

# Endogenous Trade Policy: Political Struggle in the Growth Process

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## Abstract

This paper develops a dynamic theory that accounts for the evolution of trade policy, underlying internal class conflicts, and output growth performance. By analyzing political responses to the distributional effects of international trade, it finds that economies with a comparative advantage in manufacturing tend to reach a developed stage through the ebb and flow of protectionism. This nonmonotonic evolution of trade policy is consistent with historical evidence for Western Europe over the last few centuries.

*Keywords:* Trade Policy, Growth, Class Conflict.

*JEL Classification:* F10, F13, F43, O11, O40.

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# 1 Introduction

Over the last two centuries, the world economy has witnessed two epochal phenomena never seen before: the rapid expansion of international trade and the emergence of income gaps between nations. The approximate growth rate of Europe’s intercontinental trade was 3.7% per annum in this period, while the figure was 1.1% per annum between 1500 and 1799 (O’Rourke and Williamson, 2002a). The gap between the West and the rest of the world in average per capita GDP was nearly 2:1 in 1820, whereas it was as much as 7:1 in 1998 (Maddison, 2001, Table 1-9b, p. 46).

While these figures have brought a potential link between international trade and long-run growth performance to many economists’ attention, there seems to be no established theory that accounts for their historical relationship. As pointed out by Williamson (2003), the role of international trade has typically been neglected by the recent literature that analyzes the transition from Malthusian stagnation to modern growth.<sup>1</sup> Even the few exceptions, such as the work of McDermott (2002) and Galor and Mountford (2003), treat the emergence of international trade as being exogenous.<sup>2</sup> On the other hand, the literature on endogenous tariff theory primarily uses static frameworks that ignore the dynamic aspects of trade and aggregate output.<sup>3</sup>

This research distinguishes itself from these previous articles by exploring the historical evolution of trade policy and economic growth. Analyzing political responses to the distributional effects of trade, the research finds that there is a prominent interaction between them. The analysis is focused on the development of Western Europe since the mid-17th century, dividing it into three distinct epochs of trade policy.<sup>4</sup> In the first epoch (1660–1830s), Western European countries imposed

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<sup>1</sup>See, for example, Goodfriend and McDermott (1995), Galor and Weil (2000), Kogel and Prskawetz (2001), and Hansen and Prescott (2002).

<sup>2</sup>There are two other notable articles relevant to the present paper. McDermott (1999) endogenizes a country’s openness by incorporating government motivation for mercantilistic protection against the inflow of foreign ideas. In contrast to the present article, McDermott does not study international trade in commodities and, hence, overlooks the substantial impact of grain inflow on the 19th-century European economy. Baldwin et al. (2001) develop a growth model in which exogenous reductions in the costs of trading goods (such as shipping costs and those associated with political barriers) promote industrial agglomeration in the North and thereby generate substantial income differences between the North and the South.

<sup>3</sup>See Mayer (1984), Magee, Brock and Young (1989), and Grossman and Helpman (1994), among others.

<sup>4</sup>This paper focuses on the international trade between Western Europe and the rest of the world, including Eastern Europe, and also focuses on restrictions on importing agricultural goods, rather than manufactured or other goods. As is well known, the grain trade was initially limited to the European continent because of underdeveloped transport systems. Amsterdam played a central role in determining grain prices in Europe in the 17th and 18th centuries (Glamann 1974, p. 457). In the 18th century, England and France shifted from intra-European trade to intercontinental trade (Kriedte 1983, Chap. 3), and by the 1770s Atlantic trade became the engine of European economic growth (*ibid.*, p. 125). For example, Carolina’s rice exports increased fivefold between 1720 and 1740 (Nash 1992, p. 687).

severe restrictions on the import of grain, one of the main foodstuffs, thereby adversely affecting most people's living standards. The second epoch (1830s–1870s) was marked by a decisive shift toward free trade. The resulting influx of grain, especially from the New World and Russia, had substantial impacts on income distribution within societies. In response to the grain invasion, many of these nations went back to the protection of domestic agriculture, a competing sector. This political backlash characterizes the third epoch, which continues today.

The primary objective of this research is to analyze this historical evolution of trade policy experienced by Western Europe, a region plausibly regarded to have been scarce in land and abundant in capital.<sup>5</sup> On top of that, the theory developed below predicts a second wave of free trade in advanced stages of development. Thus, it demonstrates two surges of liberalism with a stage of protectionism in between. The present paper provides an interest-based explanation for the determination of openness through an internal political process, rather than through diplomatic games played among trading countries.<sup>6</sup> According to this approach, the nonmonotonicity of trade policy reflects qualitative changes in individuals' stances on free trade in the process of economic development.

This research develops a two-sector, two-good, overlapping-generations economy that uses two specific factors, land and capital, and one mobile factor, labor.<sup>7</sup> The model features three elements that alter individuals' trade policy preferences in the growth process. The first element is the expansion of consumption bundles. While there are two marketable consumption goods, food and a manufactured good, the former is essential to low-income households for their survival. Hence, their desired trade policy minimizes the real cost of food. The second element is the expansion of income sources, in the sense that higher-income earners derive revenues from capital, in addition

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<sup>5</sup>According to careful investigation by Rogowski (1989, pp.154–158), as late as 1600, Northwestern Europe was abundant in capital and scarce in land, whereas Eastern Europe was abundant in land and scarce in capital. During the 16th century, the vast granaries of eastern Germany and Poland had achieved rapid growth, and by the first half of the 17th century, an annual average of 140,000 tons of grain flowed into Northwestern Europe through the Danish Sound (De Vries 1976, p.33). Although England was a net exporter of many types of grain in the first half of the 18th century, this was largely because of the bounty and was thus known as “a forced export” (Ormrod 2003, pp.216–217).

<sup>6</sup>The interest-based approach is adopted by Rogowski (1989), who applies the Stolper–Samuelson theorem to interpret class and rural/urban conflicts over trade policies in 19th-century European nations. However, he neither constructs a formal model nor discusses the determination of trade policy. The present article extends this line of research in order to analyze the dynamic interaction between trade policy and economic growth.

<sup>7</sup>While the model is an extension of Galor and Moav's (2004) one-sector, one-good growth model, their research accomplishes a different objective. They explore the effects of distributional policies on subsequent output growth in a closed economy, and suggest that the qualitative effects depend on the stage of development.

to their wage incomes. Because wages and interest rates are affected in opposite ways by trade liberalization, the level of savings is a key determinant of preferences over trade policy. The third and last element is the absence of land markets. This prevents the returns on land and capital from being equalized, which provides landowners with an incentive to support proagricultural trade policies.

The theory developed in this paper presents the following scenario for the evolution of an economy that has a comparative advantage in manufacturing. In the early stages of development, the economy operates under a closed system in which, because of the necessity of staple food, the small-scale agricultural sector absorbs a substantial part of the labor force. The resulting low wages (in terms of food) prevent the landless poor from purchasing the nonessential manufactured good, and their poverty sustains the economic dominance of landlords.

In contrast, opening up to international trade breaks this class structure by placing egalitarian pressure on the income distribution. That is, food consumption by the poor is enhanced while landlords' rents are reduced. These two egalitarian forces of trade liberalization—the rise of the working class and the fall of the landed elite—are a prime incentive for landlords to prefer autarky. Therefore, the initial development process entails a political struggle between landed and landless interests. As long as the former rich group wields political power, the economy adopts protectionist policies.

Although trade liberalization raises landlords' capital revenues, this positive effect is not dominant in the early development stages where it does not pull much labor out of agriculture. However, capital accumulation, in conjunction with a limited supply of land, gradually raises landlords' potential gains from industrial specialization.<sup>8</sup> Through this mechanism, an epochal policy switch to free trade takes place and dissolves class conflict between landlords and workers.

As the economy develops under free trade, further specialization in manufacturing raises wage rates (in terms of food), and thereby permits landless workers to consume the manufactured good as well as food. In these circumstances, they may be less supportive of liberal (i.e. proindustrial and antiagricultural) policies, because industrial specialization raises the relative price of the manufactured good. Hence, as long as rising wages lead to an extension of the franchise, the political

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<sup>8</sup>This is in line with the work of Galor et al. (2005), who demonstrate landlords' opposition to industrialization in a closed economy.

participation of the landless class causes a resurgence in protectionism.

Despite the political backlash, capital accumulation continues to boost output and real wages, which ultimately enables everyone to generate savings. Because trade liberalization leads to a rise in interest rates, all individuals vote for free trade in developed stages where their savings are sufficient and owning land is not particularly lucrative. This eventual shift to liberalism should be interpreted as a theoretical prediction, as most current developed countries still adhere to agricultural protection.

The rest of this paper is organized as follows. Section 2 presents historical evidence on European trade policy and economic development. Section 3 describes the basic structure of the model. Section 4, the main part of the paper, demonstrates the coevolution of trade policy and output, as experienced by industrial economies. Section 5 concludes the discussion and proposes possible extensions to the research. Some proofs of technical results are in the Appendix.

## 2 Historical Evidence

This section presents the historical evidence on Western European trade policy and economic development that supports the central argument of the paper. As mentioned in the introduction, this paper considers trade in goods between Western Europe and other regions. The investigation dwells on the role of trade policy, rather than transportation costs, in determining a country's openness. Moreover, in the context of the paper, trade protection means restrictions on the imports of agricultural goods, rather than of manufactured or other goods. The following three epochs construct a broad picture of the history of Western European trade policy over the last three centuries.

