow test (1960) which is based on the separation of the series into two sub-periods according to an a priori known break-date; the parameters are estimated for each sub-period which are then tested using F statistics.

As outlined by Hansen (2001), the big limitation of this test lies in the fact that the break point must be known: if the latter is randomly chosen, the test can be devoid of meaning as the true break-date can be missed; if the date is chosen on the basis of the characteristics of the data, it can generate endogeneity issues owing to its correlation with the data: it can misleadingly indicate the presence of a break when none exists.

Another approach based on a known break-date has been developed by Perron (1989) who suggested three models to identify the presence of structural breaks: a) a “crash model” with a change in the intercept; b) a “changing growth model” with a change in the slope of the trend function; c) a model where both intercept and slope change at the time of the break.

Alternative tests have been created where the break is considered as unknown; most of them have been constructed to test for unit root against a stationary alternative with a single unknown break point. Zivot and Andrews (1992) designed a test which allows for a single structural break in the intercept and/or in the trend of the series, as determined by a grid search over possible break points.

The regression equations used by Zivot and Andrews’ test for unit root in the presence of an endogenous break has the following null hypothesis which considers the series as integrated without a break:
$H_0: y_t = \mu + \rho y_{t-1} + e_t$

Under the alternative $y_t$ can be represented by a trend stationary process with a one-time break in the trend; the selection of the break point, which corresponds to a dummy $\lambda$, is chosen in order to give the least favourable result to the null hypothesis. Hence the tests of the null hypothesis of the presence of unit root in the series still involve $H_0: \rho = 1$ like in the ADF, although new critical values have been computed taking into account an endogenous break.

The regression equations estimated by Zivot and Andrews to test for unit root follow the three models postulated by Perron; thus, they allow for a change in the level of the series (a), in the trend (b) and in both (c).

\begin{align*}
y_t &= \mu^A + \theta^A DU_t(\lambda) + \beta^A t + \rho^A y_{t-1} + \sum_{j=1}^k \zeta_j^A \Delta y_{t-j} + e_t \quad (a) \\
y_t &= \mu^B + \theta^B t + \gamma^B DT^*_t(\lambda) + \rho^B y_{t-1} + \sum_{j=1}^k \zeta_j^B \Delta y_{t-j} + e_t \quad (b) \\
y_t &= \mu^C + \theta^C DU_t(\lambda) + \beta^C t + \gamma^C DT^*_t(\lambda) + \rho^C y_{t-1} + \sum_{j=1}^k \zeta_j^C \Delta y_{t-j} + e_t \quad (c)
\end{align*}

where

$DU_t(\lambda) = 1$ if $t < T\lambda$, 0 otherwise; it is a dummy for a mean shift;

$DT^*_t(\lambda) = t - T\lambda$ if $t > T\lambda$, 0 otherwise; it is a dummy corresponding to a trend shift;

$k$ indicates the number of lags to be added to the regression to prevent autocorrelation.


One clear weakness of the Zivot-Andrews strategy, and of similar approaches, is its inability to deal with more than one break in the series. Further efforts to address this issue led to the development of testing the presence of multiple breaks. Among others, Clemente, Montañés and Reyes (1998) proposed a test that allows for two structural breaks, either additive outliers
(the AO model, which captures a sudden change in a series) or innovational outliers (the IO model which allows for a gradual shift in the mean of the series).

The Clemente et al. (1998) test represents an extension of the Perron and Vogelsang (1992) approach, but allows for two breaks by adding two supplementary dummy variables for intercept and slope changes, as indicated by the following equation:

\[ y_t = \mu + \rho y_{t-1} + \beta t + \gamma DT_1 + \theta DU_2 + \theta DU_1 + \sum_{j=1}^{2} \alpha_j A y_{t-j} + u_t \]

Another development in the search for multiple structural breaks was achieved by Bai and Perron (1998) who created a step-by-step method: starting by testing for a single break, the sample is divided in two (once the first break is found) according to the estimated break point, and then the test is repeated in each subsample, until the null fails to be rejected.

The investigation of structural breaks has not been applied only to the univariate framework, but has also been extended to multivariate analysis. As mentioned earlier, conventional co-integration tests could yield misleading results in the presence of structural breaks. The study of co-integration relationships in the presence of structural breaks can be quite complex as it requires the detection of a potential break in both the co-integration coefficients, in the error correction parameter, in all long-run relations (or in some of them) and in the short-run dynamics. Moreover, the breaks could happen in all the variables, or not. Among the various statistical studies which have been elaborated on co-integration tests in the presence of structural breaks, Gregory and Hansen (1996) have created a residual-based co-integration test with a single structural break of unknown timing in the co-integrating vector. Bai and Perron (1998) detect multiple structural changes in the linear regression model estimated by least squares.

More recent studies include Lutkepohl, Saikkonen and Trenkler (2004) who tested the co-integration rank of a VAR with level shifts of unknown time while Andrade and Bruneau (2000) extended the Gregory and Hansen (1996) test to include multiple breaks applied to a multivariate framework along the lines of Johansen. Johansen, Mosconi and Nielsen (2000) showed how intervention dummies should be specified and included in VAR models in order to include structural breaks. They generalize
the likelihood-based multivariate co-integration analysis developed by Johansen to a case where structural breaks are known points in time, thus originating new asymptotic tables. Jimeno, Moral and Saiz (2006) carried out recursive eigenvalue tests (following Hansen and Johansen, 1999) to detect instability in the number of co-integrating relations or co-integrating rank. Through the computation of unrestricted bivariate and trivariate VAR models, they test for the null of a common break date in the intercept, treating the break date as unknown.

Another test for structural breaks in a multivariate co-integration relationship has been developed within the ARDL framework by Pesaran and Shin (1995) drawing from the CUSUM test proposed by Brown, Durbin and Evans (1975). This approach is founded on a test of the stability of the short-term parameters of the co-integration relationship through the cumulative sum of residuals (CUSUM) and CUSUM of squared residuals (CUSUMSQ) tests.

According to this methodology, the null hypothesis that the ARDL regression equation is correctly specified (i.e. that the co-integration relationship explained by the model is not broken by structural breaks) cannot be rejected if the representation plot of the CUSUM and CUSUMSQ statistics lies within the critical bound of the 5 per cent significance level.
4. Integration with the global economy: a study of the cotton market in Egypt and Western Anatolia

The Ottoman Empire underwent a process of integration with the global economy during the second half of the 19th Century, thus following the same pattern experienced by many regions of the world. This chapter explores one aspect of this process, examining the linkages established between the cotton industry in Egypt and Western Anatolia, which were part of the Ottoman Empire, and the international cotton market, during the time of the so-called first wave of globalisation (from the second half of the 19th Century till the outbreak of the First World War). We undertake a quantitative exploration of the pattern of price transmission between the international cotton market and the Ottoman Empire markets over this period, connecting changes in the nature of spatial market integration between these markets to major economic and political developments. As far as we are aware, this is the first rigorous econometric analysis of cotton market integration between the international and Ottoman Empire markets.

The dramatic intensification of linkages with the global economy evidenced by the exponential growth of Ottoman trade volume and value during the second half of the 19th Century clearly demonstrates the Empire’s integration with the world market and its participation in the vast expansion of international trade.\(^{128}\) Along with other commodities, cotton was a key Ottoman export. Owing to the crucial significance it played in the world economy during this particular historical period, the cotton trade is useful for understanding the nature of the relationship between the Ottoman and the global markets. What we aim to discover with our study is whether the extent of Ottoman cotton market integration changed (improved or worsened) over time. We also attempt to connect changes in the nature of spatial market integration between Ottoman and global markets to major economic and political developments. An investigation of the structure of the cotton market and of the major transformations it underwent will allow us to explore these issues and the degree to which the process of integration took place.

Moreover, it is important to acknowledge that the extent to which the Ottoman state was incorporated into the European-dominated world economy was gradual and at the same time uneven: the Empire was a heterogeneous entity so some regions were affected at an early stage of the 19th Century, while others remained comparatively untouched until the 20th Century. The main implication of the Ottoman territorial vastness and of its regional diversification was that commodity market integration took place at various speeds and magnitudes. We thus take into account this diversity and investigate whether the two major Ottoman cotton-exporting cities, Alexandria and Izmir, experienced different patterns and degrees of international price transmission.

In a recent article Şevket Pamuk (2004) provides some evidence of the co-movement of commodity prices between the main Ottoman and European cities, thus attesting to the existence of market integration between the Empire and the global economy. But the statistical analysis undertaken is quite elementary and the author himself suggests the need for further research using more sophisticated statistical techniques. Our study makes a contribution towards this by undertaking a more in-depth analysis of one aspect of Ottoman Empire participation in the global commodity market.

This chapter is structured as follows: after illustrating the analytical framework and the methodology utilized to explore the process of market integration based on the Law of One Price, we proceed with an econometric analysis of international cotton market integration in Egypt and Western Anatolia. In the final section we discuss the implications of the statistical results outlining the different experiences of the Egyptian and Anatolian markets and also present some conclusions.

4.1 Analytical framework

This section is centred around the empirical analysis of the cotton market in two areas of the Ottoman Empire, Western Anatolia and Egypt, from 1845 to 1914, following the theoretical

framework which describes the concept of market integration as the fulfilment of the Law of One Price (for a complete analysis of market integration and the Law of One Price see Chapter 3.2). The case study of this particular market (i.e. the cotton market) is conducted to help reach a deeper understanding about the level of market integration of the Empire with the global economy during the so-called first wave of globalisation. Specifically, it is aimed at examining the evolution of integration over time and to relate its changes in pace and extent to broader economic and political developments.

Despite the plethora of studies investigating the issues of price transmission and of the degree of linkages of commodity markets in the 19th Century economies, most empirical analysis has directed its attention to developed countries, specifically to that area of Continental Europe which came to represent the hub of the world economy. On the other hand, many fewer works investigate developing countries’ level of involvement and receptiveness to this new global phase spurred by the Industrial Revolution, when volumes and values of commodities exchanged nationally and internationally expanded exponentially.

The model utilised to measure the extent of global integration of the Ottoman cotton market follows the process of price transmission embodied by the Law of One Price. The degree to which changes in one market are transposed to another can be described by the following two equations:

\[ P_{ALEX} = \beta_1 P_{LIVERPOOL} + \gamma_1 P_{IZMIR} + \varepsilon \] \hspace{1cm} (1)
\[ P_{IZMIR} = \beta_2 P_{LIVERPOOL} + \gamma_2 P_{ALEX} + \varepsilon \] \hspace{1cm} (2)

where \( P_{ALEX}, P_{LIVERPOOL}, P_{IZMIR} \) represent the prices of cotton in Alexandria, Liverpool and Izmir, respectively and \( \varepsilon \) is the disturbance term.

However, the above-described relationship among prices should not be computed through a simple OLS regression as it would generate spurious results and misleading estimates in cases where the series exhibit unit roots. Moreover, in order to detect both short-run and long-run dynamics in the interconnectiveness (or absence thereof) of Ottoman and global prices, the model needs to assume a dynamic structure.

131 See, for example, the study of Marks (2009) on rice price convergence in Indonesia and of Goodwin and Grennes (1998) on wheat price integration in Tsarist Russia.
The price movements of the three cities during the period under analysis are depicted in Figure 4.1.1. Some common patterns in the development of the series can be noticed: a slow rise from 1845 to 1860, interrupted by a huge jump in the early 1860s coinciding with the American Civil war (1861-5); then a downward trend till the end of the century, corresponding to the global price depression (1873-96), followed by a period of steady price increase until the First World War.

*Figure 4.1.1: Cotton price movements in Liverpool, Alexandria and Izmir, 1845-1914, in British pound per metric ton.*

A simple visual analysis of prices co-movements reveals the presence of a common behaviour among the variables in the long-run, with the Alexandria and Izmir cotton markets following global prices. At the same time it is also noticeable that there are some specific points in time in which prices were diverging. Thus, further investigation is needed of the nature of the relationship and the degree of spatial market integration among the price series over time.

Another important characteristic of the series can be observed in their price differentials: the price of Egyptian cotton was generally higher than that of American cotton sold in Liverpool owing to its superior quality; moreover, Egyptian long staple cotton was usually used in a blend with other more standard varieties to produce higher quality cotton cloth (Owen, 1969).
On the other hand, Western Anatolian native cotton, known as “yerli” (a variety of Indian Gossypium herbaceum), was rough and short stapled. Owing to its lower quality, it was cheaper than both Egyptian and American cotton and was utilised to produce a coarser cloth (Mihci and Mihci, 2002).

To conduct a thorough examination of the extent of integration between the Ottoman cotton market and the world economy is essential to analyse the structure and the characteristics of this market in order to understand what may have facilitated or obstructed the process of price convergence. We believe that five crucial factors related to the features of the cotton market need to be examined in order to assess the impact of the dynamics of price transmission:

1) The change in trade policy, i.e. the lowering of export tariffs in 1861-2;
2) The reduction in transport costs;
3) The improved exchange rate stability consequent to the adherence to the gold standard;
4) The market structure of the domestic cotton industry;
5) The relevance of the Ottoman Empire in the overall formation of world cotton prices.

We expect the first three aspects to have facilitated the process of market integration and the last two to have hindered it, as can be inferred from their analysis presented in the following paragraphs.

1) Export taxes
Until 1861 the Ottoman government imposed a 12 per cent duty on all exports, as established by the 1838 Anglo-Turkish convention and the Hatt i-Serif (Imperial Script) of the following year (which also fixed import tax rates at 5 per cent and led to the gradual abolition of state monopolies). Thus, the major change in Ottoman trade policy which affected the cotton trade was the reduction of export duties in 1862 from 12 to 1 per cent; the value of this tax did not change until the dissolution of the Empire.

As already pointed out in the previous chapter (see Section 3.2) export taxes constitute a form of trade cost and a cause of distortion in markets. Therefore, the developments in Ottoman trade policy which saw a sharp reduction in export duties in 1861-2 from 12 per cent to 1 per cent represented a reduction in trade costs and for this reason we can expect that they had a beneficial effect on market integration and consequently eased the process of price convergence.

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132 Export taxes were considered an important source of fiscal revenue.
transmission. It is important to specify that if the export tariff had remained unchanged at 12 per cent, markets could still have been integrated provided that the tax was not prohibitive. The reduction in trade costs brought about by the lower export tax is then expected to have accelerated the speed of price transmission.

2) Transport costs

In the Ottoman Empire, as in the rest of the world, the major development that revolutionised the way in which commodities were moved, both by water and land, was the invention of the steam engine in the late 18\textsuperscript{th} Century and its further improvements during the 19\textsuperscript{th} Century. Transport costs were sharply reduced and the unpredictability of travelling by sail was minimised. Moreover, with the increasing size of steamships over the course of the century, maritime trade costs experienced further reductions.

Steamships began entering Ottoman waters in the 1820s and started replacing sailing vessels so that by the end of the century they were responsible for shipping most of all goods transported by sea. Such developments, together with the introduction of the telegraph in 1869 and the expansion of the railway system, represented a crucial turning point in linking the Ottoman lands with the global economy and were at the basis of the significant expansion in the cotton trade described in earlier chapters. Furthermore, the harbours of Izmir and Alexandria both underwent a process of modernisation in their infrastructure. The port of Izmir was renovated between 1867 and 1875 endowing it with new facilities comprising a four kilometre-long quay and 32 hectares of dock space. In Alexandria new jetties, wharves and docks were built between 1869 and 1880.

The largest decrease in transport costs took place after the mid-century and these costs continued undergoing a steady decline until the outbreak of the First World War. Such a reduction in transport costs led to a decrease in the gap between global and Ottoman prices and consequently to an acceleration of the process of convergence. We would therefore expect the degree of integration of the Empire to increase after the 1860s owing to these improvements in maritime transportation.

3) Exchange rate in the Ottoman Empire

In the 1880s the Ottoman Empire abandoned the system of floating exchange rates and adhered to the gold standard\textsuperscript{133}. The latter has often been seen by the literature as a crucial

\textsuperscript{133} The Ottoman Empire entered the gold standard in 1881 and Egypt in 1885.
factor in facilitating trade expansion and market integration owing to the engendered reduction of exchange rate risk volatility: the gold standard was, in fact, a system of fixed exchange rates under which countries agreed to exchange their currencies for gold at a fixed price. It can therefore be expected that the Ottoman adherence to this international financial system acted as a stimulus to the process of market integration with the global economy.

4) Market structure in the domestic cotton industry

The domestic cotton market in the Ottoman Empire was decentralised on the production side but concentrated in the export sector: cotton was cultivated by a vast number of farmers and sold to the international market by a small number of merchant houses. Thus the domestic market can be characterised as an oligopsony, where multiple sellers supply a few buyers.

*Figure 4.1.2: Ottoman cotton supply chain.*

![Ottoman cotton supply chain diagram](image)

As depicted in figure 4.1.2, cotton was cultivated by a large number of small farmers (*fellahin*), predominantly in their small land holdings and, to a lesser degree, in the big estates of a few powerful landowners. In the first case farmers sold their produce (often through village *sheiks*) to an intermediary who, in turn, brought it to the ginner and supplied it to
export merchant houses. When cotton was cultivated in large landholdings (which were more widespread in Egypt than in Western Anatolia) in most cases a direct agreement was established between landlords, ginneries and exporters. Thus, as illustrated in Chapter 2 (see Section 1.5) merchants played a pivotal role in the cotton trade as they represented the link between the domestic and the international market.

The existence of interactive socio-economic networks among Ottoman merchants in various parts of the Empire and in Europe may have led them to share information about the market and to cooperate in their trade activities; such collusive behaviour can be identified as a potential source of market power in the domestic market. As thoroughly analysed in Section 3.2, the presence of a non-perfectly competitive market represents a distortion which can hinder price transmission.

5) The Ottoman Empire’s role in the global cotton market
While the domestic market was characterised by the presence of market power on the demand side due to the small number of buyers from producers, it is not immediately clear whether the Empire had any market power as a cotton exporter in the global market. Ottoman participation in the international cotton trade was relatively small, as shown by its share in world production: the latter was around 10 per cent, between 1850 and 1914 (with Egypt representing a much bigger player), while the US produced between 60 and 80 per cent of global cotton crops during the period under analysis. Nevertheless this does not preclude the possibility that the Empire had some degree of market power, particularly in the short-run, and we will explore this further through our statistical analysis of price transmission. As in the case of monopsony/oligopsony, the presence of market power in the world market constitutes an obstacle to market integration.

To summarize, three different forces have been identified in the analysis of the process of Ottoman participation in the global cotton market which can been considered as factors promoting and accelerating price convergence: decreased transport costs from the mid-century, a reduction in export taxes from 1861-2 and the adherence to the gold standard from the 1880s. We would therefore expect market integration to be stronger from the 1860s onwards. On the other hand, the existence of market power in the domestic market, and possibly in the international market, may have hindered or slowed down this process.
4.2 Methodology and data

The methodology adopted to study the dynamics of the Ottoman cotton market and to verify the validity of the expectations we have outlined follows the steps depicted in Figure 4.2.1: after having estimated the order of integration of each cotton price series through ADF and Zivot and Andrews and Clemente et al. unit root tests, we will assess the presence of Granger causality among the price series and will use impulse response functions to show the effects of shocks on the variables. Subsequently we will perform the ARDL co-integration test in a multivariate framework, then construct an ARDL model to depict the short and long-run nature of the relationship among prices.

The step-by-step approach we utilised to evaluate the notional components of market integration and price transmission is portrayed in Figure 4.2.1, and is described below.

*Figure 4.2.1: Methodology used to study the process of price transmission.*
1) At first each variable is tested with the augmented Dickey Fuller procedure (or any other unit root test); this step is coupled with univariate structural break tests (allowing for one and two breaks) to confirm or reject the presence of stationarity. Then a Granger causality test is executed in order to check if the price variables are related, coupled with a study of the impulse response functions. In cases where all series are I(0), then the dynamic relationship among variables can be studied through ARDL and/or VAR models.

2) If the series are integrated of the same order, Engle and Granger and Johansen co-integration tests are performed. The tests’ results are further confirmed or invalidated by recourse to structural break co-integration tests, detecting the presence of breaks in co-integration coefficients, the error correction parameter and in the long-run and short- run relations. In cases where there is of a different order of integration, the ARDL co-integration test is performed, and consequently an ARDL model will represent the best way to understand the relationship among variables.

3) If the series are integrated, then their dynamic relationship can be analysed through VECM; if they are not, a VAR model should be used.

4.2.1 Price data
The cotton price data were obtained from various sources. As they were expressed in different units of measurement (in Egyptian pounds per qantar in Egypt,\textsuperscript{134} in piastres per okke or per cwt in Turkey\textsuperscript{135}), they have been converted to metric tons per British pound using exchange rates given by Pamuk (2000) for Turkey and by Owen (1969) for Egypt.

For Izmir, the main export harbour of Western Anatolia, wholesale domestic cotton prices have been acquired from both unpublished and published sources:
- 1845-1862: Consular Reports of the British Foreign Office consulted in the British National Archive in London:
  FO 78/62; 701; 750; 795; 832; 868; 905; 954; 1020; 1108; 1209; 1307; 1447; 1687.
- 1863-76: Kasaba, 1988;

\textsuperscript{134} One qantar was the equivalent of 98.9 lb.; one Egyptian pound corresponded to one British pound.
\textsuperscript{135} One okke equalled 1.283 kg., while one cwt corresponded to 112 lbs; one British pound equalled 1.10 Turkish lira, which in turn was made of of 100 piastres.
- 1859-1861: Owen, 1993;
- 1876-1908: Quataert, 1973;

Prices for the years 1856 and 1883-4 could not be found and so the missing data have been filled through interpolation.

For Alexandria, the principal Egyptian export location, domestic cotton prices have been found in the following published sources:
- 1845-1873: Owen, 1969;
- 1874-1913: Richards, 1987;
- 1914: Johnson, 1926.

American cotton prices sold in Liverpool (obtained from Jacks, O’Rourke and Williamson, 2011) have been held as world prices: Liverpool was the principal global harbour for the import of raw cotton during the 19th Century, and the US the main global supplier; hence prices of American cotton in Liverpool have been used as a proxy for the Ottoman ones owing to the lack of a complete series of Egyptian and Anatolian prices in the period under analysis. For the years in which world prices for Ottoman cotton are available (from 1863 to 1875 and 1882 to 1914 for Egyptian cotton sold in Liverpool and from 1876 to 1908 for Izmir export prices) a clear co-movement among the series is observable, thus justifying the use of American prices as a proxy. Table 4.2.1 compares the price index for American cotton with the Egyptian and Turkish indexes. Section 4.3.1 offers a study of co-integration using Ottoman world prices during the available years, comparing the results with the previous analysis.

Table 4.2.1: Index of annual average prices for American Egyptian and Western Anatolian cotton (1901-05=100).

<table>
<thead>
<tr>
<th>Years</th>
<th>American</th>
<th>Egyptian</th>
<th>Western Anatolian</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876-1880</td>
<td>119</td>
<td>-</td>
<td>124</td>
</tr>
<tr>
<td>1881-1885*</td>
<td>111</td>
<td>100*</td>
<td>117</td>
</tr>
<tr>
<td>1886-1890</td>
<td>107</td>
<td>93</td>
<td>102</td>
</tr>
<tr>
<td>1891-1895</td>
<td>78</td>
<td>71</td>
<td>82</td>
</tr>
<tr>
<td>1896-1900</td>
<td>69</td>
<td>73</td>
<td>75</td>
</tr>
<tr>
<td>1901-1905</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1906-1910</td>
<td>107</td>
<td>133</td>
<td>106</td>
</tr>
</tbody>
</table>

Note: *1882-85 for Egyptian prices.

4.3 Application

The cotton price data for all cities have been transformed into their log values as they all showed a skewed distribution, as can be seen in Figure 4.3.1. Moreover, the vast majority of studies centred on the issue of price convergence use logs in order to draw conclusions about the elasticity of price transmission.

Figure 4.3.1: Transformation of cotton price data in logarithmic values.

---

137 A logarithmic transformation is often useful for data which have positive skewness, as with the log values the approximation to a normal distribution is greatly improved.
The following table illustrates some descriptive statistics of the logs of the three prices.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Variance</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liverpool</td>
<td>4.10</td>
<td>0.413</td>
<td>0.170</td>
<td>1.39</td>
<td>5.39</td>
</tr>
<tr>
<td>Alexandria</td>
<td>4.13</td>
<td>0.392</td>
<td>0.154</td>
<td>0.70</td>
<td>3.65</td>
</tr>
<tr>
<td>Izmir</td>
<td>3.90</td>
<td>0.393</td>
<td>0.154</td>
<td>0.90</td>
<td>4.39</td>
</tr>
</tbody>
</table>
**Stationarity tests and structural breaks**

According to the augmented Dickey Fuller test for unit root,\(^{138}\) where the number of lags has been chosen following the Schwarz Information Criterion\(^{139}\) all the variables proved to be stationary (Alexandria and Liverpool at the 5 and 10 per cent level of significance, Izmir also at 1 per cent), as reported in the following table.

Table 4.3.2: ADF results (with drift).

<table>
<thead>
<tr>
<th>City</th>
<th>Lags</th>
<th>Test statistics Z(t)</th>
<th>1% critical value</th>
<th>5% critical value</th>
<th>10% critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liverpool</td>
<td>1</td>
<td>-2.267*</td>
<td>-2.385</td>
<td>-1.669</td>
<td>-1.295</td>
</tr>
<tr>
<td>Alexandria</td>
<td>1</td>
<td>-2.307*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Izmir</td>
<td>1</td>
<td>-3.221*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* = stationary.

As explained in the previous section, if a structural break is present in the series, the unit root test may have low power. Furthermore, as outlined by Leybourne and Newbold (2003), among others, if structural breaks are not taken into account, co-integration techniques may show misleading results. It has already been mentioned that from a graphical inspection of the cotton data an enormous upsurge in prices affecting all three markets at the height of the America Civil War is noticeable. The effects of the great depression of 1873-96, with the associated price deflation, are likewise clearly distinguishable: these events may be at the origin of one or multiple breaks in the series.

Therefore unit root tests allowing for one structural break in both intercept and trend, following Zivot and Andrews’ procedure, have been performed. The results, shown in Table 4.3.3 and Figure 4.3.2, indicate the presence of unit roots for Alexandria and Liverpool, while Izmir is stationary at 5 per cent. The fact that these results are not consistent with those obtained from the ADF suggest that regime shifts in the series are highly significant.

---

\(^{138}\) The ADF test showed the presence of stationarity with drift. The procedure to test for unit root followed the approach proposed by Seddighi, Lawler and Katos (2000). Ch 7.4, pp.262-281.

\(^{139}\) Pesaran and Smith (1998) argue that the Schwarz Information Criterion should be preferred because it often has a more parsimonious specification. Verma (2007) adds that it is more suitable to small datasets.
Table 4.3.3: Zivot and Andrews test.

<table>
<thead>
<tr>
<th></th>
<th>Break</th>
<th>t-statistics</th>
<th>1% critical value</th>
<th>5% critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liverpool</td>
<td>1867</td>
<td>-3.147*</td>
<td>-5.57</td>
<td>-5.08</td>
</tr>
<tr>
<td>Alexandria</td>
<td>1867</td>
<td>-2.753*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Izmir</td>
<td>1862</td>
<td>-5.343</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* = non-stationary.

Figure 4.3.2: Single structural break.

The power of the Zivot and Andrews and other unit root tests to detect a single structural break have been questioned by Perron (1997), Lumsdaine and Pappel (1997), Clemente, Montañés and Reyes (1998), Lee and Strazicich (2003) and many others. One fundamental weakness of this procedure stems from its incapability of dealing with more than one break. This criticism has led to the development of stationarity tests allowing for multiple breaks.

Clemente et al. (1998) tests have therefore been performed: the cotton price series in Alexandria and Liverpool proved to be non-stationary confirming Zivot and Andrews’ procedure, while Izmir data proved to be stationary.
The following table reports the results of the test based on the Innovative Outlier (IO) model where two changes in the mean are allowed to take place gradually, and on the Additive Outlier (AO) model where the mean shifts happen suddenly.

Table 4.3.4: Clemente, Montañés and Reyes test.

<table>
<thead>
<tr>
<th></th>
<th>Break dates (IO model)</th>
<th>t-statistics</th>
<th>Break dates (AO model)</th>
<th>t-statistics</th>
<th>5% critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liverpool</td>
<td>1860-1863</td>
<td>-4.832*</td>
<td>1858-1872</td>
<td>-4.742*</td>
<td>-5.490</td>
</tr>
<tr>
<td>Alexandria</td>
<td>1860-1865</td>
<td>-4.851*</td>
<td>1858-1872</td>
<td>-4.206*</td>
<td></td>
</tr>
<tr>
<td>Izmir</td>
<td>1860-1871</td>
<td>-6.971**</td>
<td>1863-1869</td>
<td>-5.337*</td>
<td></td>
</tr>
</tbody>
</table>

* = non-stationary; ** = stationary.

Figure 4.3.3: IO tests for structural breaks.
The breaks depicted in the test coincide with the period of the American Civil War for all variables: Liverpool and Alexandria, according to the IO model and Izmir following the AO model. Another break that can be directly associated with a major economic change occurs in 1872 (for Alexandria and Liverpool, according to the AO): this date represents the year before the stock market crash of 1873 which triggered a severe international depression and led to a long period of price deflation globally. It is also worth noting that the financial collapse of the Ottoman Empire in 1875-6 did not affect the behaviour of the cotton series: a Chow test has been performed selecting 1875 as the break date, but no structural break was found.

According to these results, both Alexandria and Liverpool prices show non-stationarity, while in the case of Izmir the different outcomes of the AO and IO tests introduce uncertainty as to the true order of integration of the variable.

**Granger causality test and impulse response functions.**
A Granger causality test is executed in order to detect the presence of a relationship among the price variables. The results of the test are based on a VAR model of the three price series
in their first differences. Five lags have been added to the VAR model following the Schwarz Bayesian Information Criterion in order to prevent autocorrelation.

The concept of Granger causality is based on the idea that one variable can be predicted through the past values of another variable. If, for example the price of cotton in Alexandria (P\textsubscript{ALEX}) is Granger caused by the price of cotton in Liverpool (P\textsubscript{LIV}), this means that the past values of P\textsubscript{LIV} are likely to help in predicting P\textsubscript{ALEX}.

The following table gives the results of the Granger causality test for cotton prices in Liverpool, Alexandria and Izmir. The null hypotheses tested are:

H\textsubscript{01}: P\textsubscript{2} does not cause P\textsubscript{1}
H\textsubscript{02}: P\textsubscript{2} and P\textsubscript{3} do not cause P\textsubscript{1}

Table 4.3.5: Granger causality tests.

<table>
<thead>
<tr>
<th>P\textsubscript{1}</th>
<th>P\textsubscript{2}</th>
<th>p value</th>
<th>P\textsubscript{2} and P\textsubscript{3}</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandria</td>
<td>Liverpool</td>
<td>0.002</td>
<td>Liverpool</td>
<td>0.000</td>
</tr>
<tr>
<td>Alexandria</td>
<td>Izmir</td>
<td>0.015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Izmir</td>
<td>Liverpool</td>
<td>0.044</td>
<td>Liverpool</td>
<td>0.001</td>
</tr>
<tr>
<td>Izmir</td>
<td>Alexandria</td>
<td>0.679</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liverpool</td>
<td>Alexandria</td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liverpool</td>
<td>Izmir</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As can be seen from Table 4.3.5, Alexandria and Izmir prices Granger-cause the world prices and are Granger-caused by them. The direction of causality goes both ways in that world prices played a role in the formation of Ottoman prices and the latter had an influence on the determination of global cotton prices.

To further investigate the relationship among prices, we conducted a study of the impulse response functions: the latter are used to analyse how a sudden change in one variable impacts on another variable over time. The results, depicted in Figure 4.3.5, indicate that a shock in Liverpool impacts positively on both Alexandria (the shock dies out after two years) and Izmir (the effects of the shock are positive in the first year and negative in the second, and then become positive again in the third year). A shock in Alexandria generates a positive reaction in Liverpool (thus signalling its importance in global price formation) but has only a
small negative impact in Izmir. A shock in Izmir seems to have almost no effect on Alexandria and world prices. The full results in tabular form can be found in the appendix.

Figure 4.3.5: Impulse response functions.

ARDL Co-integration test
According to the unit root test results, the three variables under study show a different level of integration and therefore the conventional Johansen’s co-integration procedure cannot be applied as it requires all data series to be non-stationary. Furthermore, both unit root tests also suggested that the variables contain structural breaks: this finding further complicates the use of Johansen’s test owing to the fact that it does not take into account endogenous structural breaks. As mentioned in the previous section, the inclusion of structural breaks has been extended also to the multivariate framework of co-integration testing. Nevertheless these techniques are currently in their early stages of development and require a much more complex procedure. To overcome these difficulties, the autoregressive distributed lag

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140 Miller and Ratti, 2009.
(ARDL) approach to co-integration is adopted to estimate the analytical model. It will be coupled with the CUSUM and CUSUMSQ analysis to detect structural breaks.

This methodology has been chosen because it allows a greater degree of flexibility owing to its versatility in including both stationary and non-stationary data and in allowing additional variables that can represent structural breaks. Moreover, the ARDL bound testing is preferable when the sample size is small and allows the determination of different lag lengths for each variable, unlike VECM and VAR models.

Although Engle and Granger’s (1987) original definition of co-integration refers to variables that are integrated of the same order, Enders (2004) argues that it is possible to find equilibrium relationships among groups of variables that are integrated of different orders. Lütkepohl and Krätzig (2004:89) also explain that: “Occasionally it is convenient to consider systems with both I(1) and I(0) variables. Thereby the concept of co-integration is extended by calling any linear combination that is I(0) a co-integration relation, although this terminology is not in the spirit of the original definition because it can happen that a linear combination of I(0) variables is called a co-integration relation”.

The ARDL framework which will be used to test the presence of co-integration in the Ottoman cotton market is specified by the following two models, which define Alexandria and Izmir markets, respectively:

\[
\Delta \ln P^{ALEX} = a_0 + \sum_{j=1}^{n} b_j \Delta \ln P^{ALEX}_{t-j} + \sum_{j=0}^{n} c_j \Delta \ln P^{JV}_{t-j} + \sum_{j=0}^{n} d_j \Delta \ln P^{IZMIR}_{t-j} + \delta_1 \ln P^{ALEX}_{t-1} + \delta_2 \ln P^{LIV}_{t-1} + \delta_3 \ln P^{IZMIR}_{t-1} + \lambda_1 \text{war} + \lambda_2 \text{gold} + \varepsilon_{1t}
\]  

(3)

\[
\Delta \ln P^{IZMIR} = a_0 + \sum_{j=1}^{n} b_j \Delta \ln P^{IZMIR}_{t-j} + \sum_{j=0}^{n} c_j \Delta \ln P^{JV}_{t-j} + \sum_{j=0}^{n} d_j \Delta \ln P^{ALEX}_{t-j} + \delta_1 \ln P^{IZMIR}_{t-1} + \delta_2 \ln P^{LIV}_{t-1} + \delta_3 \ln P^{ALEX}_{t-1} + \lambda_1 \text{war} + \lambda_2 \text{gold} + \varepsilon_{2t}
\]  

(4)

where

\(P^{ALEX} \) = cotton price in Alexandria

\(P^{LIV} \) = cotton price in Liverpool

\(P^{IZMIR} \) = cotton price in Izmir
Two dummy variables have been added to Equations (3) and (4), in order to include the effect of the American Civil War and the adherence to the gold standard. The latter has been included as it has been widely documented that the adoption of the gold standard, and the associated exchange rate stability, contributed to lowering trade costs thus facilitating the process of market integration. Great Britain adhered to the fixed exchange rate system from 1870 till the outbreak of the First World War; most parts of the Ottoman Empire adopted it from 1881 and Egypt from 1885.

The choice of the lag structure is a crucial issue in this test. One lag has been chosen for $\ln P^{ALEX}$, $\ln P^{IZMIR}$ and $\ln P^{LIV}$, while no lags have been added to $\Delta \ln P^{LIV}$, $\Delta \ln P^{IZMIR}$ and $\Delta \ln P^{ALEX}$ in regressions 3 and 4, following the Schwarz Bayesian Information Criterion. The latter has shown a better performance with small samples (Pesaran, Shin and Smith, 2001).

The ARDL co-integration procedure consists of testing the null of no co-integration $H_0$: $\delta_1 = \delta_2 = \delta_3 = 0$ against the alternative, i.e. it tests for the absence of a long-run relationship between the dependent variable and the regressors. The validity of the null hypothesis can be examined by comparing the F statistic obtained from the regression with the F-test critical values computed by Narayan (2005). Narayan calculated critical values for sample sizes ranging from 30-80 observations diversified according to the number of regressors, $k$ (following the methodology proposed by Pesaran, Shin and Smith, 2001): the two computed sets of critical values provide a band that covers all possible classifications of the variables into I(0) and I(1). If the computed F-statistics is higher than the upper bound of the critical value, then the null will be rejected, while in the case where it lies under the lower bound, then the hypothesis of lack of co-integration is validated.

The results, reported in Table 4.3.6, suggest the presence of a co-integration relationship for both the Alexandria and Izmir cotton markets. The specifications we used here are with unrestricted intercept and no trend (case III in Narayan, 2005).
The presence of a co-integration relationship for both the Alexandria and Izmir markets allows us to use the ARDL error correction approach to analyse the long and short-run relationship among domestic and world prices according to the model suggested by Pesaran et al. (1996, 2001) which is closely related to the bound testing approach.