### 2.1 The Age of Protectionism, 1660–1830s

Protectionism was the prevailing doctrine in Europe during this period, and the import of grain was severely constrained by national laws, the most well known and important of which were the British Corn Laws, which were in force until 1846.<sup>9</sup> According to Bairoch (1989, pp. 7–8), “It should be

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<sup>9</sup>The term ‘corn’ did not merely mean American corn or maize; rather, the term meant grains such as wheat, oats, rye, barley, malt, peas, beans, and maize (Barnes 1965, p. 7). Although the British Corn Laws existed before 1660, it was not until 1660 that the government restricted the import of grain and encouraged grain exports (Barnes 1965, p. 8 and Glamann 1974, p. 465). Other European countries were mainly protectionist at least around 1820 (Bairoch 1989, pp. 6–7). This paper conventionally sets 1660 as the initial period of analysis.

noted that ‘Corn Laws’ were a quasi-permanent feature of tariff history in most European countries. They had always aimed at a precarious balance between protecting local agriculture and preventing the price of bread rising too steeply.” For instance, Burke’s Act of 1773 fixed the threshold price for the domestic market, above which wheat could be imported, at 44 shillings per quarter, and was later raised to 80 shillings per quarter by the law of 1815 (*ibid.*, p.8).<sup>10</sup> Likewise, in France, landowners succeeded in introducing a sliding scale tariff to protect cereals between 1815 and 1845 (Fohlen 1973, p.30). Before the 19th century, protectionist policies against foreign grain generally restricted intracontinental trade, rather than intercontinental trade.<sup>11</sup>

The absence of grain imports kept European economies under agricultural-land constraints. Using British data from between 1565 and 1936, O’Rourke and Williamson (2002b) found a clear relationship between commodity and factor prices and endowments for the pre-1828 period. They also noted that this relationship broke down after 1828, rather than after the 1490s, which was the era of the Voyages of Discovery. Based on this finding, they suggest that for the period before 1828, the closed-economy model is superior to the open-economy model, which is better for the period after 1828.

Some evidence indicates that the living standards of the working class did not improve in this epoch; rather, they deteriorated. For instance, Allen (2001, pp.427–429) reports that indicators of the welfare of laborers in many European cities trended downward or were stable between 1500 and 1800; they suggest that incomes were just enough to cover rents and necessities. Similarly, Hoffmann et al.(2002) found that for the period between 1500 and about 1800, both unskilled labor and luxury goods generally became cheaper relative to staple foods (grains and bread) in major European regions (Table 2 and Figure 1, pp. 331–333). They also found that working people spent a greater share of their budgets on grain than did upper class people in England and Wales,

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<sup>10</sup>A quarter of wheat was 217.7 kg.

<sup>11</sup>It appears that intercontinental trade in grain was not the primary concern of pre-19th century policy makers because of substantial freight costs. Some historians, such as Irwin (2001) and Taylor (2002), argue that it was underdeveloped shipping technology, rather than protectionist policies, that constrained intercontinental trade from the 16th century to the 18th century. While Europe engaged in trade with other continents, such as the New World, Asia, and India following the Voyages of Discovery, most traded commodities between 1500 and 1800 were noncompeting luxury goods, which were of high value relative to their transport costs. Examples include pepper, other spices, cotton textiles, tea and coffee from Asia, and sugar, tobacco and silver from the Americas (Findlay and O’Rourke 2001, pp. 7–10). Because luxury goods were beyond the budget of low-income groups, intercontinental trade was of little relevance to living standards, except those of elite Europeans (Irwin 2001 and Williamson 2002c, p. 15).

France, and the Netherlands (Table 1, pp. 326–327).<sup>12</sup> Consistently with this evidence, the growth model developed in this paper predicts that the relative price of food rises under autarky.

## 2.2 The First Period of Globalization, 1830s–1870s

The triumph of liberalism was symbolized by Britain’s repeal of the Corn Laws in 1846.<sup>13</sup> Williamson (1990, Table 1, p. 128) estimates that the ad valorem tariff equivalent on grain in Britain fell from about 71% to about 22% between 1815 and 1845—a significant step toward free trade. Britain’s liberal ideas spread throughout most of Europe, especially after 1860, when Britain and France agreed on the Anglo-French treaty that incorporated the most-favored-nation clause (Bairoch 1989, 40 and Minchinton 1973, p. 100).<sup>14</sup> Wheat continually came into Europe from Australia, Argentina, India, the American mid-west, and Canada, and the value of wheat exports from America increased 20-fold between 1850 and 1915 (Woodruff, 1973, p. 660).<sup>15</sup> In Germany, Belgium, and France, imports of grain accounted for 3% of domestic production in the period 1862–1866 and reached 20% in the 1876–1880 period (Bairoch 1989, p. 47).

The dismantling of agricultural protection and the associated inflow of grain on an enormous scale brought about two major changes in European economies. The first was that within-country wealth inequalities were reduced. O’Rourke and Williamson (2005, Figure 1, p. 8) report that in England between 1500 and 1936, the wage–land rent ratio had been falling until about 1850 and then began to rise. The second was the specialization in capital-intensive goods, which drew workers from agriculture. In Britain, the decline in the number of agricultural workers began after 1850 and was associated in part with enormous agricultural imports (Pomeranz 2000, p. 287). These two dramatic changes show that trade liberalization and the accompanying grain inflows caused

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<sup>12</sup>In England and Wales in 1688, the bottom 40% of income earners spent about 35% of their incomes on bread and other grain, whereas the top 5% spent only 4.2% on these goods. In France, rural workers spent 30.8% of their incomes on bread and other grain in 1763, whereas middle and upper class people spent only 1.7% on these items in 1788. This implies that the relative price of grain was more important for the living standards of poorer people.

<sup>13</sup>This article defines the 1830s as the first period of globalization. While the triumph of liberalism was symbolized by Britain’s repeal of the Corn Laws in 1846, the onset of liberalism dates back to the early 1820s. In 1822, the nation reduced the threshold price (referred to in Section 2.1) to 70 shillings per quarter (Bairoch 1989, p. 9).

<sup>14</sup>“The most-favored-nation clause is a formula by which each of the two signatories to a treaty agrees to grant the other any advantage, favor, or privilege with regard to trade or navigation that it granted at the time of signing, or that it would grant in the future, to any other nation” (Bairoch 1989, pp. 38–39). According to Minchinton (1973, p. 100), the abolition of grain duties was conducted by the Zollverein in 1853, by Britain in 1860, by France and the Netherlands in 1862, by Italy in 1870, and by Belgium in 1871.

<sup>15</sup>The increase from the late 19th century onwards occurred mainly because of reductions in transportation costs and advances in the technology used for wheat production, rather than because of liberal trade policy. This is because agricultural protection prevailed during this period in Western Europe.

a structural breakdown; they transformed Western Europe from an autarkic economy to an open economy and led to the elimination of resource constraints.

Meanwhile, political power was wielded by the landed elite in most European nations. For example, Aydelotte (1967, p. 51) reports that the share of the British aristocracy and gentry in the House of Commons was roughly 80% in 1846, the year in which the Corn Laws were repealed. Moreover, as depicted in Figure 1, before the 1870s, the franchise was limited to a small segment of the population in the main parts of Europe, except France. Hence, many of landlords' preferences were presumably reflected in the trade policies adopted, and trade liberalization would not have been achieved without their broad support.

One of the potential forces behind the policy switch to free trade was, as mentioned in the introduction, the rising relative importance of industrial capital in landlords' portfolios.<sup>16</sup> This hypothesis is consistent with the empirical work of Schonhardt-Bailey (1991), who focuses on the case of Britain in the first half of the 19th century. She has documented the increased diversification of the asset portfolios of British landowners and found that Members of Parliament representing more diversified constituencies were more likely to vote for free trade. In addition, Thompson (1994, pp. 166–167) has documented the aristocracy's decreasing dependence on agricultural incomes in the 19th century in England.<sup>17</sup>

### **2.3 Political Backlash, 1870s Onwards**

As shown by Minchinton (1973, p. 100), the retreat from free trade occurred in much of continental Europe in the late 19th century (in Italy in 1878, in Germany in 1879, in France in 1881, in Bulgaria in 1883, in Switzerland in 1884, in Rumania in 1886, in Belgium and Sweden in 1887, and in Austria–Hungary, Spain, Portugal, and Russia in the same decade). The impact of cheap New World and Russian grain became evident in European markets by the late 1870s and 1880s, as is apparent from the 50% decline in real British land rents between 1870 and 1913 (Findlay

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<sup>16</sup>According to O'Rourke's (2000) recent review of British trade policy, economic historians suggested two other major reasons for the repeal of the Corn Laws. Kindleberger (1975) suggests that economic ideas convinced the voters of the efficiency of free trade. By contrast, Irwin (1989) argues that a gradual loss of faith in Malthusian and Ricardian theories prompted the prime minister Robert Peel to convert to liberalism. By contrast, this paper focuses on another potential source of trade liberalization.

<sup>17</sup>An empirical study by Scheve and Slaughter (2001) provides indirect evidence for the view that real-estate ownership affects trade-policy preferences. Based on recent individual-level survey data for the United States, they confirm that trade barriers were more likely to be supported by individuals who owned houses in counties where industries with comparative disadvantages were concentrated. Home ownership in their study plays a similar role to that played by the ownership of agricultural land in this paper.

**Table 1** Import Tariff Levels in 1913 (percentage of value)

Country	Manufacturers	Wheat
Austria–Hungary	20	35
Belgium	9	0
Denmark	—	0
Finland	28	0
France	21	38
Germany	13	36
Italy	20	40
Netherlands	—	0
Norway	—	4
Portugal	—	prohibitive
Spain	34	43
Sweden	25	28
Switzerland	8	2
United Kingdom	0	0
Continental Europe	19	25

*Source.* Bairoch (1989, Table 9, p. 76 and Table 16, p. 139).

and O’Rourke 2001, p. 35). The general response to this ‘grain invasion’ was to protect domestic agricultural sectors to a greater extent than industrial sectors.

Evidence of this series of political backlashes can be observed in time-series and cross-sectional data. The time-series data illustrated in Figures 2(a)–2(b) show that several geographically large countries, such as Austria–Hungary, France, Germany, and Italy, were mainly raising tariffs during this epoch, whereas the United Kingdom, a geographically small country, was not.<sup>18</sup> In fact, the United Kingdom maintained free trade until 1932 (Bairoch 1989, Section VI). Turning to the cross-sectional data, the bottom row of Table 1 shows that continental Europe was on average more protectionist against imports of wheat than against imports of manufactured goods. This was the case in Austria–Hungary, France, Germany, Italy, Spain, Sweden, and, to some extent, Portugal. The United Kingdom, in sharp contrast, displayed considerable and widespread liberalism. The asymmetry in European political responses was initially identified by Kindleberger (1951, p. 33).

<sup>18</sup>Between the 1870s and the 1890s, the average tariff rate increased from 4.4% to 10.1% in France, and from 3.8% to 9.1% in Germany (Blattman et al. 2002, p. 5).

**Table 2** Net Exports, 1876–1880 and 1913: Actual Prices (\$ million)

Region	1876–1880		1913	
	Primary Products	Manufactures	Primary Products	Manufactures
United Kingdom	−1245	640	−1836	1150
NW Europe	−960	630	−2830	1523
Other Europe	235	−120	104	−555
USA and Canada	270	−90	559	−157
Oceania			326	−361
Latin America			936	−828
Africa	838*	−1250*	373	−425
Asia			843	−786

*Sources.* Findlay and O’Rourke (2001, Table 4, p. 66), originally from Lamartine Yates (1959, Tables A.19–A.22, p. 227–230).

\*Includes Oceania, Latin America, Africa, and Asia.

He argues that “the response of Germany, France, and Italy to the decline in the world price of wheat was to impose tariffs in an attempt to maintain the relative price of wheat and to protect grain producers,” whereas “Like Britain, the Netherlands, and Belgium, Denmark did not impose a tariff on wheat.” A plausible conjecture based on the time-series and cross-sectional data is that between the 1870s and 1913, core continental European countries generally became protectionist against foreign trade and that there was more protection of agriculture than industry.

The resurgence of protectionism was not sufficiently powerful to cause a return to the economic isolation that prevailed before the first period of globalization (Williamson 2002a, p. 4). As shown in Table 2, despite their proagricultural policies, Northwestern Europe and the United Kingdom remained net importers of primary products and net exporters of manufactured goods at the beginning this epoch, whereas the opposite is the case for all the other regions.

Two empirical observations are consistent with this article’s view that the retreat into protectionism was provoked in part by expansion of the working classes.<sup>19</sup> First, Figure 1 clearly illustrates that many European nations experienced a dramatic extension of the franchise around the end of the 19th century, which implies that the middle class was gaining political influence. Second, O’Rourke (1997) argues that the the-late-19th-century grain invasion had different welfare

<sup>19</sup>Because there are only two income classes in the economy analyzed below, in the context of the model, the term ‘workers’ includes small-scale capitalists, whose major source of income is wages.

effects on British and French workers. The article focuses on its two opposing impacts on real wages: the decline in grain prices and the rise in nominal wages. By utilizing computable general equilibrium models that have parameters based on empirical data, O'Rourke calculates that a negative shock on cereal prices raises real wages in France but reduces them in Britain, where the share of agricultural employment was much lower than in France (*ibid.*, p. 792). Given these results, this research shows that diverging political responses to the grain invasion is associated with the properties of agricultural production.

The protection of agricultural sectors continues, as was demonstrated at the World Trade Organization meeting in Mexico in 2003. Coppel and Durand (1999, Figure 1, p. 20) found evidence of stationary trends in producer support estimates (PSEs) in OECD countries' agricultural sectors between 1986 and 1998. During this period, the PSEs remained at about 40% in the European Union, at about 20% in the United States, and at about 60% in Japan; these levels are well above those prevailing in Australia and New Zealand (*ibid.*, p. 6). In contrast, trade liberalization in manufactured goods has been successful. Findlay and O'Rourke (2001, Table 5, p. 67) have documented the declining trend in average tariffs on manufactured goods for 27 major countries between 1913 and 1998. Intercontinental price gaps between 1950 and 2000 were cut by 76%, of which no less than 74% can be attributed to trade liberalization (Lindert and Williamson 2003, Table 5.1, p. 231). These reports suggest that manufacturing sectors are the major contributors to trade liberalization.

## 2.4 Summary

This historical evidence teaches one that a country's trade policy can vary over time in accordance with its stage of economic development. A country may even experience an ebb and flow in its trade policies during the growth process, as is evident from the political backlashes that occurred in 19th-century continental Europe. Another lesson is that the opening of an economy to international trade paves the way to modern growth by alleviating the economy's resource constraints. Hence, international trade appears to have a considerable influence on economic growth and living standards. These important points are confirmed by the theoretical analysis that follows.

### 3 The Model

Consider a two-good, two-sector economy operating over an infinite discrete-time horizon. The economy may take part in international trade in final goods, and the degree of trade protection is determined through the internal political process. Trade policies affect physical capital accumulation, which is the engine of economic growth. The levels of population and technology are stationary over time.<sup>20</sup>

#### 3.1 The Production of Final Goods

The production side is described as a standard specific-factors model. In perfectly competitive environments, an agricultural good is produced in one sector by employing land and labor, and a manufactured good is produced in the other sector by using capital and labor. Labor is perfectly mobile between sectors, and all the inputs are rented out by domestic households.

##### 3.1.1 The Agricultural Sector

This sector produces the agricultural good (staple food), which is both perishable and indispensable for survival. Production is based on CES technology. Let  $X_t$  and  $L_t^A$  denote the quantities of land and labor employed by this sector in period  $t$ . The output of the agricultural good produced in period  $t$ ,  $y_t^A$ , is then

$$y_t^A = F(X_t, L_t) = A[aX_t^\delta + (1-a)L_t^\delta]^{1/\delta}, \quad (1)$$

with  $A > 0$ ,  $a \in (0, 1)$  and  $\delta < 0$ . The parameter restriction imposed on  $\delta$  implies that  $\lim_{L_t \rightarrow 0} F_L(X, L_t) \equiv F_L(X, 0) < \infty$ ; that is, the marginal productivity of labor remains finite as the labor input approaches zero.<sup>21</sup> As shown subsequently, this property permits complete specialization in manufacturing in the later stages of economic development.<sup>22</sup>

Producers in period  $t$  maximize their profits given  $p_t$ , the price of the agricultural good,  $\pi_t$ , the rental price per unit of land, and  $w_t^A$ , the wage per unit of labor in period  $t$ . For convenience, the manufactured good is taken as the numeraire. This standard optimization problem is solved

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<sup>20</sup>Letting physical capital affect agricultural production would not alter the basic results, provided that the accumulation of aggregate capital caused labor to flow to the manufacturing sector.

<sup>21</sup> $F_i$  denotes the partial derivative of the function  $F$  with respect to argument  $i$ . In what follows, this notation applies to all functions.

<sup>22</sup>An economy that incorporates Cobb–Douglas technology would not completely specialize in manufacturing even at such a stage of development. In this case, the central argument of the paper could be maintained, but simplicity of exposition would be lost.

by maximizing  $p_t y_t^A - \pi_t X_t - w_t^A L_t$  with respect to  $X_t$  and  $L_t$ . Substituting a fixed land supply,  $X \in (0, 1)$ , into the resulting inverse demand functions yields

$$\begin{aligned}\pi_t &= p_t F_X(X, L_t); \\ w_t^A &= p_t F_L(X, L_t).\end{aligned}\tag{2}$$

### 3.1.2 The Manufacturing Sector

This sector produces the manufactured good, which can be consumed or stored, based on Cobb–Douglas technology. Let  $K_t$  be the aggregate quantity of capital employed by this sector in period  $t$ . Since the working population in each period is normalized to unity, the output of the manufactured good produced in period  $t$ ,  $y_t^M$ , is

$$y_t^M = M K_t^\alpha (1 - L_t)^{1-\alpha},\tag{3}$$

where  $\alpha \in (0, 1)$  and  $M > 0$  denotes the level of technology. As in the agricultural sector, producers in period  $t$  maximize their profits given  $w_t$ , the market wage per unit of labor, and  $r_t$ , the rental price per unit of physical capital, in period  $t$ . The market price of the manufactured good is normalized to unity. Therefore, their inverse demand functions are

$$\begin{aligned}r_t &= \alpha M k_t^{\alpha-1} \equiv r(k_t); \\ w_t &= (1 - \alpha) M k_t^\alpha \equiv w(k_t),\end{aligned}\tag{4}$$

where  $k_t \equiv K_t/(1 - L_t)$  is the ratio of capital to labor employed in the manufacturing sector, not the capital–labor ratio for the aggregate economy. For simplicity, it is assumed that physical capital depreciates completely after being used.