The estimation of a long-run model is so specified:

\[
\ln P^{ALEX} = \alpha_0 + \sum_{j=1}^{\infty} \alpha_j \ln P^{ALEX}_{t-j} + \sum_{j=0}^{\infty} \alpha_2 \ln P^{LIV}_{t-j} + \sum_{j=0}^{\infty} \alpha_3 \ln P^{IZMIR}_{t-j} + \lambda_1 \text{war} \\
\quad + \beta_1 \text{gold} + \varepsilon_{1t},
\]

(5)

\[
\ln P^{IZMIR} = \gamma_0 + \sum_{j=1}^{\infty} \gamma_j \ln P^{IZMIR}_{t-j} + \sum_{j=0}^{\infty} \gamma_2 \ln P^{LIV}_{t-j} + \sum_{j=0}^{\infty} \gamma_3 \ln P^{ALEX}_{t-j} + \lambda_2 \text{war} \\
\quad + \beta_2 \text{gold} + \varepsilon_{2t},
\]

(6)

where

\(\alpha_1, \alpha_2, \alpha_3, \gamma_1, \gamma_2, \gamma_3\) are the long-run coefficients describing the co-integrated relationship.

Following the Schwarz Bayesian Information Criteria one lag was added to each variable, hence \(j_{MAX} = 1\); the results, reported in Table 4.3.7, show that Liverpool cotton prices had a significant long-run impact on both Alexandria and Izmir, indicating the responsiveness of these two locations to the changes and shocks happening in the global economy. These results reveal that the elasticity of price transmission is quite high, as a 1 per cent increase in Liverpool prices leads to a 97 per cent rise in Alexandria and a 153 per cent rise in Izmir. Another factor which significantly affected price setting was the adherence to the gold standard for Alexandria.
Diagnostic tests have been added to the computed models.

Table 4.3.7: ARDL long-run coefficients.

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.246</td>
<td>-0.74</td>
<td>0.465</td>
</tr>
<tr>
<td>$lnP^{LIV}$</td>
<td>0.977</td>
<td>5.49</td>
<td>0.000</td>
</tr>
<tr>
<td>$lnP^{IZMIR}$</td>
<td>0.083</td>
<td>0.83</td>
<td>0.407</td>
</tr>
<tr>
<td>War</td>
<td>-0.238</td>
<td>-1.84</td>
<td>0.071</td>
</tr>
<tr>
<td>Gold</td>
<td>0.162</td>
<td>2.95</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Model (2): ARDL (1, 1, 1) Dependent variable: $lnP^{IZMIR}_t$

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.107</td>
<td>-0.13</td>
<td>0.898</td>
</tr>
<tr>
<td>$lnP^{LIV}$</td>
<td>1.53</td>
<td>3.20</td>
<td>0.001</td>
</tr>
<tr>
<td>$lnP^{ALEX}$</td>
<td>-0.57</td>
<td>0.91</td>
<td>0.441</td>
</tr>
<tr>
<td>War</td>
<td>-0.105</td>
<td>-0.31</td>
<td>0.754</td>
</tr>
<tr>
<td>Gold</td>
<td>0.262</td>
<td>1.63</td>
<td>0.109</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.86</td>
<td>0.78</td>
</tr>
<tr>
<td>LM test for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>autocorrelation</td>
<td>0.92</td>
<td>0.94</td>
</tr>
<tr>
<td>Prob. &gt; chi2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>4.77</td>
<td>8.40</td>
</tr>
<tr>
<td>VIF (variance inflation factor)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Once the long-run relationship is established, we can apply the ARDL procedure to estimate the short-run relationship among domestic and world cotton prices. It is described through the computation of an error correction model within the ARDL framework:

\[
\Delta \ln P^{ALEX} = \alpha_0 + \sum_{j=1}^{n} b_j \Delta \ln P^{ALEX}_{t-j} + \sum_{j=0}^{n} c_j \Delta \ln P^{LIV}_{t-j} + \sum_{j=0}^{n} d_j \Delta \ln P^{IZMIR}_{t-j} + \lambda_1 \text{war} + \beta_1 \text{gold} + \theta_1 ECT_{1,t-1} + \epsilon_{1t} \tag{7}
\]

\[
\Delta \ln P^{IZMIR} = \alpha_0 + \sum_{j=1}^{n} b_2 \Delta \ln P^{IZMIR}_{t-j} + \sum_{j=0}^{n} c_2 \Delta \ln P^{LIV}_{t-j} + \sum_{j=0}^{n} d_2 \Delta \ln P^{IZMIR}_{t-j} + \lambda_2 \text{war} + \beta_2 \text{gold} + \theta_2 ECT_{2,t-1} + \epsilon_{2t} \tag{8}
\]

\[141 \ H_0: \ \text{no serial correlation.}\]
\[142 \ \text{VIF values higher than 10 indicate the presence of multicollinearity.}\]
where:
- \( c_1 \) (\( c_2 \)) and \( d_1 \) (\( d_2 \)) represent how much of a given change in cotton prices in Liverpool and Izmir (Alexandria) will be transmitted to Alexandria (Izmir) within the first year: these parameters represent the initial adjustment or contemporaneous effect.
- \( \theta_1 \) and \( \theta_2 \) are the coefficients of the error correction term (ECT) which shows how fast variables converge to equilibrium and therefore it describes the speed of adjustment effect.

The two ECT are defined as follows:

\[
ECT_1^t = \ln P^{ALEX}_t - \alpha_0 - \sum_{j=1}^{\infty} b_1 \ln P^{ALEX}_{t-j} - \sum_{j=0}^{\infty} c_1 \ln P^{LIV}_{t-j} - \sum_{j=0}^{\infty} d_1 \ln P^{IZMIR}_{t-j} - \dot{\lambda}_1 \text{ war } - \beta_1 \text{ gold}
\]

\[
ECT_2^t = \ln P^{IZMIR}_t - \alpha_0 - \sum_{j=1}^{\infty} b_2 \ln P^{IZMIR}_{t-j} - \sum_{j=0}^{\infty} c_2 \ln P^{LIV}_{t-j} - \sum_{j=0}^{\infty} d_2 \ln P^{ALEX}_{t-j} - \dot{\lambda}_1 \text{ war } - \beta_2 \text{ gold}
\]

Hence \( \theta \) represents the short-run speed of adjustment to reach the long-run equilibrium as it defines how much of the price difference among the three prices is eliminated in each subsequent period: the closer its value is to -1, the faster is the speed at which convergence takes place. The presence of a \( \theta \) different from zero is a necessary condition for long-run price convergence. On the other hand, a significantly different from zero \( c_1 \) (\( c_2 \)) or \( d_1 \) (\( d_2 \)) is neither a necessary nor a sufficient condition for convergence to take place. Even if these coefficients are equal to one, which corresponds to perfect short-run adjustment, the series may still drift apart in the long-run.

The results, shown in Table 4.3.8, indicate that the error correction term in both equations is highly significant and has the right sign (it is negative) thus implying the presence of an adjustment process to the long-run equilibrium after a shock. Convergence to the long-run is not instantaneous in Alexandria, as indicated by \( \theta \), the coefficient of the error correction term, which is equal to -1.73. In fact, the presence of \( \theta \) with values between -1 and -2 suggests that converge to long-run equilibrium does not proceed monotonically but is dampened by oscillatory behaviour along the path to convergence. On the other hand, a deviation from the long-run equilibrium in Izmir is corrected by about 96 per cent in the next year \( (\theta = -0.96) \).
For both the Alexandria and the Izmir market Liverpool is a significant variable in the short-
run model, thus indicating the presence of an initial transmission between domestic and
global prices: the responsiveness of Alexandria in the short-run is almost the same as in the
long-run, while it is lower in Izmir. Moreover, Alexandria prices seem to have an impact on
Izmir in the short-run.

Table 4.3.8: Short-run dynamics in Alexandria and Izmir.

<table>
<thead>
<tr>
<th>Model (3): ARDL (1, 1, 1) Dependent variable: $\Delta \ln P_{ALEX}^{t}$</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.012</td>
<td>-0.43</td>
<td>0.667</td>
</tr>
<tr>
<td>$\Delta \ln P_{LIV}^{t}$</td>
<td>0.613</td>
<td>4.96</td>
<td>0.000</td>
</tr>
<tr>
<td>$\Delta \ln P_{IZMIR}^{t}$</td>
<td>0.109</td>
<td>-0.78</td>
<td>0.543</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-1.173</td>
<td>-4.84</td>
<td>0.000</td>
</tr>
<tr>
<td>War</td>
<td>0.072</td>
<td>0.75</td>
<td>0.459</td>
</tr>
<tr>
<td>Gold</td>
<td>0.021</td>
<td>0.50</td>
<td>0.619</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model (4): ARDL (1, 1, 0) Dependent variable: $\Delta \ln P_{IZMIR}^{t}$</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.007</td>
<td>-0.14</td>
<td>0.888</td>
</tr>
<tr>
<td>$\Delta \ln P_{LIV}^{t}$</td>
<td>0.861</td>
<td>3.79</td>
<td>0.000</td>
</tr>
<tr>
<td>$\Delta \ln P_{ALEX}^{t}$</td>
<td>0.068</td>
<td>0.34</td>
<td>0.737</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.966</td>
<td>-2.15</td>
<td>0.036</td>
</tr>
<tr>
<td>War</td>
<td>0.699</td>
<td>0.41</td>
<td>0.683</td>
</tr>
<tr>
<td>Gold</td>
<td>0.005</td>
<td>0.09</td>
<td>0.932</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.56</td>
<td>0.47</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.23</td>
<td>0.83</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>2.44</td>
<td>4.10</td>
</tr>
</tbody>
</table>

A further step in the analysis of the co-integration relationship consists of testing for the
stability of the parameters which define it in order to ensure that no structural break is present.
Unstable parameters would, in fact, undermine the validity of the model and lead to
misspecification and biased results. Hence, in the presence of structural breaks the estimated
model would suffer from the non-normality problem.
Therefore we will test for the presence of structural breaks in the co-integrated cotton market of the Ottoman Empire following the approach suggested by Pesaran and Shin (1998) and Narayan and Smith (2005): this is based on the cumulative sum of recursive residual (CUSUM) and CUSUM of square (CUSUMSQ) tests used to assess parameter constancy. According to this methodology the short-run dynamics are fundamental for detecting the stability of the long-run coefficients and therefore we propose to apply the CUSUM and CUSUMSQ tests to the residuals of the estimated error correction model. The CUSUM test is used for detecting systematic changes in the regression coefficients: it utilises the cumulative sum of recursive residuals based on the first observations and it is updated recursively and plotted against break points. The CUSUMSQ adopts the same procedure, but it is more useful for detecting a sudden departure from the constancy of the regression coefficients.

The absence of structural breaks in the co-integration relationship is ensured if the plot of the CUSUM and CUSUMSQ remains within the 5 per cent critical bounds; in this case, the null hypothesis that all coefficients are stable cannot be rejected.

In Figure 4.3.6 we report the CUSUM and CUSUMSQ tests’ results for the Ottoman cotton market: in the case of Alexandria, in 1898 the plots lies outside the 5 per cent critical value bounds in the CUSUMSQ test indicating the absence of structural stability in the model during that year. In Izmir the CUSUMSQ plot lies outside of the bounds between 1862 and 1896. These outcomes, which reflect the existence of a major disruption in the co-integration relation in both cities, correspond to major economic and political events: in Alexandria in 1898 marked the beginning of a favourable phase for cotton production in that cotton prices experienced a spike upwards contrary to world prices which were decreasing. During this phase prices rose steadily prompting an increase in cotton production and reversing the previous phase of relative stagnation caused by civil unrest. Sixteen years earlier, in 1882, Egypt had undergone a major political turmoil initiated by a peasant revolt, the Urabi rebellion, which was suppressed by the British bombardment of Alexandria that signalled the beginning of the country’s occupation. In successive years, cotton cultivation was disrupted and it took the country around ten years to recover: during this time canals were blocked, ginning factories were robbed and personal security was so uncertain that many merchants became unwilling to go to the interior. As a result, cotton production shrank and received a negative shock with the sudden drop in prices in the early 1890s.
This negative downturn was reversed in 1898 when the new phase started, marked by an increase in productivity which allowed a more intensive use of the land. Moreover, 1898 was the year when most farmers began to include cotton in their crop rotation every two rather than three years. But the main factor which contributed to these positive developments was connected with the rise in demand for Egyptian cotton stimulated by an expansionary phase in the global economy and by new improvements in spinning techniques in Europe (mainly in Britain and Germany). This progress in spinning and weaving was mainly due to the spread of the process of "mercerising" which made the cotton fibre finer and of higher lustre so that it resembled silk. As a result of this invention which revolutionised the cotton industry, higher quality yarns and cloth could be produced at prices lower than silk. Egyptian cotton, being of superior quality, was one of the most suitable varieties for the production of mercerised threads and fabrics.

The improvements in Egyptian cotton production resulted in stronger linkages with the international market and a consolidation of trade networks between Egypt and Europe: the end of the 1890s and the beginning of the new century saw an intensification of European involvement in the processing of cotton, characterised by a considerable increase in European foreign investment in ginning and pressing.

In the case of Izmir, the first break is located in 1861 at the time of the breakout of the American Civil War which caused a considerable supply shock. Moreover in 1861/2 export taxes were lowered from 12 per cent to 1 per cent. Then we have a second phase, from 1862 to 1895, which includes several major political events: the default of the Empire (1875/6) and the subsequent establishment of the Public Debt Administration which meant the direct control of the Empire’s finances by European powers. Another crucial hallmark of this period was the Ottoman-Russian war (1877/8), concluded with the Empire’s defeat, which marked the loss of important territories in the Balkans. 1896 signalled the end of the price depression, after which the Empire underwent a period of relative stability. Furthermore, a rise in global demand and prices for cotton at a time when most economies were flourishing gave a new impetus to the Anatolian cotton market.

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143 The process of mercerising was invented by John Mercer in 1844 but it did not become widespread until H.A. Lowe improved it and patented it in 1890.
The presence of instability in the co-integration relationship indicated by the CUSUMSQ tests renders a further investigation of the data necessary. Therefore the estimation of long and short-run parameters before and after the period of the breaks is repeated in order to compare the dynamics of the price movements in the various phases.
**Alexandria**

The price relationship between Alexandria and world prices will be investigated in the two periods before and after the identified break (1845-1897 and 1898-1914).

From the results shown in the tables below it can be seen that between 1845 and 1897 world prices had an impact on the behaviour of domestic prices both in the long and short-run, while they were significant only in the short-run during the 1898-1914 phase. The process of market integration, measured through the degree of price convergence between the Egyptian and the global cotton markets, moderately accelerated from 1898, as shown by the coefficients of the error correction term, which increased from -0.64 to -0.72. This improvement can be associated with a set of factors: the consolidation of trade linkages between Egypt and Europe, the lowering of transport costs over time, the developments in infrastructure (the Alexandria port underwent a process of modernisation) and the stability effects prompted by the adherence to the gold standard. Nevertheless, the process of price convergence was never complete and we assume that this was due to the presence of market power among cotton traders both in the domestic market and possibly in the global market.

No further structural break has been detected in the two periods, as illustrated by the CUSUM and CUSUMSQ result reported in Figures 4.3.7 and 4.3.8.

**Table 4.3.9: ARDL long-run coefficients for the Alexandria market, 1845-97.**

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.233</td>
<td>-0.70</td>
<td>0.488</td>
</tr>
<tr>
<td>$\ln P^{LIV}$</td>
<td>0.843</td>
<td>4.81</td>
<td>0.000</td>
</tr>
<tr>
<td>$\ln P^{IZMIR}$</td>
<td>0.222</td>
<td>1.29</td>
<td>0.071</td>
</tr>
<tr>
<td>Gold</td>
<td>0.056</td>
<td>0.86</td>
<td>0.396</td>
</tr>
<tr>
<td>War</td>
<td>-0.193</td>
<td>-1.55</td>
<td>0.127</td>
</tr>
</tbody>
</table>

**Table 4.3.10: ARDL long-run coefficients for the Alexandria market, 1898-1914.**

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.95</td>
<td>0.68</td>
<td>0.515</td>
</tr>
<tr>
<td>$\ln P^{LIV}$</td>
<td>0.96</td>
<td>0.90</td>
<td>0.468</td>
</tr>
<tr>
<td>$\ln P^{IZMIR}$</td>
<td>-0.15</td>
<td>0.33</td>
<td>0.892</td>
</tr>
</tbody>
</table>

**Diagnostic tests**

<table>
<thead>
<tr>
<th></th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.93</td>
<td>0.10</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.49</td>
<td>0.12</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>8.80</td>
<td>6.31</td>
</tr>
</tbody>
</table>
Table 4.3.11: Short-run dynamics in Alexandria, 1845-1897.

Model (7): ARDL (1, 0, 0) Dependent variable: $\Delta \ln P_{\text{ALEX}}$

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.005</td>
<td>-0.28</td>
<td>0.777</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{LIV}}$</td>
<td>0.915</td>
<td>8.10</td>
<td>0.000</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{IZMIR}}$</td>
<td>-0.109</td>
<td>-1.51</td>
<td>0.139</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.639</td>
<td>-3.72</td>
<td>0.001</td>
</tr>
<tr>
<td>War</td>
<td>0.056</td>
<td>0.94</td>
<td>0.351</td>
</tr>
<tr>
<td>Gold</td>
<td>-0.005</td>
<td>-0.17</td>
<td>0.864</td>
</tr>
</tbody>
</table>

Table 4.3.12: Short-run dynamics in Alexandria, 1898-1914.

Model (8): ARDL (1, 0, 0) Dependent variable: $\Delta \ln P_{\text{ALEX}}$

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.009</td>
<td>0.30</td>
<td>0.768</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{LIV}}$</td>
<td>0.814</td>
<td>2.59</td>
<td>0.025</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{IZMIR}}$</td>
<td>-0.211</td>
<td>-0.73</td>
<td>0.481</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.723</td>
<td>-3.40</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 7</th>
<th>Model 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.67</td>
<td>0.52</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.77</td>
<td>0.83</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>1.65</td>
<td>2.77</td>
</tr>
</tbody>
</table>

Figure 4.3.7: Plot of CUSUM and CUSUMSQ for Alexandria, 1845-1897.
Izmir

In the three phases identified for the Izmir cotton market world prices had an impact on domestic prices in the long-run while in the short-run the variable Liverpool was significant only in the 1862-92 period (see Tables from 4.3.13 to 4.3.18).

The process of market integration, reflected in the extent of price transmission, varied remarkably over time. In the first phase, the error correction term had a large negative coefficient thus indicating that prices were not converging (see Table 4.3.16). In fact, when the error correction parameter has a value smaller than -2 (or when it has a positive value), it implies that the dependent variable (Izmir) diverges from the long-run equilibrium. This outcome can be attributed to the fact that a large share of raw cotton production was used domestically and its export represented only a residual market. According to a consular report, in 1851 total output was around 30,000 bales, of which 12-15,000 were exported and the rest was used in the domestic market. The situation changed drastically in the 1870s when cotton became primarily an export crop as domestic spinning and weaving activities shrank considerably: another consular report from the 1870s puts total production at 60,000 bales, of which more than 51,000 were exported. Till the mid-19th Century a large portion of cotton textiles consumed by the Empire was made manually by rural households for consumption.

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144 Arshad and Hameed (2009); Alam and Quazi (2003).
within the village: one of the most widespread forms of cotton production was the “putting-out” system, under which peasant women and children hand-spun raw cotton in their homes both for personal consumption and for the market.¹⁴⁶ These market conditions help us explain the reasons why the raw cotton market responded more to domestic changes, rather than to global ones.

Moreover, the lack of a good transport system, high export taxes imposed on exports until 1861 (at 12 per cent), may have hampered the process of price transmission.

During the second phase (1862-95) Izmir underwent a fast process of integration which can be attributed to the remarkable improvements in transport and infrastructure, particularly the development of the Izmir port and the construction of the Izmir-Aydin railway. Furthermore, the effect of lowering the export tax (from 12 per cent to 1 per cent) may have contributed to the process of price convergence. The error correction coefficient is -0.91 (see Table 4.3.17), indicating that 91 per cent of the disequilibrium in Izmir domestic cotton prices is corrected each year.

For the last period, from 1896 to 1914, the computed error correction parameter is -1.61 (see Table 4.3.18), thus indicating the presence of some factors which slowed down the process of short-run convergence. When the error correction term is between -1 and -2, it will produce dampened fluctuations in the dependent variable in its equilibrium path: this means that the error-correction process oscillates around the long-run value in a dampening manner before converging to the equilibrium route relatively quickly.

This outcome can be related to the revived demand for cotton in the domestic market, spurred on by the needs of a growing textile industry. From 1896 several cotton spinning factories had been set up in Istanbul, Izmir, and elsewhere in the Ottoman Empire: the raw cotton used in these mills was chiefly home-grown.¹⁴⁷ By 1909-11 they produced almost a quarter of total yarn consumption in the Empire (Pamuk, 1987: 127). A portion of cotton cultivation thus began to be shifted from the international to the domestic market: in 1905, when total output was 42,000 bales, around 24,000 were exported. In the light of these events it is possible to connect the slower speed of convergence to world prices to the increased influence of the

¹⁴⁶ Pamuk (1987) notes that the extent to which the hand-spinning and weaving of simple peasant cloth was organised under the putting-out system remains unclear.
domestic market. This outcome suggests that the Izmir market, after a period of integration, became unlinked from the global cotton market at the end of the 19th Century as the degree of price transmission slowed down.

Table 4.3.13: ARDL long-run coefficients for Izmir market, 1845-61.

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.511</td>
<td>1.14</td>
<td>0.285</td>
</tr>
<tr>
<td>(\ln P_{LIV})</td>
<td>5.690</td>
<td>2.11</td>
<td>0.044</td>
</tr>
<tr>
<td>(\ln P_{ALEX})</td>
<td>-6.130</td>
<td>1.78</td>
<td>0.090</td>
</tr>
<tr>
<td>War</td>
<td>-0.811</td>
<td>-1.33</td>
<td>0.217</td>
</tr>
</tbody>
</table>

Table 4.3.14: ARDL long-run coefficients for Izmir market, 1862-1895.

* The variable \(\ln P_{ALEX}\) has not been included to avoid multicollinearity.

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.088</td>
<td>3.14</td>
<td>0.004</td>
</tr>
<tr>
<td>(\ln P_{LIV})</td>
<td>0.709</td>
<td>6.65</td>
<td>0.000</td>
</tr>
<tr>
<td>Gold</td>
<td>-0.003</td>
<td>-0.06</td>
<td>0.956</td>
</tr>
<tr>
<td>War</td>
<td>0.092</td>
<td>0.92</td>
<td>0.366</td>
</tr>
</tbody>
</table>

Table 4.3.15: ARDL long-run coefficients for Izmir market, 1896-1914.

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.107</td>
<td>1.29</td>
<td>0.220</td>
</tr>
<tr>
<td>(\ln P_{LIV})</td>
<td>0.993</td>
<td>0.38</td>
<td>0.190</td>
</tr>
<tr>
<td>(\ln P_{ALEX})</td>
<td>-0.297</td>
<td>1.37</td>
<td>0.865</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 9</th>
<th>Model 10</th>
<th>Model 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.67</td>
<td>0.92</td>
<td>0.73</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.66</td>
<td>0.27</td>
<td>0.63</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>5.87</td>
<td>4.34</td>
<td>9.19</td>
</tr>
</tbody>
</table>

Table 4.3.16: Short-run dynamics in Izmir, 1845-1861.

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.043</td>
<td>0.22</td>
<td>0.828</td>
</tr>
<tr>
<td>(\Delta \ln P_{LIV})</td>
<td>3.084</td>
<td>-1.73</td>
<td>0.118</td>
</tr>
<tr>
<td>(\Delta \ln P_{ALEX})</td>
<td>0.830</td>
<td>0.70</td>
<td>0.501</td>
</tr>
<tr>
<td>ECT_{t-1}</td>
<td>-4.32</td>
<td>-2.32</td>
<td>0.045</td>
</tr>
<tr>
<td>War</td>
<td>0.063</td>
<td>0.09</td>
<td>0.930</td>
</tr>
</tbody>
</table>
Table 4.3.17: Short-run dynamics in Izmir, 1862-1895.

Model (13)*: ARDL (1, 0) Dependent variable: $\Delta \ln P_{IZMIR}$

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.005</td>
<td>-0.02</td>
<td>0.985</td>
</tr>
<tr>
<td>$\Delta \ln P_{LIV}$</td>
<td>0.780</td>
<td>5.98</td>
<td>0.000</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.916</td>
<td>-6.98</td>
<td>0.000</td>
</tr>
<tr>
<td>Gold</td>
<td>0.002</td>
<td>0.06</td>
<td>0.958</td>
</tr>
<tr>
<td>War</td>
<td>-0.013</td>
<td>-0.16</td>
<td>0.837</td>
</tr>
</tbody>
</table>

* The variable $\Delta \ln P_{ALEX}$ has not been included to avoid multicollinearity.

Table 4.3.18: Short-run dynamics in Izmir, 1896-1914.

Model (14): ARDL (1, 0, 1) Dependent variable: $\Delta \ln P_{IZMIR}$

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.007</td>
<td>-0.19</td>
<td>0.850</td>
</tr>
<tr>
<td>$\Delta \ln P_{LIV}$</td>
<td>0.961</td>
<td>2.11</td>
<td>0.054</td>
</tr>
<tr>
<td>$\Delta \ln P_{ALEX}$</td>
<td>-0.031</td>
<td>0.14</td>
<td>0.977</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-1.681</td>
<td>-2.85</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 12</th>
<th>Model 13</th>
<th>Model 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.40</td>
<td>0.86</td>
<td>0.50</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.76</td>
<td>0.57</td>
<td>0.40</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>2.47</td>
<td>1.79</td>
<td>3.16</td>
</tr>
</tbody>
</table>

Figure 4.3.9: Plot of CUSUM and CUSUMSQ for Izmir, 1845-61.
4.3.1 Co-integration analysis with Ottoman world prices

The aim of this section, as outlined in 4.2.1, is to conduct a co-integration analysis of Ottoman domestic and border prices for the years in which the latter are available, and compare the outcomes with our previous results. As mentioned earlier, we believe that the
use of American prices for cotton sold in Liverpool as proxy for Ottoman border prices is appropriate, and is justified on the basis of the co-movements among them.

First the Alexandria cotton market will be considered. The following figure depicts the movement between domestic prices and prices of Egyptian cotton sold in Liverpool between 1882 and 1914.

From a visual inspection of the data it is noticeable that in some years (1899, 1908-9) the world price of Egyptian cotton is lower than the domestic one. This may be related to the influence of stockholding and speculation on cotton prices. It is documented by the literature that speculation was a widespread practice among cotton exporters, especially since the establishment of the cotton future exchange in Alexandria (Owen, 1969:208; Todd, 1915). It is likely that merchants stockpiled cotton bought after harvest, to resell it in the future, expecting a price rise. In the indicated year it appears that the exporters’ expectations revealed to be incorrect.

**Figure 4.3.1.1: Price movements of Egyptian cotton in Liverpool and Alexandria, 1845-1914, in British pound per metric ton.**

The ARDL framework which will be used to test the presence of co-integration in the Ottoman cotton market is specified by the following model:

\[
\Delta \ln P^{ALEX}_{t} = a_0 + \sum_{j=1}^{n} b_j \Delta \ln P^{ALEX}_{t-j} + \sum_{j=0}^{n} e_j \Delta \ln P^{WORLD}_{t-j} + \delta_1 \ln P^{IZMIR}_{t-j} + \lambda_1 \text{gold} + \varepsilon_{it}
\]
where

\[ \ln P_{\textsc{WORLD}}, \] = price of Egyptian cotton sold in Liverpool.

The results for the ARDL bound test indicate the presence of a co-integration relationship at the 10 per cent level of significance.

*Table 4.3.1.1: ARDL bound test for co-integration in the Alexandria cotton market, 1882-1914.*

<table>
<thead>
<tr>
<th></th>
<th>F-statistics</th>
<th>Critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td><strong>Alexandria</strong> (k=3)</td>
<td>4.90</td>
<td>3.710 – 5.018</td>
</tr>
</tbody>
</table>

\( k \) indicates the number of regressors.

* Significant at 10 per cent.

In the long-run relationship, Egyptian world prices have an impact on domestic ones: the significant coefficient illustrates that 80 per cent of a world price change will be transmitted to the domestic market.

*Table 4.3.1.2: ARDL long-run coefficients for the Alexandria market, 1882-1914.*

<table>
<thead>
<tr>
<th>Model 15: ARDL (1, 0, 0) Dependent variable: ( \ln P_{\textsc{ALEX}} ) Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.155</td>
<td>-0.28</td>
<td>0.779</td>
</tr>
<tr>
<td>( \ln P_{\textsc{WORLD}} )</td>
<td><strong>0.808</strong></td>
<td><strong>2.62</strong></td>
<td><strong>0.014</strong></td>
</tr>
<tr>
<td>( \ln P_{\textsc{IZMIR}} )</td>
<td>0.202</td>
<td>1.04</td>
<td>0.305</td>
</tr>
<tr>
<td>Gold</td>
<td>0.026</td>
<td>0.34</td>
<td>0.737</td>
</tr>
</tbody>
</table>

World prices also influenced the short-run relationship, but at a lower degree (\( A \ln P_{\textsc{WORLD}} \) coefficient = 0.41). The significant error correction term, which indicates the presence of a long-run convergence to equilibrium, has a similar value (-0.69) to the ECT of the previous analysis of Egyptian domestic and American prices between 1896 and 1914 (-0.72). These outcomes act as a further validation of our previous results.

The CUSUM and CUSUMSQ tests did not detect any parameter instability; hence no structural breaks are present in the series.
Table 4.3.1.3: ARDL short-run dynamics in Alexandria, 1882-1914

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>t-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.037</td>
<td>-0.40</td>
<td>0.693</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{WORLD}}$</td>
<td>0.410</td>
<td>2.78</td>
<td>0.002</td>
</tr>
<tr>
<td>$\Delta \ln P_{\text{IZMIR}}$</td>
<td>0.202</td>
<td>1.16</td>
<td>0.259</td>
</tr>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.689</td>
<td>-3.25</td>
<td>0.003</td>
</tr>
<tr>
<td>Gold</td>
<td>0.041</td>
<td>0.44</td>
<td>0.666</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 15</th>
<th>Model 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.64</td>
<td>0.39</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.43</td>
<td>0.20</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>10.78</td>
<td>6.27</td>
</tr>
</tbody>
</table>

An analysis of the Izmir cotton market will now be illustrated, using export prices of Western Anatolian cotton. Figure 4.3.13 illustrates the trend of domestic and export cotton prices in Izmir between 1876 and 1908.\(^{148}\)

\(^{148}\) The data used as domestic prices and as export prices, found in Quaetart (1973), come from different sources which used different currencies and quantity measurements. Western Anatolian world cotton prices (source: Accounts and Papers, British Parliamentary Papers) have been converted from French francs to British pound sterling. Some quantity values were expressed in bales, some others in tons and have been converted at 5.09 bales per ton. Izmir domestic prices (derived from the following newspapers: La Turquie, Levant Herald and Le Journal de la Chambre de Commerce de Constantinople) were expressed in piasters per okke. The unit of weight, okke, varied annually for each commodity, but Quataert converted the okke at a constant rate of 1.28 kg. The piaster/Lira relationship fluctuated throughout the period 1876-1908; nevertheless the prices have been adjusted to a common 100:1 piaster/Lira ratio. Therefore, it is possible that the fact that in some years exports prices were lower than domestic prices has been caused by a conversion mistake. Cotton exports did take place for the indicated years: export quantities are reported by Quataert (1973:400). Unfortunately the literature does not seem to provide any explanation for the price hike in 1891. Again, it is possible that it was a typo or a conversion mistake. I have re-run the ARDL regression excluding the year 1891, replacing the gap through interpolation, to test the effect of the presence of such outlier. The regression results did not change.
Figure 4.3.1.2: Movements of domestic and export cotton prices in Izmir, 1876-1908, in British pound per metric ton.

The ARDL framework used to test the presence of co-integration in the Ottoman cotton market is specified by the following model:

\[ \Delta \ln P_{IZMIR}^{IZMIR} = \alpha_0 + \sum_{j=1}^{n} b_j \Delta \ln P_{IZMIR}^{IZMIR} + \sum_{j=0}^{n} c_j \Delta \ln P_{WORLD}^{WORLD} + \sum_{j=0}^{n} d_j \Delta \ln P_{ALEX}^{ALEX} + \delta_1 \ln P_{IZMIR}^{IZMIR} - 1 + \delta_2 \ln P_{WORLD}^{WORLD} - 1 + \delta_3 \ln P_{ALEX}^{ALEX} - 1 + \lambda_1 \text{gold} + \varepsilon_{1t} \]

where

\[ \ln P_{WORLD}^{WORLD} = \text{Izmir cotton export price}. \]

Table 4.3.1.4: ARDL bound test for co-integration in the Izmir cotton market, 1876-1908.

<table>
<thead>
<tr>
<th>Model</th>
<th>F-statistics</th>
<th>Critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Izmir</td>
<td>5.69</td>
<td>3.710 – 5.018</td>
</tr>
<tr>
<td>k=3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( k \) indicates the number of regressors.

The test results indicate the presence of a co-integration relationship. The long-run impact of both world and Alexandria prices was stronger for the latter variable.
Table 4.3.1.5: ARDL long-run coefficients in Izmir, 1876-1908.

<table>
<thead>
<tr>
<th>Model 17: ARDL (1, 1, 1) Dependent variable: $lnP^{IZMIR}_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory variable</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>$LnP^{WORLD}$</td>
</tr>
<tr>
<td>$lnP^{ALEX}$</td>
</tr>
<tr>
<td>Gold</td>
</tr>
</tbody>
</table>

As in the Egyptian case, in the short-run the computed ECT (-1.30) is significant and has a similar value to the ECT of the previous analysis of Western Anatolian and American cotton prices between 1896 and 1914 (-1.68).

Table 4.3.1.6: ARDL short-run coefficients in Izmir, 1876-1908.

<table>
<thead>
<tr>
<th>Model 18: ARDL (1, 1, 1) Dependent variable: $Δ lnP^{IZMIR}_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory variable</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>$Δ lnP^{WORLD}$</td>
</tr>
<tr>
<td>$Δ lnP^{ALEX}$</td>
</tr>
<tr>
<td>ECT$_{t-1}$</td>
</tr>
<tr>
<td>Gold</td>
</tr>
</tbody>
</table>

Diagnostic tests

<table>
<thead>
<tr>
<th></th>
<th>Model 17</th>
<th>Model 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.84</td>
<td>0.46</td>
</tr>
<tr>
<td>LM test for autocorrelation</td>
<td>0.80</td>
<td>0.14</td>
</tr>
<tr>
<td>Multicollinearity test</td>
<td>2.38</td>
<td>1.38</td>
</tr>
</tbody>
</table>

The CUSUM and CUSUMSQ tests did not detect any parameter instability; hence no structural breaks are present in the series.

4.4 Conclusions

The analysis carried out in this chapter has demonstrated that the process of cotton market integration in the two different areas of the Empire, Egypt and Western Anatolia, had an uneven character and followed two separate paths. Despite the existence of a large body of literature which describes the first wave of globalisation as a period in which commodity markets became increasingly more integrated, our study indicates that the two Ottoman regions underwent different experiences. The results show that the cotton market in Alexandria became more closely interconnected with the global economy: the most significant factors which may have facilitated market integration over time were lower
transport costs, improvements in infrastructure (Alexandria harbour) and adherence to the gold standard. At the same time, price transmission was not complete, probably owing to the presence of market power both in the domestic and in the world market. Another aspect of the co-integration analysis worth noting is that the American Civil War did not have any impact on the market relationship between the domestic and the global cotton market.

In Izmir, on the other hand, market integration started at a later stage. In the period between 1845 and 1861 the process of price transmission seemed quite weak. During this time a large share of raw cotton was supplied to the domestic market and rural households hand-worked a considerable portion of cotton textiles used for consumption within Anatolian villages.

Furthermore, market integration may have also been hindered by the inadequate transport system and by high export taxes. Between 1862 and 1895 the degree of price transmission from the international to the domestic cotton market became quite high. The main factors that may have contributed to the increased level of market integration are lower transport costs (transition from sail to steam in the 1870s), improvements in infrastructure (Izmir harbour) and a decrease in export taxes. Then, after a period of convergence, the linkages between the domestic and international cotton markets became weaker. The slower degree of price transmission between 1896 and 1914 can be related to the revived demand for cotton in the domestic market spurred on by the opening of spinning factories. Thus, the increased influence of the domestic market contributed to lowering the speed of convergence with world prices.
5. De-industrialisation and re-industrialisation in the Ottoman cotton industry

The sweeping changes throughout the long 19th Century had a profound impact on handicraft industries worldwide. Like everywhere else in the so-called Periphery, the Ottoman Empire’s manufacturing output declined in the face of superior European productivity advances in factory commodity production. But this initial process of de-industrialisation did not always proceed in a monotonic manner. It slowed down in many areas of the Periphery between the end of the 19th and the beginning of the 20th Century. In some cases it was reversed, supplanted by a new stage of re-industrialisation.

The pattern, timing and magnitude of these changes varied widely, both globally and within the Ottoman Empire. The Ottoman Empire experienced a process of de-industrialisation in common with most regions outside the core industrialising countries of Europe, and this was reflected in the virtual collapse of its handloom textile industry. But this de-industrialisation did not proceed in an even manner. Indeed, the textile industries in the two areas analysed in our study showed quite contrasting developments towards the end of this period, after experiencing a collapse of their handicraft textile industries at the beginning. In Egypt, which was at the “periphery” of the Empire, the extent of the demise of the domestic textile sector proved to be “permanent”: by the end of this period, Egypt had almost no domestic textile industry and was exporting practically all of its raw cotton to foreign markets, primarily those in Britain. In contrast, in Western Anatolia, which was located at the “core” of the Empire, after an initial lengthy phase of decline a process of re-industrialisation began to take place, particularly in the spinning sector. This raises some interesting questions.