### 3.1.3 The Allocation of Labor

Because of perfect labor mobility, market wages are equalized across operating sectors. Wage equalization does not hold only if complete specialization occurs. The properties of the aggregate production functions reveal that for any  $K_t > 0$ ,

$$w(K_t/(1 - L_t)) \geq p_t F_L(X, L_t),\tag{5}$$

where the inequality holds strictly only if  $L_t = 0$ . The wage equality implies that  $y_t^M > 0$  as long as the economy has a positive amount of capital. Because of the bounded marginal productivity of labor, by contrast, agricultural production may not occur depending on the capital stock.

Let  $p_t^{\min}$  be the critical price for which the equality in (5) holds at  $L_t = 0$ . That is to say,  $p_t^{\min} \equiv w(K_t)/F_L(X, 0)$ . It follows that the labor force in agriculture is described by a single-valued function such that,

$$L_t = L(K_t, p_t) \begin{cases} = 0 & \text{if } 0 < p_t \leq p_t^{\min}; \\ \in (0, 1) & \text{if } p_t > p_t^{\min} > 0, \end{cases} \quad (6)$$

where  $L_K(\cdot) < 0$  and  $L_p(\cdot) > 0$  in the second case (i.e., incomplete specialization). The economic intuition behind these partial derivatives is worth emphasizing. First, capital accumulation raises the wage rate in industry, and thus causes labor to flow from agriculture. Second, a rise in the relative price increases the marginal productivity of labor, and thereby labor demand in agriculture.

Given (1) and (3), the market value of aggregate output in period  $t$  is expressed as

$$y_t = p_t F(X, L_t) + MK_t^\alpha (1 - L_t)^{1-\alpha} \equiv y(K_t, p_t), \quad (7)$$

where  $L_t = \arg \max y_t$  because of the wage equalization in (5). It follows that  $y_K(\cdot) = R_t > 0$  and  $y_p(\cdot) = y_t^A \geq 0 \forall (K_t, p_t) \gg 0$ ; namely, both capital and the relative price have only direct effects on aggregate output.

Using (6), the industrial capital–labor ratio is

$$k_t = \frac{K_t}{1 - L(K_t, p_t)} \equiv k(K_t, p_t). \quad (8)$$

In light of (5), the function  $k(K_t, p_t)$  is single-valued and has properties such that,  $\forall (K_t, p_t) \gg 0$ ,

$$k_K(\cdot) > 0; \quad k_p(\cdot) \geq 0; \quad \lim_{K_t \rightarrow \infty} k(\cdot) = \infty,$$

where  $k_p(\cdot) > 0$  if  $p_t > p_t^{\min}$ . Note that a rise in the capital stock increases the capital–labor ratio in industry  $k_t$ , despite the increased labor employment in the manufacturing sector. Furthermore,  $k_p(\cdot)$  has a positive sign because a rise in the relative price of food improves the marginal productivity of agricultural labor, inducing a labor outflow from the industrial sector.

## 3.2 Individuals

### 3.2.1 The Environment

A new generation, consisting of a continuum of individuals, is born at the beginning of every period and lives for one period. The population size of each generation is normalized to unity.

Individuals may differ in their initial endowments, but they are homogeneous in all other respects. An individual born in period  $t$  is referred to as a member  $i \in [0, 1]$  of generation  $t$ .

Each member supplies one unit of labor inelastically. In addition to the wage income, there are two potential sources of income: First, members may earn interest from the capital stock bequeathed by his/her single parent. Second, those who own land are paid rent by producers in the agricultural sector. To keep the model tractable, suppose that there is no market for land ownership; it is inherited from parents to their children. To summarize, the income of a member  $i$  of generation  $t$ ,  $I_t^i$ , is

$$I_t^i = w_t + r_t k_t^i + \pi_t x^i, \quad (9)$$

where  $k_t^i \geq 0$  and  $x^i \geq 0$  denotes the levels of capital and land, respectively, owned by the individual.

### 3.2.2 Optimization

As mentioned in the introduction, this paper considers an extreme case of Engel's Law: Individuals spend their incomes exclusively on the agricultural good, which is thought of as staple food, up to a saturation level of  $\hat{c} > 0$ . It follows that the food consumption of a member  $i$  of generation  $t$ , is

$$\begin{aligned} c_t^i &= I_t^i/p_t & \text{if } I_t^i \leq p_t \hat{c}; \\ c_t^i &= \hat{c} & \text{if } I_t^i > p_t \hat{c}, \end{aligned} \quad (10)$$

where the first expression applies when the aforementioned "food constraint" is binding. In the second case above, any remaining income is spent on the manufactured good, which is used for  $m_t^i$ , household consumption, and  $k_{t+1}^i$ , a capital transfer to the child (born in period  $t + 1$ ). They are determined as a result of utility maximization:

$$\{m_t^i, k_{t+1}^i\} = \arg \max[(1 - \beta) \ln m_t^i + \beta \ln(\bar{\theta} + k_{t+1}^i)], \quad (11)$$

where  $\beta \in (0, 1)$  and  $\bar{\theta} > 0$ . The positivity of  $\beta$  implies that bequeathing is motivated by the 'joy of giving'. The budget constraint in this case is given by

$$z_t^i \equiv I_t^i - p_t \hat{c} \geq m_t^i + k_{t+1}^i.$$

It follows that

$$\begin{aligned}
m_t^i &= \begin{cases} z_t^i & \text{if } 0 \leq z_t^i < \theta; \\ (1 - \beta)(z_t^i + \bar{\theta}) & \text{if } z_t^i \geq \theta; \end{cases} \\
k_{t+1}^i &= \begin{cases} 0 & \text{if } z_t^i < \theta; \\ \beta(z_t^i - \theta) & \text{if } z_t^i \geq \theta, \end{cases}
\end{aligned} \tag{12}$$

where  $\theta \equiv \bar{\theta}(1 - \beta)/\beta > 0$ . Note that, because of  $\bar{\theta} > 0$  in (11), low-income households prefer consuming the manufactured good to bequeathing it to their offspring.

Let  $v_t^i$  be the indirect utility of a member  $i$  of generation  $t$ . Then in light of (10) and (12), one may write

$$v_t^i = \begin{cases} I_t^i/p_t & \text{if } z_t^i < 0; \\ (1 - \beta) \ln z_t^i + \beta \ln \bar{\theta} & \text{if } 0 \leq z_t^i < \theta; \\ \ln(z_t^i + \bar{\theta}) + \varepsilon & \text{if } z_t^i \geq \theta, \end{cases} \tag{13}$$

where  $\varepsilon \equiv (1 - \beta) \ln(1 - \beta) + \beta \ln \beta$ .

### 3.3 The Initial States of the Economy

In period 0, there are two income groups,  $R$  (Rich) and  $P$  (Poor), which respectively comprise the fixed fractions  $\lambda \in (0, 1)$  and  $1 - \lambda$  of adult individuals. Land and capital are distributed equally within group  $R$ , whereas group  $P$  is proletarian; i.e.,  $x^R > x^P = 0$  and  $k_0^R > k_0^P = 0$ . Because there is no within-group heterogeneity, their descendants can be fully identified by  $i = P, R$  in each period.

The economy begins operating under an agrarian, closed system in which much of the labor force is employed in agriculture. It is assumed that the initial level of agricultural labor,  $\bar{L}$ , is sufficiently high to satisfy

$$1 - \alpha^{\frac{1}{1-\alpha}}(1 - \hat{L}) \leq \bar{L} < 1, \tag{A1}$$

where  $\hat{L} > 0$  is defined as the critical level for which the food constraint is just binding for wage workers; namely,  $F_L(X, \hat{L}) = \hat{c}$ . Since the first inequality in (A1) implies  $\hat{L} < \bar{L}$ , it follows that  $F_L(X, \bar{L}) < \hat{c}$ . Namely, underprivileged workers cannot afford to purchase the manufactured good until the economy opens up to international trade. The low wage rate is a result of the concentrated allocation of labor towards the agricultural sector.

Lemmas 9-10 in the Appendix show that, under these circumstances, the market-clearing condition for the agricultural good is

$$F(X, \bar{L}) = \lambda \hat{c} + (1 - \lambda) F_L(X, \bar{L}), \quad (14)$$

where  $\bar{L}$  is uniquely determined. Since  $F(X, \bar{L}) < \hat{c}$  in (14), the capacity of domestic agriculture is not large enough for producing  $\hat{c}$  units of food in one period. As follows from (5), the relative price in period 0 is given by  $p_0 = w(K_0/(1 - \bar{L}))/F_L(X, \bar{L})$ .

### 3.4 The Evolution of Capital

In the absence of opportunities for international lending and borrowing, aggregate capital in period  $t$  equals the total amount of bequests left to generation  $t$ . Hence,

$$K_t = \lambda k_t^R + (1 - \lambda) k_t^P, \quad (15)$$

implying that  $k_t^R$  is determined by  $K_t$  and  $k_t^P$ . Furthermore, as explained in Section 3.1, the factor prices ( $w_t, r_t$ , and  $\pi_t$ ) are completely determined by  $k_t = k(K_t, p_t)$ . Therefore, it follows from (9) that

$$\begin{aligned} I_t^i &= I(K_t, k_t^i, x^i, p_t) \equiv I^i(K_t, k_t^P, p_t); \\ z_t^i &= I^i(K_t, k_t^P, p_t) - p_t \hat{c} \equiv z^i(K_t, k_t^P, p_t). \end{aligned} \quad (16)$$

Because of the linear homogeneity of the production functions, aggregate income in period  $t$  is allocated entirely to the members of generation  $t$ . That is to say,

$$y_t = \lambda I_t^R + (1 - \lambda) I_t^P, \quad (17)$$

where  $I_t^P < y_t < I_t^R$  if  $k_t^P < K_t < k_t^R$  in (15), because of land inequality between the two groups.