Which elements were decisive in shaping such diverse trajectories of industrialisation? Were they domestic factors, linked with trade policy, level of technological development and different infrastructure? Or were they primarily external shocks, related to terms of trade

149 We will use the term “Periphery” (capitalised) as a synonym for developing world, thus representing the non-industrialised economies of the 19th Century. This should be distinguished from the periphery of the Ottoman Empire, which we associate with Egypt.
movements? To what extent were these differences connected with the British colonisation of Egypt? How do these developments in the Ottoman Empire compare with developments elsewhere in the Periphery? These issues continue to animate scholarly research in this area, with recent contributions by Professor J.G Williamson and colleagues that emphasise the importance of international developments transmitted through terms of trade shocks to the national economies (see Williamson 2004; Williamson, 2008; Dóbado, Gomez and Williamson, 2008; Clingingsmith and Williamson, 2008; Pamuk and Williamson, 2011).

In the following sections we relate the process of “de-industrialisation and re-industrialisation” within the Ottoman Empire to the study of market integration and the findings on the extent of price transmission conducted in the previous chapter, within the timeframe and data limitations of this study. Our analysis showed that Western Anatolia and Egypt underwent two different paths of integration with the global economy with significant differences in terms of the extent of price transmission from international to domestic markets. These may have been related to dissimilarities in domestic policies and broader economic structure as well as differences in the extent to which international shocks were transmitted into the domestic economies: in particular, the establishment of a mechanised textiles industry in Western Anatolia may have been related to weaker linkages between its raw cotton sector and the international market. This may have reduced the impact of de-industrialisation forces and provided greater incentives for the emergence of a domestic textile industry.

We approach this issue by outlining the theoretical framework that underpins recent research by Professor Williamson and his colleagues based on models that build on the Corden and Neary model of de-industrialisation and Dutch Disease economics (1982). We extend their discussion with insights from our study of domestic and international raw cotton market integration, emphasising the importance not only of international market developments but also of the extent to which these developments were actually transmitted into domestic markets.

We interpret the process of price transmission between the Empire and the international raw cotton markets in relation to the changes in the Western Anatolian and Egyptian textile industries. Through this perspective, we place the Ottoman experience within the wider
debate about “de-industrialisation and re-industrialisation” of the Periphery during the first wave of globalisation.

In the first part of this chapter we describe the process of decline of Ottoman textile handicrafts, outlining the debates about its magnitude and nature. Moreover, we look at the Empire in comparative perspective, reflecting upon similarities and differences with other areas of the Periphery.

In the second part, we examine the development of Ottoman textile manufacturing during the late 19th and early 20th Centuries which saw the birth of a mechanised industry in one area of the Empire, Western Anatolia, but not in the other, Egypt. We then consider possible reasons for this divergence, placing this in a comparative perspective by considering similar experiences in other regions of the world. In the final part of the chapter we analyse the process of the Ottoman textile manufacturing demise and rebirth, exploring the linkages between terms of trade, market integration and industrialisation.

5.1 De-industrialisation

As we illustrated in detail in the first chapter of the thesis, the first wave of globalisation formed the basis of a series of considerable transformations in the international web of trade and investments. Together with stronger international commodity market integration, another major feature of the so-called long 19th Century was the worldwide decline of manufacturing based on pre-industrial handicraft technology. Hand-made goods were replaced by machine-made ones to an unprecedented degree: this phenomenon, which generated a dramatic change in the structure of global commerce and in the international division of labour, has been described as the “Great Specialisation”. Thus, the process of rapid industrialisation in the Continent and in the British offshoots led to a marked distinction between industrialised and non-industrialised economies. The former became the main producers and exporters of manufactures, while the latter specialised in production and export of primary commodities, importing finished goods.

150 See Findlay and O’Rourke (2007:426).
Everywhere in the Periphery some form of de-industrialization took place although there was variation in the timing and magnitude with which it happened and the speed with which different regions recovered.

Economic historians have generated a large body of research around the issue of de-industrialisation, focusing on various aspects of it: its causes and consequences, its diffusion and magnitude, and its relationship with growth and development.

In the Ottoman Empire, as in other areas of the developing world, the intensification of trade linkages with the world economy, particularly with Europe (see Sections 1.2 and 1.3), led, on the one hand, to the expansion of marketable crops and to the specialisation in primary commodities, while on the other it resulted in the sharp decline of its traditional manufacturing activities. Since the first decades of the 19th Century, European factories have penetrated the Empire’s markets, exporting cheap industrial commodities which have competed with local goods. It was during the years of the mid-Victorian boom (1840-70) in particular that Ottoman handicrafts declined. These trends are reflected in the increasing levels of import penetration, in some ways an indicator of de-industrialisation.

In this chapter we will focus on the decline of a specific manufacturing sector, the textile industry, which had two sub-components: spinning and weaving, with the former representing an intermediate input of the latter. Table 5.1.1 provides some indicators of the demise of the textile sector. As can be seen, what occurred in the Ottoman textiles sector mirrored a broader trend which affected handicraft production globally: de-industrialisation was in fact the norm in most regions of the developing world.

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151 We use Williamson’s (2004:5) definition of de-industrialization, considering it as “the movement of labor out of manufacturing and in to agriculture, either measured in absolute numbers (weak de-industrialization), or as a share of total employment (strong de-industrialization)”.

152 See among, others: Roy (2002); Williamson (2004); Quataert (2004); Clingingsmith and Williamson (2008); Pamuk and Williamson (2011).
Table 5.1.1: Percentages of domestic textile market supplied by foreign and local sources in different areas of the developing world, 19th Century.

<table>
<thead>
<tr>
<th></th>
<th>Foreign imports</th>
<th>Domestic industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>India, 1800</td>
<td>-6 to -7</td>
<td>106-7</td>
</tr>
<tr>
<td>India, 1833</td>
<td>5</td>
<td>95</td>
</tr>
<tr>
<td>India, 1877</td>
<td>58-65</td>
<td>35-42</td>
</tr>
<tr>
<td>Ottoman Empire, 1820s</td>
<td>3</td>
<td>97</td>
</tr>
<tr>
<td>Ottoman Empire, 1870s</td>
<td>65-75</td>
<td>25-35</td>
</tr>
<tr>
<td>Ottoman Empire, 1910s</td>
<td>74-80</td>
<td>20-6</td>
</tr>
<tr>
<td>Indonesia, 1822</td>
<td>18.1</td>
<td>81.9</td>
</tr>
<tr>
<td>Indonesia, 1870</td>
<td>62</td>
<td>38</td>
</tr>
<tr>
<td>Indonesia, 1913</td>
<td>88.6</td>
<td>11.4</td>
</tr>
<tr>
<td>Mexico, 1800s</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>Mexico, 1879</td>
<td>40</td>
<td>60</td>
</tr>
</tbody>
</table>


The Ottoman textile industry shared some similarities with that of India which was the major yarn and cloth supplier internationally in the pre-industrial revolution period. Both India and the Ottoman Empire were self-sufficient in cotton textiles until the late 18th and early 19th Centuries, but the former had a much larger export market: Indian cloth was widely sold internationally, while Ottoman cloth was predominantly used domestically and there was virtually no export of cotton cloth to Western Europe. On the other hand, both regions exported considerable amounts of raw cotton. In both regions the impact of the industrial and transport revolutions had significant consequences on three markets: raw cotton, yarn and cloth, while exports of the raw fibre dropped with the availability of cheaper and higher quality American cotton. Indian yarn and textile exports reduced dramatically. Domestic textile production also declined, outcompeted by British imports.

India’s textiles de-industrialisation was over by the end of the 19th Century and was slowly reversed by a process of re-industrialisation (Roy, 2002 and 2004; Wendt, 2005). As we will see in the next section, textiles factories were also established in parts of the Ottoman Empire, using imported machinery. While India regained part of the lost market share, becoming first

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153 Indian raw cotton exports rose considerably from the second half of the 18th Century. The main export destination was China, followed by Great Britain (Guha, 1970 and 1972).

154 In India raw cotton exports to China declined, too. This was caused by the imposition of a discriminatory export duty (equivalent to 0.15 d per lb.) established by the East Indian Company’s government for exports directed to countries other than Europe and the US (Guha, 1972). Both in India and in the Ottoman Empire raw cotton exports were resumed at the height of the American Civil War, but the export surge died out when the conflict was over. Only in Egypt did cotton production and exports expand at a significant level in the post-war period (see Sections 2.3 and 2.4).
a yarn and then a cloth exporter (Roy, 2004), the textiles factories in the Ottoman Empire produced machine-made yarn, and to a lesser extent cloth, both utilised only in the domestic market (Pamuk, 1987).

Everywhere in the world hand-spinning was the sector of production which suffered the most from European competition: Table 5.1.2 shows the decline of Ottoman hand-spinning over the century, with hand-spun yarn being replaced by European machine-made yarn.

Table 5.1.2: Average annual hand-spun yarn production and machine-spun yarn imports in the Ottoman Empire in tons, 1810-1910 (with the exclusion of Egypt).

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Domestic production*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1810s</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td>1820s</td>
<td>450</td>
<td>11,550</td>
</tr>
<tr>
<td>1840s</td>
<td>2,650</td>
<td>8,250</td>
</tr>
<tr>
<td>1870s</td>
<td>7,750</td>
<td>3,000</td>
</tr>
<tr>
<td>1910s</td>
<td>12,550</td>
<td>1,000</td>
</tr>
</tbody>
</table>

* Pamuk’s estimates.

The dyeing sector represents an even more striking case of the impact of the Industrial Revolution on Ottoman textiles production. The development of synthetic dyes in the 1850s and 1860s in Europe, as substitutes for natural ones, led to the almost complete demise of the cultivation of madder root, \(^{155}\) yellow berries, indigo and other vegetable dyes.

Historians of the Ottoman Empire have adopted different theoretical approaches to analyse the process of de-industrialisation including the decline of the domestic textile sector. These range from the Wallersteinian analysis of peripheralization, \(^{156}\) to the Braudelian “world economy” perspective, \(^{157}\) from studies based on individual industries, \(^{158}\) to the legal and

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\(^{155}\) Madder root exports dropped from an annual average of 7,000 tons in 1856 to 94 tons between 1905 and 1911 (Quataert, 1993:30).

\(^{156}\) See Inan (1987) for an overview of Wallerstein’s analysis of the Ottoman Empire.

\(^{157}\) Fernand Braudel regarded the Ottoman Empire as a world economy in its own right with a centre and a periphery, which changed over time: “The Empire was also unquestionably from the very beginning a world-economy, one which had inherited the ancient ties between Islam and Byzantium and was firmly controlled by the effective state authority.” Braudel (1992: 467). Braudel played a crucial role in shaping Ottoman historiography, particularly influencing the work of two Ottoman leading scholars: Barkan and Inalcik.

\(^{158}\) Faroqui (2009) defines the change in focus from the “periphery-world economy” to the “individual businesses” as a true analytical paradigm change in Ottoman economic history.
institutional framework and to consumption studies.\textsuperscript{159} A wide range of reasons have been identified as being responsible for the decline of Ottoman manufacturing which are in line with those provided by the broader literature on de-industrialisation in the developing world:

- **Technology**: The productivity gains generated by the use of steam power lowered the price of European manufactures which achieved a greater level of competitiveness\textsuperscript{160} in the Ottoman domestic market.

- **Lower trade costs**: The transport revolution swept away the natural protection which domestic handicrafts had previously enjoyed. The sharp reduction in freight rates across the Mediterranean and the Black Sea,\textsuperscript{161} together with the adherence to a non-protectionist trade policy,\textsuperscript{162} were the main engines driving the Empire’s pattern of specialisation.

As Issawi (1982:151) stated: "...in the 1820’s and 1830’s it (the Middle East) was hit by the full blast of European competition. Factories were pouring out cheap goods, and peace and increased security in the Mediterranean and improvements in shipping made it possible to land them at low costs. To this should be added the effects of the various commercial treaties, which froze import duties at low levels and opened up the region’s markets”.

- **Institutional forces**: Some authors, like Faroqhi (2009), have hypothesised a connection between Ottoman de-industrialisation, Western economic and political supremacy,\textsuperscript{163} and inefficient internal institutions. Drawing on the literature which links de-industrialisation to domestic supply-side factors,\textsuperscript{164} Faroqhi (2009) identifies certain conditions of the Ottoman

\textsuperscript{159} On consumption studies, see Quataert (2000).
\textsuperscript{160} For example, the price of English yarn fell by two-thirds between 1792 and 1812 and its production increased by 250 per cent (Quataert, 1993).
\textsuperscript{161} According to Harlaftis and Kostelenos (2007), the freight factor on wheat fell by nearly 80 per cent on London imports from the Black Sea and the Mediterranean.
\textsuperscript{162} The lowering of trade barriers is regarded as an important contributor to the weakening of import-competing sectors in the Periphery. See Section 1.1 for discussion of the role of trade policy and the effect of the imposition of free trade treaties on the developing world during the first wave of globalisation.
\textsuperscript{163} Within the global history of textiles, Western political and economic superiority have been considered as crucial factors in determining the decline of manufacturing in the Periphery. In India "generations of historians have been at pains to argue both that the textile industry made major contribution to the world economy and that it suffered massive decline in the face of European corporate and colonial exploitation" (Wendt, 2005:11). Similar historiography accounts from the three major Southeast Asian regions in which the textile industry flourished, Western Indonesia, the Philippines and Thailand, portray European industrialisation as a phenomenon which turned wealth into poverty. On the other hand, Japan’s experience, marked by a radical transformation of hand-spinning and weaving through the adoption of Western technology coupled with the maintenance of cultural autonomy and internal agency, has been celebrated and depicted as a success.
\textsuperscript{164} A much more limited literature looks at local supply-side factors as causes of de-industrialisation. For example, Clingingsmith and Williamson (2008) indicate that the decline of the Mughal hegemony in the 18th
economy which hindered the establishment of a mechanized textile industry: among them, were the weakness of capital formation and the limitation posed by tax-farming.\textsuperscript{165}

The literature on the destructive impact of European machine-made textiles on non-mechanized production differs not only about the causes, but also about the pace and extent of the decline. One of the most controversial issues concerns the extent of the Ottoman textiles industry’s demise including the particularly contentious issue concerning the survival of hand-spinning. These issues have been debated between Pamuk (Pamuk, 1987; Pamuk and Williamson, 2011) and Quataert (1993).

The former, in line with other Ottoman historians like Issawi and Owen, points out that total textile production declined, while Ottoman manufactures still managed to adapt and survive in the age of European hegemony. Pamuk’s estimates (1987) indicate that hand-spinning almost disappeared (see Section 2.5, Table 2.5.2): production dropped from an average of 11,550 tons to 1,000 tons per year from 1820-2 to 1909-11. On the other hand, during the same time the amount of hand-woven cotton rose (from an average of around 11,700 to 17,550 tonnes per year) owing to the rising imports of machine-made yarn and their substitution for hand-spun ones. The author also emphasises that the decline of total employment in Ottoman cotton textiles by about one half between 1820 and 1910, was primarily due to the disappearance of hand-spinning.

Quataert criticises Pamuk’s methodology of computing hand-spun yarn production for not being representative and convincing, arguing that the hand-spinning of cotton yarn hardly disappeared. His estimates, reported in Table 5.1.3, suggest that in 1900 hand-spun cotton amounted to 4,357 tonnes (a quantity more than four times higher than Pamuk’s estimate), providing one-quarter of all Ottoman yarn requirements. While agreeing that the international export market for Ottoman cottons disappeared and that Ottoman industrial production shrank in global importance, Quataert stresses that “the internal market represents the key to understand the history of the manufacturing sector during the nineteenth century” (Quataert, 1993:17). The replacement of Ottoman with British (and later Italian and Indian) yarn had

\textsuperscript{165} Tax-farmers, which had been in charge of tax collection since 1695, contributed to exacerbate the lack of capital through over-taxation.
devastating effects on domestic production, but was not a uniform process; Ottoman yarn spinning persisted, especially in rural areas of the hinterland.\footnote{Quataert (1993:37) indicates that Amasya weavers used local yarns exclusively and that “in Amasya in the mid 1830s homespun provided enough yarn to supply some 800 looms commercially weaving cloth”.}

In a recent paper Pamuk defends the validity of his estimates on the basis that “Quataert fails to offer any explicit revision of Pamuk’s reconstruction. Nor is Quataert explicit about the size of the demise of local textile production in the face of foreign competition” (Pamuk and Williamson, 2011:12).

**Table 5.1.3: Hand-spun cotton yarn production in the Ottoman Empire in 1900 (excluding Egypt).**

<table>
<thead>
<tr>
<th>Region</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sivas province</td>
<td>2,000</td>
</tr>
<tr>
<td>Aleppo city</td>
<td>100</td>
</tr>
<tr>
<td>Mardin district</td>
<td>45</td>
</tr>
<tr>
<td>Harput district</td>
<td>700</td>
</tr>
<tr>
<td>Maras district</td>
<td>46</td>
</tr>
<tr>
<td>Izmir region</td>
<td>800</td>
</tr>
<tr>
<td>Mosul area</td>
<td>666</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,357</strong></td>
</tr>
</tbody>
</table>

*Source: Quataert (1993:40).*

Similar issues enliven the debate about the nature and extent of the Indian textile industry’s demise: particularly controversial is the role played by British colonialism in the development of Indian textile commerce and industry. Opinion is divided concerning the effects of the emergence of mills in Britain. Some authors consider the British presence as a violent negative shock to India’s textile production\footnote{See, for example, Twomey (1983) Chaudhuri and Morineau (1999) and Ray (2009).} while others have revisited and criticised the Indian de-industrialisation thesis and emphasised the emergence of a “mixed industrialisation” which combined handicraft and power loom production\footnote{See Haynes, 1999: “The logic of the artisan firm in a capitalist economy: handloom weavers and technological change in Western India, 1880-1947”, in Stein and Subrahmanyam (Eds.). See also Roy (2002).}. According to this view, industrialisation is considered to be a force which changed the structure of the Indian textile industry, rather than causing its destruction. Hand-spinning was replaced by mechanised spinning so that domestic-spun cotton began to replace imported yarn to supply both the hand-weaving industry (part of which survived) and the first Indian mills, which adopted mechanised weaving using imported machinery. Wendt (2005:10) states: “Late 19th
and early 20th century sources clearly document the gradual spread and adoption of mechanised processes for cotton cleaning and spinning. Railways and cotton gins gradually replaced all hand cotton cleaning. Based on surveys of weavers during the 1890s, it is clear that the weavers in the Madras Presidency were using machine spun yarn from Madras, Madurai, Coimbatore, Bombay and elsewhere”.

5.2 Re-industrialisation

Between the last two decades of the 19th Century and the beginning of the 20th Century the process of de-industrialisation slowed down in most of the Periphery and some areas like China, India, Japan and some parts of Latin America started a significant re-industrialisation (Williamson, 2004).

This was also the case within the Ottoman Empire but the focus of many studies on the de-industrialisation process in the Ottoman Empire has tended to detract attention from the fact that some Ottoman regions, like Western Anatolia, also experienced an incipient and slow process of re-industrialisation, particularly in the textile sector, though others, like Egypt, remained producers and exporters of primary commodities.

Can differences in the timing and extent of re-industrialisation in a part of the Ottoman Empire be explained with the insights from the conventional economic models used to explain the previous de-industrialisation process?

The array of theoretical approaches to explain the origins of industrialisation itself is quite wide and includes theories of technological change, of social and institutional change, of colonial expansion and capital accumulation and theories based on different belief and cultural systems. In recent years there has been a renewed interest among economic historians in the issue of the diffusion of industrialisation. In particular, some authors have emphasised the importance of the “non-Western path” of industrialisation (see, among others, Pomeranz, 2001; Sugihara, 2002; Quataert, 2004) which occurred at different paces and

---

169 Spielvogel (2009).
170 Dutt (1947).
according to different patterns.\textsuperscript{172} In \textit{“The Great Divergence”}, Pomeranz (2001) analyses the economic and institutional systems of four “core” global regions (Western Europe, Tokugawa Japan, the lower Yangzi of China and Northern India) concluding that in all areas the “preconditions” for industrialisation were present. The reason why the process occurred in Great Britain first has generated a huge literature with some analysts attributing it primarily to the availability of coal and of vast resources from the New World.\textsuperscript{173} After the first “Western” experience of Britain, Continental Europe and the US, a second route to industrialisation occurred in the non-European world which involved the use of imported machinery and exploitation of the abundance of cheap labour.

By the late 19\textsuperscript{th} Century, Japanese and Indian spinning and weaving sectors (mainly spinning sector in India) saw the replacement of handicrafts by mechanised production. In India the first phase of industrialisation began with the introduction of modern cotton spinning techniques in Bombay in 1854 with one mill of 30,000 spindles and 500 workers; by the end of the century there were 193 mills, 5 million spindles, 40,000 looms and 160,000 workers (Otsuka, Ranis and Saxonhouse, 1988:5).

In Japan spinning mills started being built by the government in the 1860s, although initially they were not profitable. The effective transplantation of a mechanised factory system occurred in the late 1880s which led to a process of structural change in the economy and marked the beginning of Japanese industrialisation (Tanimoto, 2005).

The quicker adoption of cotton spinning technology in Japan than in India is cited as one of the major factors that explain its success (Sugihara, 2002, Otsuka, Ranis and Saxonhouse, 1988). Technology improvements such as modifications in mule spinning in 1884 and the adoption of ring spinning in 1887-9 occurred at a very fast pace in Japan, while India (and the Ottoman Empire) lagged behind. Sugihara (2002) identifies the existence of proto-industries\textsuperscript{174} and the modernisation of the rural sector in Japan as the decisive precondition

\textsuperscript{172} At one end of the spectrum lies Japan who rapidly developed a strong domestic textile industry and became a textiles exporter in the 1880s while at the other end lies Egypt where attempts to establish firms for the processing of domestic raw cotton failed.

\textsuperscript{173} Pomeranz (2001) suggests that he absence of a Mongol threat in Europe also facilitated the process of resources and capital accumulation crucial for industrialisation.

\textsuperscript{174} The concept of proto-industry, developed by Mendels (1972), has been identified with small-scale industrial activities located in the countryside where the producers are semi-independent peasants who combine agriculture with small-scale industry and produce for inter-regional and international markets. Despite being criticised, the proto-industrialisation theory has engendered a flood of studies aimed at investigating the
for industrialisation. Quataert (2004) suggests that the strong presence of the putting-out system in textiles production, rather than the presence of proto-industries, both in the Ottoman Empire and in China, was crucial for industrialisation.

In Western Anatolia, the first mechanised textile factories were established by the state in the 1830s (Issawi, 1980a:309), but they “suffered from great inefficiencies, including lack of fuel and metallic raw materials and the total absence of skilled labour” (Issawi 1982: 154; Clark 1974). The situation changed in the 1890s when spinning and weaving factories quickly spread: by 1914, in the area covering present Turkey, there were 82,000 spindles, 787 looms and 3,000 workers (Issawi, 1980b:310).

By the beginning of the 20th Century, Western Anatolian mechanised factories provided around 13 per cent of all industrial yarn used in the Empire and competed with both European yarn (of similar quality) and Ottoman hand-spun yarn (of lower quality): Table 5.2.1 shows the price differences in the Maraş district in 1904. The small price differentials between domestic and imported machine-made yarn suggests a reason for the replacement of part of European with Ottoman yarn.

Table 5.2.1: Comparison of imported and domestic yarn prices, in piastres per oke (equal to 1.283 kg.)

<table>
<thead>
<tr>
<th></th>
<th>European</th>
<th>Ottoman (machine spun)</th>
<th>Ottoman (hand spun)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19.71-16.18</td>
<td>18.28-10.85</td>
<td>9-12</td>
</tr>
</tbody>
</table>

Source: Quataert (1993:183)

On the other hand, in Egypt, after a short period of failed industrialisation during the government of Muhammad Ali in the 1820s, the attempts to establish mechanised textile industries failed. Two cotton mills were set up in 1899: the first with 20,000 spindles was forced to liquidate as it was not profitable and shut down in 1907; the second, the Anglo-Egyptian Weaving & Co. with 22,000 spindles and 400 looms experienced serious financial difficulties in 1907 and did not recover in the following years (Owen, 1969:223-4).

importance of rural industries. Many have argued that cottage industries in Britain supplied the platform for its industrial revolution (Mendels, 1972; Petmezas, 1990; de Vries, 2008).
In the next section we consider recent approaches to the analysis of reasons for the different industrial development paths within the ‘periphery’ and their applicability to understanding the divergent experiences between Egypt and Western Anatolia.

5.3 Theoretical approaches to analysis of de-industrialisation and re-industrialisation

As indicated at the beginning of the chapter, recent work by Professor J.G. Williamson and colleagues on the broad issue of de-industrialisation draws on the theoretical model of de-industrialisation based on the so-called Dutch Disease framework, first proposed by Corden and Neary (1982). This model provides a systematic analysis of aspects of structural change in an open economy when impacted by an exogenous shock that affects a particular tradable sector. It has been widely used in the literature as a framework to analyse both current and historical developments. These include: analysis of the impact of a resource boom on income distribution (Goderis and Malone, 2008; Ross, 2007); the relationship between resources and economic growth (Matsuyama, 1992; Sachs and Warner, 2001); and the impact of terms of trade changes on the historical process of industrialisation (Dobado, Gómez and Williamson, 2008; Pamuk and Williamson, 2011).

This approach highlights the importance of international terms of trade changes associated with the Industrial Revolution that may have penalised the Ottoman import-competing sectors (i.e. textile handicrafts) through “Dutch disease” effects that pulled labour and other resources out of textiles manufacturing and into the agricultural sector, thus prompting a process of de-industrialisation.

After presenting the main features of the Corden-Neary “core” model and the variant proposed by Dobado, Gómez and Williamson (2008) applied to the analysis of Ottoman Empire by Pamuk and Williamson (2011), we will relate its theoretical implications to the response of the Empire’s textile industry during the 19th Century. Then, we will explore

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175 Corden (1984) provides a review and consolidation of some further extensions to that model.
176 The term was coined to describe the de-industrialisation experience of the Netherlands after its discovery of natural gas reserves in the North Sea in the late 1950s. The exploitation of this new resource led to an improvement in the balance of trade but had an adverse impact on domestic tradeable industries and, in particular, reduced the competitiveness of Dutch manufacturing.
whether our price transmission analysis presented in the previous chapter can shed further light on factors contributing to the process of de-industrialisation.

5.3.1 The model

We briefly outline here the main features of Corden and Neary’s (1982) core model, denoting the “traditional” export sector as the raw cotton sector, to provide the basis for discussing the impact of three key variables of interest: terms of trade movements, technological change, and industry protection policies, on the industrialisation process in the Ottoman Empire.\(^\text{177}\)

We then discuss some variations to the core model.

Consider a small open economy that produces and consumes two tradable commodities, raw cotton and manufactures, at exogenously given world prices and a non-traded commodity, ‘services’, the price of which is determined in domestic markets.

Raw cotton, \(X_C\), is an exportable that is produced with a technology using labour (L) and a specific factor, land (T):

\[
X_C = X_C (L_C, T_C)
\]

Manufactures, \(X_M\), is an importable produced using labour and a specific factor, ‘capital’ (K):

\[
X_M = X_M (L_M, K_M)
\]

The non-tradable commodity, ‘services’ (\(X_S\)) is using produced with labour and a specific factor, ‘services capital’, \(K_S\):

\[
X_S = X_S (L_S, K_S)
\]

The model assumes:

- There are no distortions in commodity or factor markets, so prices are flexible and markets clear to ensure full employment.
- Terms of trade are exogenously given.
- Labour is perfectly mobile across all sectors.

\(^{177}\) The formal Corden-Neary model uses proportionate changes in variables to analyse the comparative static outcomes of various shocks. The discussion below aims only to present the intuition behind some of the key features and results of the model as the formal model is easily accessible.
At equilibrium:

1. There is full employment, so \( L = L_C + L_M + L_S \)

2. Profit maximisation by firms implies (money) wages are equated to marginal (value) products in each industry:

\[
\begin{align*}
 w_C &= VMPL_C = P_C \times MPL_C \\
 w_M &= VMPL_M = P_M \times MPL_M \\
 w_S &= VMPL_S = P_S \times MPL_S
\end{align*}
\]

where
\[
\begin{align*}
 w_i &= \text{(money) wage in industry } i \ (C, M \text{ and } S) \\
 MPL_i &= \text{marginal product of labour in industry } i \\
 VMPL_i &= \text{value marginal product of labour in industry } i
\end{align*}
\]

3. Because labour is homogeneous and perfectly mobile between industries, wages must be equalized between the three industries. Hence,

\[
 w_C = w_M = w_S
\]

The equilibrium in the economy is depicted in Figure 5.3.1.1. The horizontal axis \( O_BO_T \) depicts the total labour supply: the amount of labour employed in the non-tradable and in the two tradable sectors is measured by the distance from \( O_B \) and from \( O_T \), respectively. \( L_T \) stands for the total demand for labour in the tradable sectors, obtained by laterally adding \( L_M \), labour demand in manufacturing and \( L_C \), labour demand in the raw cotton sector. Full-employment equilibrium occurs at \( A \), where \( L_T \) intersects \( L_S \), with an initial wage rate of \( w_0 \).

Let us now assume that the country specialises in the production and export of cotton and imports manufactures. In what follows we will analyse the impact of a series of changes in the economy: a) an improvement in terms of trade; b) technological change and c) the introduction of a tariff in the manufacturing sector. These require relaxing some of the assumptions of the core model.
Figure 5.3.1.1: Equilibrium in a three-sector economy

\[ \text{Figure 5.3.1.1: Equilibrium in a three-sector economy} \]

\[ \begin{align*}
\text{a) Improvement in terms of trade} \\
\text{Terms of trade will be considered as the ratio of average export prices (P_x) to average import prices (P_m). An improvement in terms of trade can be caused by a higher price increase in exports than in imports and/or by a stronger price decline in imports than in exports. Both scenarios will lead to de-industrialisation which is considered as the movement of labour out of manufacturing into the cotton industry.} \\
\text{If the country imports manufactures and exports cotton, a rise in the world price of cotton, at unchanged world price for manufactures, will lead to an improvement in terms of trade.} \\
\text{This will have two main impacts on the economy, a resource movement effect and a spending effect, which affect both total output and returns to factors of production.} \\
\text{The resource movement effect occurs as higher cotton prices (hence improved terms of trade) raise the marginal product of labour in the cotton industry, allowing it to offer a higher wage and attract labour from other sectors. This leads to a movement of labour out of both manufacturing and services (which contract) into the cotton sector (which expands). Wages also rise in the manufacturing and the service industries. Higher labour demand in the cotton sector causes the composite labour demand schedule L_T to shift upwards to L_T^1, reaching a new equilibrium at B (Figure 5.3.1.1) where wages are higher (w_1). Employment in services declines from O_S S to O_S S^1. Employment in textiles drops from O_T M to O_T M^1.} 
\end{align*} \]
Standard trade theory tells us that a terms of trade improvement will enhance the real income of the country. This leads to higher spending on both services and manufacturing.

If we focus solely on the impact of a spending increase, non-tradables will experience a price increase, caused by higher demand, leading to a real appreciation where the real exchange rate is defined as the relative price of non-tradables to tradables. The services labour demand schedule shifts upwards to a position such as $L_S^1$ and at the new equilibrium C wages are higher ($w_2$).

The combination of the resource movement and the spending effect has ambiguous effects on the non-tradable sector: while the resource pull from the export sector tends to lower its total output, the spending effect acts in the opposite direction, allowing services to compete for labour with the cotton sector. No conjecture can be made as to which effect will prevail without further information as this will depend on the nature of supply functions, demand elasticity for services, etc.

The effects of the terms of trade improvement in the service sector are shown in Figure 5.3.1.2. The resource movement effect pulls labour out of services and into cotton, reducing employment from $L_S$ to $L_S^1$. The increase in service prices pushes $VMPL_S$ upwards, thus offsetting, at least partially, the impact of the resource movement effects. In the figure we show a case where employment (and hence output) expands (to $L_S^2$). Rents also increase (from $w_1^{CA}$ to $w_1^{1DB}$). But this does not necessarily need to happen, as it depends on the magnitude of change in wage relative to the change in the marginal product of labour in services.

In contrast, as the country is a “small” country with no market power in world markets, the higher demand for manufactures does not lead to a higher price for manufactures. Hence the increased demand for manufactures is met by an increase of imports at unchanged prices. Employment in manufacturing must consequently drop (to $O_T^2M^2$ in figure 5.3.1.1) as the sector faces higher wages. Hence the manufacturing sector will be unambiguously negatively affected through the resource movement effect, and its total output will decline: this process has been labelled *direct de-industrialisation*. Moreover, we have seen that the labour demand schedule of services is shifted upwards by the rise in their price, thus driving wages even
higher. As a consequence, employment and output in manufacturing drops further, leading to what has been referred to as *indirect de-industrialisation* resulting from the spending effect.

*Figure 5.3.1.2: Effects of terms of trade improvement in the non-tradable sector.*

Figure 5.3.1.3 shows the loss incurred by the manufacturing industry. The amount of labour employed decreases from $L_M$ to $L_M^1$. As higher wages are not offset by any price rise, total output falls, and the rent of the specific factor, manufacturing sector capital, diminishes from $w_{MGE}$ to $w_M^{1GF}$.

*Figure 5.3.1.3: Effects of terms of trade improvement in the manufacturing sector.*

**b) Technological change**

Let us assume that some level of Hicks-neutral technological change occurs in the domestic raw cotton sector. We can think of it as a productivity improvement and/or as an improvement in the quality of the fibre.
Technological improvement raises the marginal product of labour and hence shifts the labour demand schedule upwards (\(\text{VMPL}_C^1\) in Figure 5.3.1.4) and generates a wage rise (\(w_C^1\)).

This will have a similar effect to a terms of trade improvement on total output, national income, and on returns to factors in the cotton industry. Its impact on the service sector will be ambiguous, as it could either expand or contract. On the other hand, the manufacturing sector would be again negatively affected, owing to lower employment and output levels (through both indirect and direct de-industrialisation), and, consequently, to a decrease in the returns to capital, its specific factor.

*Figure 5.3.1.4: Technological change in the cotton sector.*

\[\text{c) The introduction of a tariff in the manufacturing sector}\]

The introduction of tariff protection in the manufacturing sector has the effect of increasing the domestic price of manufactures by the amount of the tariff, thus enhancing the relative price of import-competing industries *vis a vis* the export sector. Thus:

\[P_x/(1+t) \frac{p_m}{P_m} < P_x/P_m\]

where \(t\) is the *ad valorem* tariff rate.

The induced rise in manufacturing price will generate an increase in the labour demand schedule of manufactures, thus pushing \(\text{VMPL}_M\) upwards and raising the wage rate. Resources will be diverted from the cotton and services sectors into manufacturing.
At the same time, the imposition of a price distortion through the tariff will have a welfare-reducing effect on national income in a “small” country. The fall in national income will have negative effects on the non-tradable sector: the demand for services will fall, leading to a price drop and a depreciation of the real exchange rate. Thus, the overall impact of a protectionist policy for manufacturing – often used to counteract the adverse effects of an export boom – will have a negative impact on the export industry as well as on the non-tradable sector.

d) Extensions to the core model

Pamuk and Williamson’s recent paper on Ottoman de-industrialisation (2011) is based on a modified Dutch Disease model, a “neo-Ricardian model”, which incorporates a Lewisian-type labour market with a fixed real wage based on food. This had been utilised earlier by Dobado, Gómez and Williamson (2008) to analyse de-industrialisation in Mexico between 1750 and 1857.

The Dobado, Gómez and Williamson (2008) paper presents a formal three-sector model where the assumption of a flexible wage in the standard Corden-Neary model is replaced with a real wage that is fixed in food units (with food as the non-tradable good) but where the assumption of a competitive, integrated economy-wide labour market is maintained. Pamuk and Williamson (2011) argue that the Ottoman Empire, being a pre-industrial economy, is better represented by such a model.

It is obvious that applying a conventional, relatively simple economic model such as the Dutch Disease model to the analysis of economic changes of underdeveloped economies during the 19th Century, at a time when they were just beginning to engage in commercial crop cultivation, raises important methodological questions. In particular it is important to ensure that the model captures at least the major structural features of the economies and that its underlying assumptions are plausible (or that model predictions are robust to substantial deviations) if insights of the model are to have credibility. But before discussing these assumptions and their plausibility, we will outline briefly the main implications of this model for the analysis of de-industrialisation forces.

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178 For the Lewis model, see Lewis, 1954, 1978.
179 Boldizzoni (2011) presents a strong methodological critique of economic history research which applies mainstream economic models to historical situations without adequate appreciation of (and research into) the specific social, cultural and institutional context.
In the Dobado, Gómez and Williamson three-sector model (2008), a “small” country has the real wage fixed in food units, where food is the non-tradable good. The other two sectors are textiles, the manufacturing importable and silver, the exportable.

This assumption of an economy-wide fixed real wage creates a link between food sector productivity and the tradable sectors, including the textile manufacturing sector. It also implies that de-industrialisation (a contraction of the textile sector) can occur if the own (product) wage in textiles increases – which can happen for a number of reasons such as a fall in textile price, a rise in domestic food price or a rise in prices of the exportable. They show that in an integrated labour market with a single economy-wide wage, differences in the rate of product wages in the textile and export sectors can generate relative de-industrialisation. In particular, an increase in food prices or an improvement in terms of trade brought about by increased world prices of export commodities will tend to encourage de-industrialisation. A decrease in textile employment is defined as “strong de-industrialization”, while a decline in the share of textile workers in total employment is defined as “weak-de-industrialisation”.

As Dobado, Gómez and Williamson (2008:19) point out, “this is a very simple model, and like all models, makes assumptions that held only approximately at best anywhere in the poor periphery or even in Europe during the eighteenth and most of nineteenth Century”; the model was designed to organise analytical thinking, rather than as a representation of reality. But it is important to review some of its main assumptions and discuss their validity or plausibility. These assumptions include: perfectly competitive factor and product markets; an integrated labour market with a fixed real wage (in terms of food); perfect pass-through of international prices to domestic prices; the small country assumption, implying a one way link between domestic and international prices, with domestic supply or demand shocks having no impact on international prices.