Hence, given the initial inequality in capital ownership ( $K_0 > k_0^P = 0$ ), equation (12) implies

$$K_t \geq k_t^P \quad \forall t \geq 0, \quad (18)$$

where the equality holds only if  $K_t = 0$ . In other words, the capital stock of group  $P$  is not greater than the average level in any period. This between-group inequality appears plausible, given the historical evidence, and enables an examination of the effects of international trade on different income classes.

These results reveal that the evolution of  $(K_t, k_t^P)$  is given by

$$\begin{aligned}
K_{t+1} &= \left\{ \begin{array}{ll} \beta \max [y_t - (1 - \lambda)I_t^P - \lambda(p_t \hat{c} + \theta), 0] & \text{if } z_t^P \leq \theta \\ \beta(y_t - p_t \hat{c} - \theta) > 0 & \text{if } z_t^P > \theta \end{array} \right\} \\
&\equiv \phi(K_t, k_t^P, p_t); \\
k_{t+1}^P &= \beta \max (z_t^P - \theta, 0) \equiv \psi(K_t, k_t^P, p_t),
\end{aligned} \tag{19}$$

where  $K_0 > k_0^P = 0$  and  $p_0 = w(K_0/(1 - \bar{L}))/F_L(X, \bar{L})$ .

### 3.5 The Political System

Every period, the economy makes a decision on its trade policy, which has no effects on the world market prices. The government only uses tariffs for protection, and tariff revenues are not rebated to individuals but are spent on consumption by the government. Regardless of the trade policy of the home economy, the world economy does not impose restrictions on trade.

Suppose that the small-open economy has a comparative advantage in manufacturing in international markets, in which the relative price of food is constant at  $p^w > 0$ . Let  $p_t^c$  denote the autarkic price in period  $t$ . Then the domestic price falls to a level that is on the interval  $[p^w, p_t^c] \equiv \mathbf{p}_t$ , depending on the tariff level levied by the government. It follows from (13) that the preferred price for a member  $i$  of generation  $t$ , denoted as  $p_t^i$ , is

$$p_t^i = \begin{cases} \arg \max_{p_t \in \mathbf{p}_t} [I^i(K_t, k_t^P, p_t)/p_t] & \text{if } z^i(K_t, k_t^P, p_t) \leq 0 \ \forall p_t \in \mathbf{p}_t; \\ \arg \max_{p_t \in \mathbf{p}_t} z^i(K_t, k_t^P, p_t) & \text{otherwise.} \end{cases} \tag{20}$$

This indicates that the individual's preferred trade policy varies with the level of  $z_t^i \equiv I_t^i - p_t \hat{c}$ , which determines her/his consumption bundle.

The economy operates under a political system in which majority voting determines the trade policy that is implemented while voters are alive. While group  $P$  is assumed to be the majority, only individuals whose parents' incomes exceed some threshold have the franchise. For simplicity, suppose that<sup>23</sup>

$$p_t = \begin{cases} p_t^R & \text{if } z_{t-1}^P \leq 0; \\ p_t^P & \text{if } z_{t-1}^P > 0. \end{cases} \tag{21}$$

This framework implies that one of two political regimes emerges during the process of economic development. Under Regime I, the first case in (21), the food constraint is binding for group  $P$  and,

<sup>23</sup>Note that  $z_{t-1}^R > 0$  as long as  $K_t > 0$ , because (12), (15) and (18) show that  $k_t^R = \beta(z_{t-1}^R - \theta) > 0$  if  $K_t > 0$ .

thus, political decisions are made by group  $R$ . Under Regime II, the second case in (21), capital accumulation keeps group  $P$  wealthy enough for their political participation. As will become apparent, the evolution of the economy under each regime is governed by a two-dimensional, first-order, autonomous dynamical system for  $K_t$  and  $k_t^P$ .

## 4 Trade Policy in the Growth Process

This section analyzes the evolution of the land-scarce economy and the associated ebb and flow of protectionism reflecting gradual changes in individual trade-policy preferences and an extension of the franchise. It is shown that although the economy eventually liberalizes foreign trade, it may go through a stage of protectionism between two surges of liberalism. As shown below, this nonmonotonic transition of trade policies is consistent with the experience of Western Europe presented in Section 2.

Each of Regimes I and II encompasses two phases of trade policy. Regime I-A is an underdeveloped stage that is characterized by protectionism and political conflict. Members of group  $P$  (the landless class) are wage workers who can only afford staple food, and thus they desire trade liberalization. However, because they are not sufficiently wealthy to have voting rights, political decisions are made by members of group  $R$  (the landed class), who support anti-industrial policies that protect their gains from owning land.

Trade liberalization takes place and class conflict dissipates under Regime I-B. The accumulated capital stock raises the relative importance of capital in landowners' portfolios and thereby induces them to vote for proindustrial, liberal policies. Hence, despite the fact that landless workers have no voting rights, the economy opens up to international trade, which allows them more staple food. Although the landless cannot afford the manufactured good yet, their food consumption increases during the industrialization process.

Regime II-A is a semideveloped stage in which there could be a resurgence of protectionism. Now that sufficiently high wages allow members of group  $P$  to consume the manufactured good as well as staple food (i.e., the food constraint is not binding), they take into account the effects of trade policy on the consumption of both goods. In this circumstance proindustrial policies may not benefit these wage workers, because the resulting labor inflow to the manufacturing sector reduces the wage rate in terms of the manufactured good. Their political influence arising in this stage may

bring the economy back to protectionism.

Under Regime II-B, the economy eventually reaches a highly developed stage that features established liberalism and an absence of political conflict. Since members of group  $P$  start savings, the interest rate becomes an additional factor through which trade policy affects their incomes. The negative effect of trade protection on the interest rate counteracts the accompanying positive effect on wages (in terms of the manufactured good). For this reason, individuals with sufficient capital prefer free trade.

#### 4.1 Regime I: Dominance of the Landed Class

Under this monolithic regime, both political power and economic resources are in the hands of landowners, whereas other members of society have no voting rights and spend all their wages on consuming food. As a result, the domestic price level solely reflects landlords' preferences; i.e.,  $p_t = p_t^R$ . The economy opens up to international trade in the second stage of Regime I, and then living standards among the poor begin to improve.

##### 4.1.1 The Trade Policy Preferences of Group $R$

Under Regime I, members of group  $P$  receive no bequests from their parents, and thus earn only wage incomes. In this circumstance, as shown by (14), members of group  $R$  can afford  $\hat{c}$  units of food at least under autarky. Thus (17) and (20) reveal that the preferred price for each member of group  $R$  is, for  $K_t > k_t^P = 0$ ,

$$p_t^R = \arg \max_{p_t \in \mathbf{P}_t} \lambda z^R(K_t, 0, p_t) = y(K_t, p_t) - (1 - \lambda)\omega(K_t, p_t) - \lambda p_t \hat{c}, \quad (22)$$

where  $\omega(K_t, p_t) \equiv w(k(K_t, p_t)) = I_t^P$  and  $p_t^c = w(K_t/(1 - \bar{L}))/F_L(X, \bar{L})$ .

First consider the case of complete specialization. Note that  $z_p^R(K_t, 0, p_t) = -\hat{c} < 0$  if  $p_t \in (0, p_t^{\min})$  and thus  $L(K_t, p_t) = 0$ . This property is straightforward because, as long as  $p_t$  is on this interval, trade protection merely raises the cost of food consumption with no effect on the labor allocation.

Second, in the case of incomplete specialization ( $0 < L_t < 1$ ), equations (7) and (39) in the Appendix show that

$$\lambda z_p^R(K_t, 0, p_t) = y_t^A - (1 - \lambda)\gamma_t F_L(X, L_t) - \lambda \hat{c}, \quad (23)$$

where  $\gamma_t \in (0, 1)$  equals the elasticity of  $w_t$  with respect to  $p_t$ . It then follows from (14) that  $\lambda z_p^R(K_t, 0, p_t^c) > 0$ , implying the local optimality of the autarkic policy (from the viewpoint of group  $R$ ).

The following analysis focuses on the case of corner solutions, so that landlords make a bilateral choice between free trade and autarky. For this purpose, the objective function in (22) is assumed to be strictly convex; i.e.,

$$z_{pp}^R(K_t, 0, p_t) > 0 \quad \text{if } 0 < L(K_t, p_t) \leq \bar{L}. \quad (\text{A2})$$

As shown by Lemma 11 in the Appendix, (A2) is satisfied if the share of capital income is sufficiently large.

Let  $\check{K} > 0$  be a critical level of  $K_t$  for which the agricultural employment level under free trade equals the autarkic level; i.e.,  $L(\check{K}, p^w) = \bar{L}$ . Then, in light of (6),

$$L(K_t, p^w) < \bar{L} \quad \forall K_t > \check{K},$$

implying that  $p^w < w(K_t/(1 - \bar{L}))/F_L(X, \bar{L})$ . Thus, as long as aggregate capital is greater than  $\check{K}$ , trade liberalization pulls labor out of agriculture and thereby promotes industrialization. In this case the economy imports the agricultural good.