Consider the assumption of perfectly competitive and integrated labour market, implying perfect inter-sectoral labour mobility. In a footnote (footnote 76), Dobado, Gómez and Williamson (2008) assert that the assumption of competition and perfectly integrated labour markets is not critical to model predictions (though the small country assumption is), but no formal proof of this proposition or simulation results to back this assertion are provided. In the absence of powerful trade unions and relatively large numbers of employers, arguably the

\[180\]

See also Clingingsmith and Williamson (2008).
assumption of competitive labour market is probably reasonable. But the degree of labour mobility is likely to have changed over time. Before the introduction of machinery, workers were probably able to move between different agricultural and some handicraft industries with relative ease. This was likely to be the case with the textile industry as many farmers possessed skills in hand-spinning and weaving (Pamuk, 1987). Nevertheless, with the mechanisation of textiles production (from the 1890s), it is arguable that the labour markets were likely to be segmented to some extent as the skills required to operate textile machines were not easily acquired by new entrants to the industry from other sectors.

The available evidence from real wage trends in the Ottoman Empire is consistent with the assumption of a relatively stable real wage for much of the 19th Century. As can be appreciated from Table 5.3.1.1, real wages were fairly stable during the 19th Century (except during the 1850s) but started to increase quite rapidly from the 1890s onwards (see also Pamuk and Williamson, 2001:175). Pamuk and Williamson (2011) argue that the model is broadly applicable until the 1880s, after which real wages rose quite rapidly and the model’s assumption of a stable real wage is no longer sustainable.

Table 5.3.1.1: Daily real wages index in Istanbul, 1800-1909.

<table>
<thead>
<tr>
<th>Period</th>
<th>Unskilled</th>
<th>Skilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800-9</td>
<td>0.84</td>
<td>0.88</td>
</tr>
<tr>
<td>1810-9</td>
<td>0.95</td>
<td>1.04</td>
</tr>
<tr>
<td>1820-9</td>
<td>1.13</td>
<td>1.10</td>
</tr>
<tr>
<td>1830-9</td>
<td>1.11</td>
<td>1.05</td>
</tr>
<tr>
<td>1840-9</td>
<td>0.99</td>
<td>0.95</td>
</tr>
<tr>
<td>1850-9</td>
<td>1.38</td>
<td>1.30</td>
</tr>
<tr>
<td>1860-9</td>
<td>0.81</td>
<td>0.80</td>
</tr>
<tr>
<td>1870-9</td>
<td>0.86</td>
<td>0.99</td>
</tr>
<tr>
<td>1880-9</td>
<td>0.91</td>
<td>1.04</td>
</tr>
<tr>
<td>1890-9</td>
<td>1.12</td>
<td>1.35</td>
</tr>
<tr>
<td>1900-9</td>
<td>1.10</td>
<td>1.31</td>
</tr>
<tr>
<td>1910-4</td>
<td>1.30</td>
<td>1.51</td>
</tr>
</tbody>
</table>

Source: Özmcucur and Pamuk (2002)

The available evidence on real wage trends indicates a rise in real wages since the introduction of machinery in textiles manufacturing. While the wage data reported in Table 5.3.1.1 refer to skilled and unskilled workers in the construction sector, according to Pamuk
and Williamson (2011), from the 1880s, both agricultural and textiles workers too experienced an increase in real wages.

The analytical discussion of domestic adjustments involving de-industrialisation that centres on terms of trade rests critically on an implicit assumption that external (world) price changes are transmitted fully or at least in large part to the domestic markets. Unless domestic prices change in line with international price movements, industry or sectoral adjustments implied by the models will not occur.

Further, in the absence of a tight link between domestic and international prices, the impact of some developments in the raw cotton sector could have quite different effects because of the input-output linkage between industries. Technological improvements in cotton cultivation, for example, may not necessarily strengthen de-industrialisation forces if they lead to a reduction in the raw fibre’s domestic price, thereby reducing costs in the textile industry. Higher domestic supplies can lower domestic prices either because the country is not “small” or because domestic and international prices are not strongly linked. Increased domestic cotton supply may then not only have the effect of increasing exports generating de-industrialisation forces but may lower the domestic price of yarn and encourage textile manufacturing.

Another important assumption of the model is that all sectors produce final consumption goods using primary factors of production and ignores important input-output linkages between the raw cotton industry (the “booming industry”) and the textile industry (the industry which contracts under Dutch Disease pressures and generates de-industrialisation), as mentioned in the previous paragraph. These two industries not only compete for resources – as assumed in the simple three-sector model – but they are also linked through an input-output linkage: the industrially transformed product of the raw cotton industry, cotton yarn, is an essential input into the textile industry.

5.3.2 De-industrialisation and market integration

We first describe the behaviour of our three main variables (terms of trade, technological change, tariff protection) in Egypt and Western Anatolia. Then, on the basis of the trends described, we discuss the implications of the Corden-Neary model based approach adopted
by Pamuk and Williamson (2011) for the path of Ottoman industrialisation. We then reflect about the role of imperfect market integration.

**Terms of trade:** In analysing Ottoman terms of trade movements, it is important to take into account the differences in the commodity composition of exports between Western Anatolia and Egypt. Western Anatolia had a diversified export basket of tobacco, raisins, figs, mohair, raw silk, raw cotton, wheat and barley. This level of diversification remained relatively unchanged throughout the 19th Century and the share of a single commodity rarely exceeded 12 per cent of the total (Pamuk, 1994:41). In Egypt exports were dominated by cotton which accounted for more than one-third of exports in the 1840s-1850s, more than 80 per cent in the 1880s and over 90 per cent at the turn of the century (Pamuk and Williamson, 2011: Appendix 2). On the other hand, the commodity composition of imports was similar in the two regions and comprised manufactured goods and intermediate inputs.

In their analysis of the relationship between terms of trade movements and industrialisation in the Ottoman Empire, Pamuk and Williamson (2011) identify a positive correlation between an improvement in Ottoman terms of trade and de-industrialisation which mirrored a pattern found in other areas of the Periphery.¹¹ But this process was not uniform within different regions of the Empire. A comparison between Egypt and the rest of the Empire shows that Egypt’s terms of trade rose much faster, thus suggesting the possibility of a stronger de-industrialisation impact.¹²

As depicted in Figure 5.3.2.1 (see also Section 1.2, part c), Egypt experienced a much stronger improvement in terms of trade over the long 19th Century: terms of trade rose at an average of 2.7 per cent per year between the mid-1820s and the end of the 1850s, while in the rest of the Empire they increased by 2.3 per cent per year over the same period. The Ottoman Empire experienced a fall in terms of trade between the mid-1860s and the early 1890s: the decline was weaker in Egypt than in the rest of the Ottoman world. With the turn of the new

¹¹ Williamson (2004) analyses the linkages between increasing terms of trade and de-industrialisation, drawing on the Indian experience. Indian terms of trade improved in the period between 1810-1860 when most of India’s domestic textile market was lost to Britain. On the other hand, after 1860, when the terms of trade no longer moved in India’s favour, the process of de-industrialisation slowed down and was eventually reversed.

¹² Nevertheless, despite the partial revival of Anatolian textiles it did not transform into a strong manufacturing sector in the 19th Century: in both regions, as in other areas of the Middle East, it was in the 1920s/1930s that industrialisation gathered momentum, gathering momentum in the post-Second World War period. See Issawi (1980a) for a discussion of the process of de-industrialisation in the Middle East in the 19th Century and re-industrialisation in the 20th Century.
century the terms of trade rose again, but at a faster pace in Egypt (Pamuk and Williamson, 2011).

**Figure 5.3.2.1: Net barter terms of trade of the Middle East, 1796-1913.**

Note: Ottoman Empire excludes Egypt, while Middle East indicates the Ottoman Empire including Egypt. The Levant (data from 1839 to 1913) represents present day Iraq, Israel, Lebanon, Palestine, Jordan and Syria.

Sources: Pamuk and Williamson (2011).

**Technological change:** The degree of technological change in the raw cotton, cotton yarn and cloth industries between Egypt and Anatolia was dissimilar.

**Raw cotton:**

In Egypt the introduction in 1820 of long staple which was superior in quality to the previously cultivated short staple cotton strains represented a major technological improvement. Moreover, higher levels of government investment in agricultural and irrigation schemes led to an advance in agricultural productivity (Owen, 1969). After the British occupation of Egypt the colonial administration directed most domestic investments towards large-scale irrigation projects, further contributing to higher productivity levels.

Table 5.3.2.1 illustrates the increase in yields achieved in the cultivation of long staple cotton.
Table 5.3.2.1: Cotton yields in Egypt, 1865-1913.

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield (qantar/feddan)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1865-6</td>
<td>2</td>
</tr>
<tr>
<td>1869</td>
<td>2</td>
</tr>
<tr>
<td>1870-1</td>
<td>2 ½</td>
</tr>
<tr>
<td>1871</td>
<td>2 ¾</td>
</tr>
<tr>
<td>1874</td>
<td>3</td>
</tr>
<tr>
<td>1880-4</td>
<td>3.43</td>
</tr>
<tr>
<td>1885-9</td>
<td>3.43</td>
</tr>
<tr>
<td>1890-4</td>
<td>5.21</td>
</tr>
<tr>
<td>1895-9</td>
<td>5.47</td>
</tr>
<tr>
<td>1900-4</td>
<td>4.67</td>
</tr>
<tr>
<td>1905-9</td>
<td>4.03</td>
</tr>
<tr>
<td>1910-13</td>
<td>4.44</td>
</tr>
</tbody>
</table>


Supply increases through better technology did not reduce domestic raw cotton prices in Egypt (see Figure 4.1.1) as international markets set the domestic price and increased supplies were exported. Supply increases through better technology did not reduce domestic raw cotton prices in Egypt (see Figure 4.1.1) as international markets set the domestic price and increased supplies were exported. So technological progress in the raw cotton industry did not reduce input costs in the textile sector, while higher exports generated the standard de-industrialisation effects through spending and resource-pull factors.

Unfortunately we were not able to find detailed data on Western Anatolian cotton yields due to time and resource constraints, however, based on the available literature, technology and agricultural productivity in Western Anatolia does not appear to have undergone significant changes during the 19th Century. The considerable expansion in production and exports of cotton and other primary commodities was, in fact, achieved through an extension of the areas under cultivation owing to the availability of marginal lands, and not through technological change (see Pamuk, 1987, 1994; Mihci and Mihci, 2002; Issawi 1980b, 1982, 1988).

Yarn and cloth:

Hand-spinning and hand-weaving were the most widely used techniques for textile production in both Egypt and Western Anatolia during the 19th Century.

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183 See, for example: Yousef (2000); Pamuk (1994); Owen (1969); Issawi (1966); Herschlag (1964).
In both regions the adoption of imported machinery for yarn and cloth manufacturing occurred in two waves. The first wave occurred in the 1830s/40s: Muhammad Ali in Egypt carried out a project of industrialising Egypt which nevertheless proved to be a failure (Owen, 1969). In the rest of the Empire the sultan in Istanbul, Mahmoud II, supported a process of textiles mechanisation. A small number of industries (three producing cotton textiles) were formed around Istanbul under state ownership, primarily to meet military demand. Their life was short and production had stopped by the early 1850s (Pamuk, 1987).

The second wave of mechanisation occurred in the 1880s but did not involve Egypt. Western Anatolia saw the establishment of a series of spinning mills around Izmir. A limited number of power looms was imported, too.

Thus, technological improvement in spinning and, to a minor extent in weaving, took place in Western Anatolia only, in the late 1880s and 1890s.

**Trade policy:** In the Ottoman Empire the government imposed an 8 per cent tariff on all imports in 1862; this rose to 11 per cent in 1907 and 15 per cent in 1914, but it did not affect Egypt which since 1882 had been incorporated in the British Empire.

Another barrier to trade was represented by the 12 per cent internal customs duty imposed on all domestic goods shipped within the Empire.\(^{184}\) This was a discriminatory tax against Ottoman-origin commodities: it was not applied to imports, owing to the Capitulation which granted tax exemptions and other privileges to foreigners (see Sections 1.2, part a). In 1874 the internal customs duty was repealed but only on overland and not on sea-borne trade. The tax on commodities transported by water decreased to 4 per cent in 1889 and 2 per cent in 1900, and was eventually abolished in 1909. This increased the competitiveness of domestic products, including yarn and cloth.\(^{185}\)

Thus, within the politically-independent Ottoman Empire, higher import duties and the gradual abolition of internal custom duties paved the way for a steady rise in the level of protection for its domestic industries, including textile manufacturing. On the other hand, since becoming a British colony Egypt had operated under a regime of almost perfect free trade.

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\(^{184}\) The internal duty was not in force in Egypt as it had autonomy over domestic taxation.

\(^{185}\) See Pamuk (1987:113) for an illustration of the discrimination against domestic manufactures.
trade. As in the rest of the British Empire, the colonial administration implemented a non-protectionist trade policy through the imposition of zero nominal tariffs. In fact, it was the belief of Lord Cromer (at the time British consul-general in Egypt) that: “it would be detrimental to both English and Egyptian interests to afford any encouragement to the growth of a protected cotton industry in Egypt” (Issawi, 1980a: 473).

We can summarise the main trends as follows: Egypt experienced a considerable terms of trade improvement and underwent a process of technological change in raw cotton production. Moreover, its textiles industry did not get any protection from import restrictions since Egypt’s incorporation in the British Empire. Western Anatolia also experienced a terms of trade improvement in the first half of the 19th and at the beginning of the 20th Century (though this was weaker than in Egypt). It experienced no major technological improvement in raw cotton cultivation but technological advancement occurred in yarn and cloth production. Over time, import tariffs on manufactures increased while discriminatory internal trade duties levied on domestic products declined.

In these circumstances, the expectation based on the theoretical model would be that there would be de-industrialisation forces in both regions but that they would be stronger in Egypt and would tend to weaken over time in Western Anatolia. In fact, as illustrated in the first two sections of this chapter, this is indeed what happened: in both Ottoman regions textiles production declined, but in Western Anatolia this process was reversed by an incipient re-industrialisation at the turn of the century. This suggests that the overall direction of structural changes in these economies is consistent with explanations based on the Dobado, Gómez and Williamson model.

5.4 Industrialisation, terms of trade and market integration

Does our analysis of price integration offer any additional insights into this process?

Our econometric analysis (Chapter 4) showed that the linkages between the domestic and global cotton markets were (a) stronger in general in Egypt and, (b) tended to weaken over
time in Western Anatolia. In Egypt’s case, the dominant role of cotton in its exports and its strong linkage with international prices meant that international terms of trade effects would have been reflected closely in domestic relative price changes. But our results also indicated that the assumption that Egypt was a price taker in international markets – considered critical for the validity of the Dobado, Gómez and Williamson model (see footnote 76, Dobado, Gómez and Williamson, 2008) – may not be strictly valid. The impulse response functions presented in Chapter 4 showed that Egyptian prices have an impact on world prices: a shock in Alexandria generates a positive reaction in Liverpool whereas a shock in Izmir seems to have almost no impact on external prices. But, in our view, this would not negate the basic relevance of the main insights; in principle, the fact that Egypt did have some market power in international markets would weaken, rather than reverse, some of the de-industrialisation forces generated through terms of trade effects. Hence, it seems reasonable to conclude that the findings on price transmission strengthen the case for accepting the relevance of the model’s propositions.

But the case is different in Western Anatolia where price transmission and integration with international markets were both more variable over time and generally weaker. We will now examine the Western Anatolian experience in somewhat greater detail.

As discussed in Chapter 4, the econometric analysis indicated three phases of international cotton market integration in Western Anatolia. During the first phase (1845-1861), the linkages between the domestic and the world markets were quite weak. External terms of trade were rising, led by an increase in export prices and by declining import prices. Western Anatolia had a diversified export composition and this terms of trade improvement was not solely due raw cotton price increases. Domestic cotton prices did increase, at this time but this rise was not driven by the global cotton market but probably linked to the inflationary phase experienced by the Ottoman economy.

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186 The absence of market integration may be related to high trade costs associated with trade policy (12 per cent export duty on cotton) and transportation costs. These were reduced in 1862 thanks to the lowering of the export tax to 1 per cent, the modernisation of the Izmir harbour and the improvement in infrastructure. Between 1845 and 1861 domestic factors played a stronger role in cotton price determination, compared to global dynamics. During this time a large portion of the raw material was hand-spun and woven and utilised domestically: in 1851, when total Anatolian production amounted to 30,000 bales, 12,000-15,000 were exported and the rest supplied the domestic market (Issawi, 1980b:234).

187 Pamuk (2004) shows that the period between the late 18th Century and the 1850s was characterised by a strong wave of inflation, with prices increasing 12-15 times. “Most of these increments were associated with the debasements that began in the 1780s and accelerated during the reign of Mahmud II” (Pamuk, 2004:456).
Table 5.4.1 shows the increase (with the exception of the years 1858-9) in the relative price of raw cotton, i.e. the ratio of domestic raw cotton prices (Pc) to textiles prices (Pt). As a result, yarn and cloth production was negatively hit. The dramatic increase in 1862 reflects the impact of the American Civil War when both raw cotton and textiles prices surged, but the former rose much more. This was, in fact, an era of strong de-industrialisation, as shown by the diminishing share of domestic market supplied by foreign imports (see Table 5.1.1).

<table>
<thead>
<tr>
<th>Year</th>
<th>Pc/Pt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1854</td>
<td>0.47</td>
</tr>
<tr>
<td>1855</td>
<td>0.56</td>
</tr>
<tr>
<td>1856</td>
<td>0.60</td>
</tr>
<tr>
<td>1857</td>
<td>0.67</td>
</tr>
<tr>
<td>1858</td>
<td>0.28</td>
</tr>
<tr>
<td>1859</td>
<td>0.26</td>
</tr>
<tr>
<td>1860</td>
<td>0.29</td>
</tr>
<tr>
<td>1861</td>
<td>0.35</td>
</tr>
<tr>
<td>1862</td>
<td>1.50</td>
</tr>
</tbody>
</table>


The second phase (1862-1895) marks the beginning of a process of strong integration between the domestic and the global market at the time of the so-called cotton famine caused by the outbreak of the American Civil War (1861-65). During this time terms of trade declined, led by a slower decrease in import than export prices, including world cotton prices, as depicted in Figure 5.4.1.

This was a period where the model predictions were likely to have greater relevance as international price movements would have been better reflected in domestic prices, thereby generating domestic structural adjustments. This was indeed the case: this period was marked by a process of slower de-industrialisation (Pamuk and Williamson, 2011:168), beginning in the 1880s. Domestically-produced cotton yarn started to meet more of the domestic demand thus slowing down the rapid growth of imports from Europe. (The process of import substitution did not start in the previous decade, despite lower relative prices of raw cotton, 188 These results are in line with the views of other Ottomanist economic historians who claim that cotton revived as a crucial export commodity during the height of the American Civil War (see Section 2.3), as demonstrated by the outstanding increase in volume and value of exports. See, among others, Kurmuş (1987) and Kasaba (1988).
owing a period of socio-economic turmoil fuelled by the Empire’s financial insolvency, as well as by the territorial losses and subsequent migration caused by the secession of many Ottoman provinces in 1878).\textsuperscript{189}

\textit{Figure 5.4.1: Relative price of raw cotton in Western Anatolia, 1862-1895.}


After the 1880s, when the Ottoman economy stabilised, both domestic weaving and spinning expanded, spurred on by lower input prices. In particular, the weaving sector experienced a stronger revival. According to Pamuk (1987) the rise in weaving employment and output was led by two factors: increased purchases of imported yarn, the price of which was declining; and the shift in consumption patterns from woollen to cotton textiles.