Let  $\hat{K} (> \check{K})$  be a critical value for which the food constraint is just binding for group  $P$ ; i.e.,  $L(\hat{K}, p^w) = \hat{L}$ . As asserted below,  $\hat{K}$  units of capital is sufficient for inducing group  $R$  to support trade liberalization.

**Lemma 1** *Under (A1)-(A2),  $\check{K}$ ,  $\hat{K}$ , and a value  $\tilde{K} \in (\check{K}, \hat{K})$  satisfy*

$$z^R(K_t, 0, p^w) - z^R(K_t, 0, p_t^c) \begin{cases} < 0 & \text{for } K_t \in (\check{K}, \tilde{K}); \\ = 0 & \text{for } K_t = \tilde{K}; \\ > 0 & \text{for } K_t \geq \hat{K}. \end{cases}$$

*Proof.* See the Appendix. □

Thus, trade liberalization benefits members of group  $R$  if (i) the agricultural sector needs a large amount of labor under autarky, (ii) they own enough amounts of capital, and (iii) the share of capital income,  $\alpha$ , is sufficiently large. Under these conditions, trade liberalization would cause a substantial shift of labor from agriculture to industry, so that the increase in capital income,

$\alpha y_t^M$ , outweighs the cost of decreased rents,  $\rho_t X$ . Without these conditions they would stick to anti-industrial policies.

These results are illustrated by Figure 3. For simplicity, the figure depicts the situation in which there is a one-off reversal of trade policy preferences on the interval  $(\check{K}, \infty)$ . The focus here is on the interval  $(\check{K}, \infty)$ , where the economy has a comparative advantage in manufacturing. Given a capital stock  $K_t \in (\check{K}, \tilde{K})$ , landlords support the anti-industrial autarkic policy, whereas those with  $K_t > \tilde{K}$  prefer free trade.<sup>24</sup>

#### 4.1.2 Regime I-A: Opposition to Free Trade

The economy develops under Regime I-A in period  $t \in [0, \tilde{t})$ , where  $\tilde{t}$  is the period in which  $K_t$  exceeds  $\tilde{K}$  for the first time (i.e.,  $K_t \leq \tilde{K} \forall t \in [0, \tilde{t})$  and  $K_t > \tilde{K}$  for  $t = \tilde{t}$ ). In this initial development stage, the landed interests resist trade liberalization in order to protect their income sources in agriculture. The resulting autarkic policy, however, is not desirable for wage workers.

**The Evolution of the Economy** In light of Lemma 1,<sup>25</sup>

$$p_t^R = p_t^c \quad \text{if } K_t \in [\check{K}, \tilde{K}] \text{ and } k_t^P = 0.$$

Thus it follows from (14) and (19) that if  $K_t \in [\check{K}, \tilde{K}]$  and  $k_t^P = 0$  in Regime I,

$$\begin{aligned} K_{t+1} &= \phi(K_t, 0, p_t^c) = \beta \max [MK_t^\alpha (1 - \bar{L})^{1-\alpha} - \lambda\theta, 0]; \\ k_{t+1}^P &= \psi(K_t, 0, p_t^c) = \beta \max \{p_t^c [F_L(X, \bar{L}) - \hat{c}] - \theta, 0\} = 0, \end{aligned} \tag{24}$$

where  $p_t = w(K_t/(1 - \bar{L}))/F_L(X, \bar{L})$ .

Note that as long as the economy is closed, the food constraint is binding on wage workers and their children have no voting rights. This autarkic, inegalitarian situation persists until  $K_t$  rises above  $\tilde{K}$  to alter the landlords' negative stance to trade liberalization.

In order to analyze the aforementioned four stages of trade policy, the following analyses are based on two conditions. First, (24) yields the accumulation of aggregate capital on some interval:

$$\beta[MK_t^\alpha (1 - \bar{L})^{1-\alpha} - \lambda\theta] > K_t, \tag{A3}$$

<sup>24</sup>Lemma 1 does not deny the existence of a capital stock  $K_t \in (\tilde{K}, \hat{K})$  for which landlords are indifferent between free trade and autarky. For simplicity, landlords are assumed to support free trade when  $K_t \in (\tilde{K}, \hat{K})$ . As will become clear, this simplification does not affect the central thesis of the paper.

<sup>25</sup>Without loss of generality, it is assumed that landlords stick to the autarkic policy when  $K_t = \tilde{K}$ .

for  $K_t = \check{K}$  and  $K^{\max}$ , which is a value such that  $w(K^{\max}) = p^w F_L(X, 0) + \theta$ .<sup>26</sup> Noting the definition of  $\hat{K}$  and Lemma 1, one finds that, as depicted in Figure 3,<sup>27</sup>

$$\check{K} < \tilde{K} < \hat{K} < K^{\max}. \quad (25)$$

Second, the initial capital stock is given by

$$K_0 \in (\check{K}, \tilde{K}), \quad (A4)$$

implying that in period 0, (a) the economy imports food in exchange for the manufactured good, and (b) the autarkic policy is desirable for group  $R$ .

Under these circumstances, aggregate capital  $K_t$  grows monotonically under autarky and ultimately exceeds the critical level  $\tilde{K}$ —an event that changes landlords' trade preferences. Despite the accompanying growth in aggregate output, the autarkic policy prevents a rise in the wage rate in terms of food, and thereby an improvement in the welfare of group  $P$ . The low wage rate is a result of the concentrated allocation of labor towards the (small-scale) agricultural sector.

**Political Conflict** The first phase of Regime I is characterized by political conflict between the two income classes. Trade liberalization benefits the members of group  $P$ , who care only about food consumption, because specialization in manufacturing boosts the wage rate in terms of the agricultural good,  $F_L(X, L_t)$ . Despite the desirability of free trade for group  $P$ , the economy remains closed under Regime I-A to enable landlords to secure their gains from agriculture. Proposition 1 below summarizes the discussion.

**Proposition 1** *Under (A1)-(A4), there is between-group conflict over trade policy (i.e.,  $p_t^R = p_t^c > p_t^P = p^w$ ) for  $t \in [0, \hat{t})$ .*

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<sup>26</sup>Since  $w(\check{K}/(1 - \bar{L})) = p^w F_L(X, \bar{L})$ , it follows from (4) that

$$\check{K} = \left[ \frac{p^w F_L(X, \bar{L})}{(1 - \alpha)M} \right]^{1/\alpha} (1 - \bar{L}) < K^{\max} = \left[ \frac{p^w F_L(X, 0) + \theta}{(1 - \alpha)M} \right]^{1/\alpha}.$$

Hence, given a fixed value  $\bar{L} \in (0, 1)$ , the inequality in (A3) holds if  $\alpha$  and  $M$  are sufficiently large while  $(1 - \alpha)M$  is constant. Since controlling  $M$  has no effect on (A1)-(A2), Lemmas 10-11 in the Appendix ensure that there exists a set of structural parameters that satisfy (A1)-(A3).

<sup>27</sup>Since  $\hat{K}$  is such that  $w(\hat{K}/(1 - \hat{L})) = p^w F_L(X, \hat{L})$ , it follows that  $w(\hat{K}) < p^w F_L(X, 0) < w(K^{\max})$  and thus  $\hat{K} < K^{\max}$ .

### 4.1.3 Regime I-B: The First Wave of Liberalization

The economy develops under free trade on the time interval  $[\tilde{t}, \hat{t}]$ , where  $\hat{t}$  is the period in which aggregate capital exceeds the critical level  $\hat{K}$  for the first time; i.e.,  $K_t \leq \hat{K}$  for  $t \in [0, \hat{t})$  and  $K_t > \hat{K}$  for  $t = \hat{t}$ . Although the living standards of group  $P$  begin to improve, the political power is still wielded by group  $R$ .

**The Evolution of the Economy** As shown by Lemma 1 and Figure 3, landlords who own sufficient capital prefer proindustrial liberal policies. More precisely,

$$p_t^R = p^w \quad \text{if } K_t > \tilde{K} \text{ and } k_t^P = 0. \quad (26)$$

Thus it follows from (19) that if  $K_t \in (\tilde{K}, \hat{K}]$  and  $k_t^P = 0$  in Regime I,

$$\begin{aligned} K_{t+1} &= \phi(K_t, 0, p^w) = \beta \max [y(K_t, p^w) - (1 - \lambda)\omega(K_t, p^w) - \lambda(p^w \hat{c} + \theta), 0], \\ k_{t+1}^P &= \psi(K_t, 0, p^w) = \beta \max [\omega(K_t, p^w) - p^w \hat{c} - \theta, 0] = 0, \end{aligned} \quad (27)$$

where  $\omega(K_t, p^w) \leq p^w \hat{c}$ . In this case, (21) and (26) show that  $p_{t+1} = p_{t+1}^R = p^w$ . Therefore, the free trade policy is pursued by the landed class on the time interval  $[\tilde{t}, \hat{t}]$ .

Note that free trade is the optimal policy for promoting aggregate capital accumulation and for economic growth, as  $p^w$  is the preferred price for the group leaving bequests (i.e. group  $R$ ). Therefore, the condition (A3) is enough to ensure that  $K_t$  grows monotonically and ultimately exceeds  $\hat{K}$  in period  $\hat{t}$ . The resulting growth in the wage rate  $\omega(K_t, p^w)$  triggers political participation by group  $P$  in period  $\hat{t} + 1$ . Unlike before, the living standards of group  $P$  improve under Regime I-B.