The higher demand for yarn was initially satisfied by European imports despite the decline in relative raw cotton prices. This can be explained by the fact that the quality and durability of factory-made yarn was higher than that of hand-spun yarn.

Then, the combination of these two factors, i.e. declining input prices (raw cotton) and the increased demand for yarn from Ottoman weavers, provided the impetus for the mechanisation of the spinning industry. Its expansion began in the late 1880s/1890s when the first factories producing yarn were established in various areas of the Empire, including Western Anatolia.

\textsuperscript{189} Quataert (1993) documents that, between 1867 and 1873, the Istanbul government established the Industrial Reform Commission to manage an ambitious program aimed at boosting manufacturing using Western machinery. The project was however abandoned owing to the financial crisis that hit the Empire in the early 1870s and led to its bankruptcy. Financial instability persisted for at least a decade and was coupled with the catastrophic Russo-Turkish War of 1878 which ended with considerable territorial losses.
The development of a mechanised spinning industry continued to strengthen during the third phase (1896-1914) despite the fact that the Empire experienced a terms of trade improvement, albeit weak, during these years. This appears to contradict the prediction of the model according to which a rise in terms of trade (in a country where the composition of exports is dominated by primary commodities) will generate de-industrialisation forces. However, if weak transmission of international prices to the domestic economy was not confined to the raw cotton sector, it is possible that the international price changes - and terms of trade effects - were only very weakly reflected in internal prices, thereby further weakening the de-industrialisation forces.

In addition to weaker de-industrialisation forces from international markets, Pamuk and Williamson (2011) suggest that improvement in the level of internal economic integration and stronger consumer preferences may have also played an important role in the revival of Ottoman textiles manufacturing. Lower internal trade costs achieved though policy (the gradual abolition of internal duties) and better transport (through railroad expansion in the countryside) encouraged integration between the Ottoman interior and its coastal regions. Consumers had strong preferences for Ottoman cloth styles and patterns and although Western manufacturers tried to imitate them, they had only limited success (Pamuk, 1987; Pamuk and Williamson 2011).

Two additional factors help to explain the process of industrial revival in textiles production: (1) the introduction of improved technology in textiles manufacturing; (2) a decrease in raw cotton prices.

The use of spinning and weaving machines increased the productivity of the yarn and cloth industries. Higher productivity and profitability led to an expansion in the textiles sector, drawing resources out of the other sectors of the economy. As shown in the econometric results, from the mid-1890s the linkages between Western Anatolia and the world market became weaker: in fact, we observe that domestic cotton prices started declining from 1903, while world cotton prices were rising. Such a decrease in input costs may have further encouraged re-industrialisation.

These developments were partly responsible for the observed changes in textile product wages during this period. Product wages in the textile industry, computed by deflating
nominal wages of skilled workers with textiles prices, show a downward trend between 1896 and 1908 (see Table 5.4.2).

Table 5.4.2: Product wages of skilled textiles workers in the Ottoman Empire, 1896-1908.

<table>
<thead>
<tr>
<th>Year</th>
<th>Product wages in textiles units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1896</td>
<td>1.47</td>
</tr>
<tr>
<td>1897</td>
<td>1.51</td>
</tr>
<tr>
<td>1900</td>
<td>1.36</td>
</tr>
<tr>
<td>1901</td>
<td>1.42</td>
</tr>
<tr>
<td>1902</td>
<td>1.37</td>
</tr>
<tr>
<td>1904</td>
<td>1.36</td>
</tr>
<tr>
<td>1905</td>
<td>1.34</td>
</tr>
<tr>
<td>1906</td>
<td>1.28</td>
</tr>
<tr>
<td>1908</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Sources: Wages of skilled workers taken from Pamuk (2001); textiles prices taken from Pamuk (1987).

Moreover, trade policies would have also helped. As the average level of tariff protection was raised in 1907. This may have further stimulated domestic textiles manufacturing at the expense of foreign imports. Some of the literature indicates that the rise in import duties incentivised factory-building (see, for example, Quataert, 1993; İnalçik and Quataert, 1997). (Data limitations do not allow us to determine whether growth in textile manufacturing changed after the introduction of the tariff).

5.5 Summary

Pamuk and Williamson (2011) have used the Dutch Disease framework to understand the mechanisms that led to the demise of the Ottoman textiles industry. Our analysis, including the analysis of the differences between Egypt and Anatolia in cotton market integration with international markets sheds some further light into the complex process of de-industrialisation and re-industrialisation in the Ottoman Empire.

Developments in yarn and cloth production in Egypt and Western Anatolia were influenced by the nature of price transmission between the international and the domestic raw cotton markets. The closer linkages between the domestic and the global markets in Egypt meant
that external terms of trade were more strongly reflected in the domestic relative price changes. In contrast, weaker linkages with the world market in Western Anatolia probably weakened the overall terms of trade related de-industrialisation forces and facilitated the rebirth of textiles manufacturing.

In Egypt, the absence of a process of industrialisation seems attributable to the interaction of a series of interconnected dynamics, consistent with the propositions of Pamuk and Williamson (2011): the strong integration between domestic and international raw cotton markets, booming terms of trade, the complete specialisation in raw cotton production for export and the lack of tariff protection for textiles manufactures. On the other hand, in Western Anatolia after a period of manufacturing decline re-industrialisation was aided, initially, by a terms of trade worsening between the 1860s and 1890s. After the 1890s, the expansion of cotton mills continued despite rising terms of trade – whose domestic impact was muted by weak price transmission and was sustained by technological advances in spinning, cheaper domestic raw cotton, improved internal market integration, consumer biases towards Ottoman textiles, and more protectionist trade policies.

To conclude, our findings on the patterns of cotton price transmission between Ottoman and global cotton markets complement the insights gained from theoretical models of de-industrialisation and help to fill out the picture of the different trajectories followed by the Egyptian and Western Anatolian cotton industries. More nationalist government policies, strong consumer preferences and structural factors led to a revival of the textile manufacturing sector in Western Anatolia and weakened the price transmission between domestic and international raw cotton markets. In contrast, the free trade policies and absence of support for a domestic manufacturing industry in British-controlled Egypt produced strong integration between domestic and international markets in raw cotton and discouraged the emergence of a textile manufacturing industry.
6. Summary and Conclusions

An exploration of the unprecedented transformations in the Ottoman Empire’s political and socio-economic structure allows us to fit the Ottoman experience into the broader framework of the first wave of globalisation.

Looking through the lens of “the first global industry”, cotton textiles, our quantitative and qualitative analysis of the Ottoman Empire aims to contribute to the widely discussed theme of the relationship between globalisation, market integration and industrialisation and the broad literature on development within the field of global history. Thus, it offers a platform from which to reflect on the Empire’s role and position in the sweep of change which characterised the international system during the long 19th Century.

Our investigation presents some new insights into two significant topics in economic history: the process of commodity market integration in the 19th Century and the process of de-industrialisation and re-industrialisation. The former has been explored in our study through an econometric analysis of the degree of integration between Ottoman and international cotton markets and its changes over time. In investigating the latter we have discussed the extent to which differences in market integration in cotton markets can deepen the insights presented by Pamuk and Williamson (2011) in the analysis of the impact of the Industrial Revolution on the Ottoman textile sector, using a variant of the Corden-Neary framework.

The line of investigation providing the analytical framework for our study has been organised as follows: first we explored the causes, consequences and the manifestations of the Empire’s involvement in the global system (Chapter 1). We then looked at one specific sector of the Ottoman economy: cotton production and trade. The choice of cotton is explained by the crucial role played by this raw material during the Industrial Revolution (Chapter 2). After highlighting the various approaches adopted by Ottomanist economic historians to describe the degree of the Empire’s involvement in the global economy (Chapter 3), we conducted an empirical analysis of the degree of international price integration between the Ottoman and the world cotton markets (Chapter 4). This aimed to explore the evolution of the nature of

190 The Economic History Review has recently dedicated a special issue (February 2011) to the different aspects of economic divergence between Europe and Asia as a consequence of the Industrial Revolution.
market integration over time and to understand the changes in the strengths of market linkages between the Empire and the global economy. In Chapter 5 we discussed the Dutch Disease framework to reflect upon the different patterns of de-industrialisation in Egypt and Western Anatolia. Furthermore, we pointed to some limitations of the existing literature and presented some additional insights into the decline and rebirth of Ottoman textiles manufacturing, based on our analysis of market integration.

The Ottoman Empire’s process of integration with the world economy followed a path common to many other developing regions. It was stimulated by two phenomena: (i) an evolving world economy, whose network of trade and finance was becoming increasingly more intertwined; and (ii) the undertaking of internal reforms aimed at centralisation, secularisation and Westernisation, which took the form of the Tanzimat. The most remarkable outcome of this process of change manifested itself through the commercialisation of agricultural production and thus through the transformation of the Empire from an agrarian state based on self-subsistence to an exporter of primary commodities.

The consolidation of the linkages with the world market was fostered by European capital in the form of foreign direct investments beginning in the mid-1860s and intensifying in the late 1880s (see Section 1.3.1). These investments played an important role in prompting market integration as they were principally aimed at the construction of infrastructure (particularly focused on improving the irrigation network in Egypt) to reduce trade costs. Foreign enterprises dug the Suez Canal, developed ports and built railways, thus strengthening market linkages.

Another factor which contributed towards drawing the Empire into the worldwide web of trade and finance was embodied in the structure of market networks (see Section 1.5). A significant portion of Ottoman international trade was controlled by non-Muslim minorities whose commercial activities, aided by the effects of the transport revolution and by the fiscal privileges enjoyed under the Capitulations, contributed to strengthening the Empire’s market linkages with the world economy. Some families, like the Ralli Brothers, controlled the cotton trade both in Egypt and Western Anatolia. All the traders had their counterparts, who shared the same culture, in the main European commercial cities. Thus, belonging to the

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191 Nevertheless, the majority of capital flows mainly took the form of financial loans granted to the Ottoman government.
same ethnic/religious community and the adherence to the same set of moral norms, value systems and social practices may have played an important role in reducing trade costs, acting as a globalisation force.

The level of Ottoman participation in the global economy did not proceed in a uniform manner, and some regions became more intertwined than others in the web of international trade with the initial “globalisation effects” being felt more strongly in the Mediterranean and Black sea ports of Izmir, Alexandria, Istanbul, Beirut and Trabzon and spreading from there along the principal trade routes.

Moreover, Ottoman involvement in the world economy occurred at different speeds, depending on the location: the areas where cash-crops were farmed became the most interconnected with the international market and these were the regions devoted to the cultivation of cotton in Egypt and Western Anatolia, silk in Lebanon, tobacco in Syria and dates in Iraq. 192

Our study makes a contribution towards understanding this process of integration with international markets by undertaking an econometric analysis of one aspect of the Ottoman Empire’s participation in the global commodity market: the integration of its cotton industry with international markets. To our knowledge this is the first analysis using econometric tools to study the changing patterns of market integration and price transmission in any Ottoman Empire industry. 193

Our empirical investigation of international cotton market integration in two regions of the Empire, Egypt and Western Anatolia, revealed that they followed two separate trajectories. Egypt consistently intensified its degree of interconnection with the global economy over time, between 1845 and 1913, while Western Anatolia’s market integration started at a later stage, in 1862, and diminished towards the end of the 19th Century (from 1896 to 1914).

These changing patterns of market integration seem to have been related to the process of de-industrialisation and re-industrialisation of the Ottoman textile industry.

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192 See, for example, Issawi (1966); Inalcik and Quataert (1996).
193 The only other quantitative study of market integration in the Ottoman Empire is Pamuk (2004). However it did not use econometric techniques.
In Pamuk and Williamson’s (2011) recent investigation of industrialisation within regions of the Ottoman Empire they identify globalisation forces, embodied in primarily in terms of trade movements, as the principal factor which shaped the decline and rebirth of Ottoman manufacturing. Until the first half of the century, booming terms of trade and lower international transport costs negatively hit domestic handicraft while negative terms of trade in the following three decades alleviated these pressures and allowed textiles production to survive. While suggesting that the spinning and weaving sectors resisted at the turn of the century (as a response to consumer preferences as well as to policies that increased the level of internal market integration) Pamuk and Williamson do not explicitly address the question of why re-industrialisation occurred in some parts of the Empire, including Western Anatolia, despite the rise in terms of trade experienced by the Empire during the last two decades of the long 19th Century.

Our contribution to the existing literature is primarily on two fronts:

First, we have provided the first rigorous quantitative analysis of the changing patterns of integration and price transmission between international and domestic raw cotton markets of Egypt and Western Anatolia. We have shown that they differed quite substantially, with Egypt becoming ever more closely integrated with international markets over time, while Western Anatolia, after an initial phase of integration, gradually weakened its degree of integration. Our analysis also confirmed that Egypt gained some market power in the global cotton market.

Second, we have highlighted the link between the theoretical framework of de-industrialisation and the degree of market integration. In Egypt the strengthening of price transmission between the domestic and the global market allowed de-industrialisation dynamics full play, in line with the assumptions of the core Dutch Disease model. On the other hand, in Western Anatolia, with its weaker linkages with the world market, de-industrialisation forces were sufficiently weakened by the mid-1890s to initiate an incipient process of re-industrialisation.

However, while we have suggested that the observed diverging developments in the process of industrialisation may indicate that Western Anatolian domestic demand factors had a relevant impact on cotton price formation and therefore may have influenced the process of
market integration, this has not been tested empirically. Indeed, we have not provided a rigorous, empirically tested explanation for the observed differences in Western Anatolian market integration over time. This would be an important area for future research that could enrich our understanding of the evolution of the Ottoman textile sector within the broader context of the evolution of the Ottoman Empire’s participation in the 19th Century globalising world.
Appendix 1: Ad valorem and specific export taxes

Ad valorem and specific export taxes have a different impact on the domestic export supply curve and on the level of international price transmission, as will be illustrated in the following examples, drawn from the cotton market.

The equations describing the quantity of cotton demanded and supplied are given by:

\[ Q_D = \alpha - \beta P_c \]
\[ Q_S = -\gamma + \delta P_c \]

The export supply curve \((Q_{ES} = \text{quantity exported})\):
\[ Q_{ES} = Q_S - Q_D = - (\alpha + \gamma) + (\beta + \delta) P_c \]
so that
\[ P_c = [(\alpha + \gamma) / (\beta + \delta)] + Q_{ES} / (\beta + \delta) \]

Before the export tax the domestic price is equal to the world price:
\[ P_c = P_c^* \]

After the specific export tax, the domestic price corresponds to the world price minus the export tax.
\[ P_c = P_c^* - t_s \]

By substituting the new price linkage we obtain a new equation for the export supply:
\[ Q_{ES} = - (\alpha + \gamma) + (\beta + \delta) (P_c^* - t) \]

So that:
\[ P_c^* = [(\alpha + \gamma) / (\beta + \delta)] + t + Q_{ES} / (\beta + \delta) \]

Thus, the imposition of a specific export tax causes an increase in the intercept of the export supply schedule by the amount of the tax \([(\alpha + \gamma) / (\beta + \delta)] + t\), while the slope remains unchanged \(1 / (\beta + \delta)\).

The application of an ad valorem export tax generates a new price linkage:
\[ P_c = P_c^*/(1 + t_a) \]

Which substituted into the export supply schedule gives:
\[ Q_{ES} = - (\alpha + \gamma) + (\beta + \delta) (P_c^*/1 + t) \]

So that
\[ P_c^* = \left[ (\alpha + \gamma) / (\beta + \delta) \right] (1 + t) + [ (1 + t) / (\beta + \delta) ] Q_{ES} \]

Hence, an *ad valorem* export tax causes an increase in the intercept of the export supply schedule \[ (\alpha + \gamma) / (\beta + \delta) (1 + t) \], and of its slope \[ (1 + t) / (\beta + \delta) \], which becomes steeper.

The different impact of the ad valorem and specific export duties on the export supply schedule are illustrated in the following two figures.
Appendix 2: impulse response function results.

### Results from varbasic

| step | (1) irf | Lower     | (1) Upper   | (2) irf | Lower     | Upper       | (3) irf | Lower     | (3) Upper   | (4) irf | Lower     | Upper       |
|------|---------|-----------|-------------|---------|-----------|-------------|---------|-----------|-------------|---------|-----------|-------------|---------|-----------|-------------|
| 0    | 1       | 1         | 1           | 0       | 0         | 0           | 0       | 0         | 0           | 0       | 0         | 0           |
| 1    | -0.289871 | -0.643041 | 0.063299    | -0.570555 | 0.264494  | 0.876617    | -0.352374 | -0.702754 | -0.001994  | -0.011794 | -0.337938 | 0.33435     |
| 2    | -0.26416 | -0.324505 | 0.377337    | -0.392617 | -0.706681 | -0.078553   | 0.600829  | 0.285212  | 0.916446   | 0.273664  | -0.040552 | 0.58788     |
| 3    | -0.462725 | -0.825428 | -1.00023    | 0.342162  | 0.029597  | 0.654727    |          |           |             |          |           |             |

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95% lower and upper bounds reported

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Bibliography

References

Unpublished documents:
Consular Reports of the British Foreign Office, consulted at the National Archives, London:
- FO 24 (Political and Other Departments: General Correspondence with Egypt before 1906)
- FO 78 (Political and Other Departments: General Correspondence with the Ottoman Empire before 1906);
- FO 83 (Political and Other Departments: General Correspondence before 1906. Great Britain and General);
- FO 195 (Embassy and Consulates, Turkey (formerly Ottoman Empire): General Correspondence);
- FO 368 (Commercial and Sanitary Department: General Correspondence from 1906);
- FO 371 (Political Departments: General Correspondence from 1906-1966);
- FO 781 (Embassy in Constantinople, Turkey: General Correspondence).

Published documents:
Ottoman Agricultural Statistics, consulted at the British Library, London

Secondary Sources:


- Chatzioannou M. C., 2010: “Creating the pre-Industrial Ottoman-Greek Merchant: Sources, Methods and Interpretations”. In “Economy and Society on Both Shores of the Aegean”, Alpha Bank Historical Archives, Athens, pp. 311-335.


- Dunstan W., 1904: “Report to the Board of Trade on Cotton Cultivation in the British Empire and Egypt”. Printed for His Majesty’s Stationery Office by Darling & Son, Ltd., London.


- Quataert D., 1973: “Ottoman Reform and Agriculture in Anatolia, 1876-1908”. University Microfilms International, Ann Arbor, Michigan, USA.


- Schanz M., 1913: “Cotton in Egypt and in the Anglo-Egyptian Sudan”. German Colonial Economic Committee. Submitted to the 9th International Cotton Congress, Schevingen.