**Political Conflict** Class conflict dissipates in this second stage of Regime I: the two income groups agree on trade policy, even though the franchise is limited to group  $R$ . Opening up to international trade promotes the employment in the industrial sector, and thus leads to a collapse of the inegalitarian equilibrium (14). The resultant improvement in the wage in terms of food,  $F_L(X, L_t)$ , benefits the members of group  $P$ , who are interested only in food consumption until period  $\hat{t}$ . For this reason, the liberal policy pursued under Regime I-B is desirable all members of the economy. The discussion is summarized below.

**Proposition 2** *Under (A1)-(A4), there is no political conflict, and free trade is preferred by all individuals (i.e.,  $p^w = p_t^R = p_t^P$ ) for all  $t \in [\tilde{t}, \hat{t}]$ .*

## 4.2 Regime II: The Rise of the Working Class

Regime II is characterized by the political participation of group  $P$ , on which the food constraint is no longer binding (i.e.  $z_t^P > 0$ ). This landless group becomes the major political power, and the domestic price level fully reflects its preferences (i.e.  $p_t = p_t^P$ ).

### 4.2.1 The Trade Policy Preferences of Group $P$

Since  $\omega(\hat{K}, p^w) = p^w \hat{c}$ , as long as  $K_t$  is higher than  $\hat{K}$  the food constraint is not binding on group  $P$  at least under free trade. Then it follows from (20) that under Regime II, where  $K_t > \hat{K}$ , the preferred price for the members of group  $P$  is

$$p_t^P = \arg \max_{p_t \in \mathbf{P}_t} z^P(K_t, k_t^P, p_t) = \omega(K_t, p_t) + \rho(K_t, p_t) k_t^P - p_t \hat{c}, \quad (28)$$

implying that  $z^P(K_t, k_t^P, p_t^P) \geq z^P(K_t, 0, p^w) > 0$ .

Now that they consume the manufactured good as well as staple food, there are two opposing effects of trade protection on their welfare. On the positive side, trade protection improves the purchasing power for the manufactured good by raising the wage rate,  $w_t$ . On the negative side, it reduces the interest rate,  $r_t$ , and raises the cost of food consumption,  $p_t \hat{c}$ .

Those opposing forces are found in the expression of  $\partial I_t^P / \partial p_t$ . Using (4) and (39) in the Appendix shows that, under incomplete specialization (i.e.,  $0 < L_t < 1$ ),

$$\omega_p(K_t, p_t) + \rho_p(K_t, p_t) k_t^P = \gamma_t F_L(X, L_t) [1 - (1 - L_t) k_t^P / K_t], \quad (29)$$

where  $\gamma_t \in (0, 1)$  equals the elasticity of  $w_t$  with respect to  $p_t$ . This shows that  $\partial z_t^P / \partial p_t$  may or may not be greater than zero, depending on the levels of  $\gamma_t$ ,  $L_t$ , and  $k_t^P / K_t$ . The opposition against free trade arises from group  $P$  provided that  $z_p^P(K_t, k_t^P, p^w) > 0$ , where  $p^w \geq p_t^{\min}$ .<sup>28</sup>

**Lemma 2**  $L(K_t, p_t^P) < \hat{L}$  if  $K_t > \hat{K}$ .

*Proof.* Under the assumption,  $p_t^P$  is given by (28) and satisfies  $z^P(K_t, k_t^P, p_t^P) > 0$ . Since  $\hat{L} \in (0, 1)$  is such that  $F_L(X, \hat{L}) = \hat{c}$ , the wage equalization (5) reveals that  $w_t > p_t \hat{c}$  only if  $L_t < \hat{L}$ . Moreover, the interest rate  $r(K_t / (1 - L_t))$  is inversely correlated with  $L_t$ . Therefore,  $L(K_t, p_t^P)$  must be lower than  $\hat{L}$  so that  $z^P(K_t, k_t^P, p_t^P) > 0$ .  $\square$

<sup>28</sup>If  $p^w \in (0, p_t^{\min})$ , then  $L_p(K_t, p^w) = 0$  and thus  $z_p^P(K_t, k_t^P, p^w) = -\hat{c}$ . In this case, free trade is at least locally optimal for group  $P$ .

Therefore, as long as  $K_t$  is greater than  $\hat{K}$ , the food constraint is not binding for group  $P$  and their children have voting rights; i.e.,  $p_{t+1} = p_{t+1}^P$  if  $K_t > \hat{K}$ .

#### 4.2.2 Regime II-A: Political Backlash

The economy develops in Regime II-A on the time interval  $(\hat{t}, t^*]$ , where  $t^*$  is the period in which aggregate capital exceeds a critical level  $K^*$  for the first time; i.e.,  $K_t \leq K^*$  for  $t \in [0, t^*)$  and  $K_t > K^*$  for  $t = t^*$ . In this regime, members of group  $P$  obtain suffrage for the first time, and their growing demands for the manufactured good may trigger a resurgence of protectionism in agriculture. On the other hand, these enfranchised workers are not wealthy enough to make transfers to their offspring (until period  $t^*$ ).

**The Evolution of the Economy** Let  $K^*( > \hat{K} )$  be the minimum level of aggregate transfers above which workers bequeath to their offspring; that is,  $\omega(K^*, p^*) = p^* \hat{c} + \theta$ , where  $p^* = \arg \max_{p \in \mathbf{p}_t} [\omega(K^*, p) - p \hat{c}]$ . Since  $\omega(\hat{K}, p^w) = p^w \hat{c}$  and  $w(K^{\max}) = p^w F(X, 0) + \theta$ , it follows that

$$\hat{K} < K^* < K^{\max}. \quad (30)$$

Equation (19) indicates that if  $K_t \in (\hat{K}, K^*]$  and  $k_t^P = 0$  in Regime II,

$$\begin{aligned} K_{t+1} &= \phi(K_t, 0, p_t^P) = \beta \max [y(K_t, p_t^P) - (1 - \lambda)\omega(K_t, p_t^P) - \lambda(p_t^P \hat{c} + \theta), 0]; \\ k_{t+1}^P &= \psi(K_t, 0, p_t^P) = \beta \max [\omega(K_t, p_t^P) - p_t^P \hat{c} - \theta, 0] = 0, \end{aligned} \quad (31)$$

where  $p_t^P$  is given by (28).<sup>29</sup>

**Lemma 3** *Under (A1) and (A3),  $\phi(K_t, 0, p_t^P) > K_t$  if  $K_t \in (\hat{K}, K^*]$ .*

*Proof.* Equation (5) and Lemma 2 show that if  $K_t > \hat{K}$ , then  $L(K_t, p_t^P) < \hat{L}$  and  $\omega(K_t, p_t^P) > p_t^P \hat{c}$ . Thus it follows from (A1) that in (31),  $y(K_t, p_t^P) - (1 - \lambda)\omega(K_t, p_t^P) - \lambda p_t^P \hat{c} > \alpha M K_t^\alpha (1 - \hat{L})^{1-\alpha}$ . Hence (A3) establishes the result by noting (25) and (30).  $\square$

This property for (31) ensures that aggregate capital grows monotonically to reach, then ultimately exceed, the critical level  $K^*$ . Hence the economy departs Regime II-A, despite the fact that  $p_t^P$  is not necessarily the optimal price for aggregate capital accumulation. Since aggregate capital

<sup>29</sup>The equations in (31) also hold for  $t = \hat{t}$  (the last period of Regime I), in which  $p_t^R = p_t^P$  as shown by Proposition 2.

remains greater than  $\hat{K}$ , Lemma 2 reveals that  $F_L(X, L_t) > \hat{c}$  and thus members of group  $P$  retain voting rights.

Under these circumstances, (28) and (29) show that group  $P$  does not vote for free trade if  $\gamma_t$  evaluated at  $p_t = p^w$  is sufficiently large.

**Lemma 4** (a)  $\lim_{\delta \rightarrow -\infty} \gamma_t = 1$  if  $0 < L_t < X$ , and (b)  $\gamma_t$  increases with  $X > 0$ .

*Proof.* See the Appendix. □

Figure 4 depicts the agricultural production function incorporating a small  $\delta$  (i.e., a low elasticity of substitution between  $X$  and  $L_t$ ) on the range  $L_t > 0$ . As is well known, the production function in this case is analogous to the Leontief type: It is observed that the wage rate in terms of food,  $F_L(X, L_t)$ , is overall inelastic, yet declines significantly once  $L_t$  exceeds  $X$ . This implies that  $F_L(X, L_t) > \hat{c}$  only if  $L_t < X$ .

Thus, in the early stages of Regime II-A, where  $K_t$  is slightly larger than  $\hat{K}$ , agricultural employment under free trade,  $L(K_t, p^w)$ , is positive but smaller than  $X$ . In this situation, the adverse effect of trade protection (a marginal deviation from the no-tariff price  $p^w$ ) on food consumption is relatively small and, hence, the landless wage workers prefer a protectionist policy that balances the consumption of the two goods,  $c_t^i$  and  $m_t^i$ . These results and Lemma 4 establish the following proposition:

**Proposition 3** *Under (A1)-(A4), the economy tends to adopt a protectionist policy (i.e.,  $p_t > p^w$ ) in period  $t \in (\hat{t}, t^*]$  if the agricultural production features (a) a low elasticity of substitution between land and labor, and (b) a large amount of land supply.*

The proposition implies that the protection of agriculture tends to emerge in *moderately* land-scarce economies, as the condition (A1) implies the limited capacity of domestic agriculture. In light of the discussions in Section 2, this result is consistent with different political responses of European nations to the-19th-century grain invasion.

**Political Conflict** As shown below, Regime II-A is characterized by the possibility of the revival of class conflict. Since the domestic demand for the agricultural good is at most  $\hat{c}$  units, (7) shows that

$$y_p(K_t, p_t) - \hat{c} = y_t^A - \hat{c} < 0 \quad \text{if } p_t \in (p^w, p_t^c). \quad (32)$$

Thus it follows from (17) that if  $p_t \in (p^w, p_t^c)$ ,

$$\lambda z_p^R(K_t, 0, p_t) + (1 - \lambda) z_p^P(K_t, 0, p_t) < 0. \quad (33)$$

This implies that the no-tariff price level,  $p^w$ , always maximizes the aggregate value  $\lambda z_t^R + (1 - \lambda) z_t^P$ . Therefore, the case  $p_t^R = p_t^P > p^w$  does not occur under Regime II-A, where each individual is interested in maximizing  $z_t^i$ . In other words, any price above  $p^w$  is not the first-best choice for *all* of the individuals. This fact leads to the following proposition.

**Lemma 5** *If the economy adopts a protectionist policy (i.e.,  $p_t > p^w$ ) in period  $t \in (\hat{t}, t^*]$ , then a marginal decline in the tariff rate would benefit group  $R$  in the same period.*

Note that in Lemma 5, it is group  $R$  rather than group  $P$  which supports the free trade policy. Since the members of group  $R$  rely heavily on their capital revenues in this semideveloped stage, a marginal decline in the tariff rate would raise the interest rate and thus their incomes. For this reason, they are best interpreted as capitalists not as landowners. This interpretation would be altered slightly if the model incorporated heterogeneous landowners: It is predicted that those with extremely large land holdings would not necessarily favor free trade.

### 4.2.3 Regime II-B: The Second Wave of Liberalization

The economy enters Regime II-B in period  $t^* + 1$ , in which a chain of intergenerational transfers emerges within group  $P$ . Since all individuals derive capital revenue as well as earn wages, the interest rate works as an additional factor through which trade policy affects the income of group  $P$ . The adverse effect of raising  $p_t$  on the interest rate,  $r_t$ , counteracts its positive effect on the wage rate,  $w_t$ . Accordingly the economy adopts liberalism in highly advanced stages.

**Conditional Dynamics** For analytical convenience, first consider the evolution of capital under free trade as a benchmark. The focus here is on  $K_t > K^{\max}$ , where  $K^{\max}$  is defined as a critical value such that  $w(K^{\max}) = p^w F_L(X, 0) + \theta$ .

As follows from (5), the free-trade economy given  $K^{\max}$  completely specializes in manufacturing. Furthermore, the wage rate  $w(K^{\max})$  is large enough for workers to leave bequests.<sup>30</sup> Hence, it

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<sup>30</sup>Note that  $w(K^{\max}) > p^w \hat{c} + \theta$  because the existence of  $\hat{L} \in (0, 1)$  in (A1) implies that  $F_L(X, 0) > \hat{c}$ .

follows from (4) and (19) that the evolution of the free-trade economy for  $K_t \geq K^{\max}$  and  $k_t^P \geq 0$  is given by

$$\begin{aligned} K_{t+1} &= \phi(K_t, k_t^P, p^w) = \beta(MK_t^\alpha - p^w\hat{c} - \theta) > 0; \\ k_{t+1}^P &= \psi(K_t, k_t^P, p^w) = \beta[w(K_t) + r(K_t)k_t^P - p^w\hat{c} - \theta] > 0, \end{aligned} \quad (34)$$

where  $\psi(K_t, 0, p^w) > 0$ . This shows that as long as  $K_t$  is greater than  $K^{\max}$ , the wage rate is sufficiently high for the members of group  $P$  to leave bequests.

**Corollary 1** *Under (A1) and (A3),  $\beta[M(K^{\max})^\alpha - p^w\hat{c} - \theta] > K^{\max}$ .*

*Proof.* Since (34) implies that  $w(K^{\max}) > p^w\hat{c} + \theta$ , it follows that  $M(K^{\max})^\alpha - p^w\hat{c} - \theta > \alpha M(K^{\max})^\alpha$ . Using this result with (A1) and (A3) proves the lemma.  $\square$

Thus, there exists a *unique*, locally stable, steady-state capital stock  $\bar{K}$  such that

$$\bar{K} = \beta(M\bar{K}^\alpha - p^w\hat{c} - \theta) > K^{\max}, \quad (35)$$

where  $\alpha\beta M\bar{K}^{\alpha-1} = \beta r(\bar{K}) < 1$ . Given the capital stock  $\bar{K}$ , which is independent of  $k_t^P$ , there exists a *unique* steady-state bequest  $\bar{k}^P$  such that

$$\bar{k}^P = \beta[w(\bar{K}) + r(\bar{K})\bar{k}^P - p^w\hat{c} - \theta], \quad (36)$$

where  $w(\bar{K}) > p^w\hat{c} + \theta$  and  $\beta r(\bar{K}) < 1$ . Since  $M\bar{K}^\alpha = w(\bar{K}) + r(\bar{K})\bar{K}$ , comparing (35) with (36) reveals that  $\bar{K} = \bar{k}^P > K^{\max}$ . Hence, an egalitarian steady-state equilibrium occurs at  $(\bar{K}, \bar{k}^P)$ , where landlords lose their rents and all individuals have the same income sources, wages and savings; i.e.,  $I_t^R = I_t^P = w(\bar{K}) + r(\bar{K})\bar{K}$ .

As explained in Section 4.2.1, free trade is not necessarily desirable for members of group  $P$ . Nevertheless, the next lemma ensures that, as long as  $K_t > K^{\max}$ , free trade generates monotonic growth in their capital bequests.

**Lemma 6** *Under (A1) and (A3),  $\psi(K_t, k_t^P, p^w) > k_t^P$  for  $K_t > K^{\max}$  and  $k_t^P \in [0, \bar{k}^P)$ .*

*Proof.* See the Appendix.  $\square$

Figure 5 graphically represents the conditional dynamical system (34). The  $KK$  and  $k^P k^P$  loci are defined as the set of  $(K_t, k_t^P)$  for which  $K_t = \phi(K_t, k_t^P, p^w)$  and  $k_t^P = \psi(K_t, k_t^P, p^w)$ , respectively. Since  $\bar{K}$  is independent of  $k_t^P$ , the  $KK$  locus is vertical at  $K_t = \bar{K}$  and has a unique intersection with the U-shaped  $k^P k^P$  locus at point  $(\bar{K}, \bar{k}^P)$ .

The diagram shows transitional dynamics on the subspace where  $K_t \in [K^{\max}, \bar{K})$  and  $k_t^P \in [0, \bar{k}^P)$ . In light of Lemma 6 and the properties of  $\phi(K_t, k_t^P, p^w)$ , the permanent free trade policy, starting at any point on the subspace, results in monotonic growth towards the symmetric steady-state equilibrium,  $(\bar{K}, \bar{k}^P)$ .

**Unconditional Dynamics** Next consider the endogenous determination of trade policy. First of all, the definition of  $K^*$  reveals that  $\omega(K_t, p^*) > p^* \hat{c} + \theta \forall K_t > K^*$ , where  $p^* = \arg \max_{p \in \mathbf{p}_t} [\omega(K^*, p) - p \hat{c}]$ . The income of group  $P$  may be improved by choosing the preferred price  $p_t^P$ , as  $p^*$  is not necessarily optimal for those who have capital revenues. Hence, it follows from (18) and (19) that if  $K_t > K^*$  and  $k_t^P \geq 0$  in Regime II,

$$\begin{aligned} K_{t+1} &= \phi(K_t, k_t^P, p_t^P) = \beta[y(K_t, p_t^P) - p_t^P \hat{c} - \theta] > 0; \\ k_{t+1}^P &= \psi(K_t, k_t^P, p_t^P) = \beta[\omega(K_t, p_t^P) + \rho(K_t, p_t^P)k_t^P - p_t^P \hat{c} - \theta] > 0, \end{aligned} \quad (37)$$

where  $p_t^P$  is given by (28).

**Lemma 7** *Under (A1) and (A3),  $\phi(K_t, k_t^P, p_t^P) > K_t$  if  $K_t \in (K^*, K^{\max}]$ .*

*Proof.* See the Appendix. □

Therefore, aggregate capital grows monotonically in and after period  $t^*$ , (at least) until exceeding the critical level  $K^{\max}$ . On the other hand, capital accumulation is bounded by  $\bar{K}$ , which is the steady-state capital stock under free trade. This is because, as (33) implies, free trade is the optimal policy for maximizing capital stocks in Regime II.

Since  $K_t > K^{\max} (> K^*)$  in the long run, (21) and (37) show that members of group  $P$  retain political control over trade policy so as to maximize their bequests. Since  $K_t$  does not exceed  $\bar{K}$  in any period, (18) and Lemma 6 indicate that  $k_t^P$  and thus  $K_t$  converge towards  $\bar{k}^P (= \bar{K})$ .

**Lemma 8** *Under (A1), the no-tariff price level,  $p^w$ , is optimal for group  $P$  when the pair  $(K_t, k_t^P)$  is sufficiently close to  $(\bar{K}, \bar{k}^P)$ .*

*Proof.* Consider a pair  $(K_t, k_t^P)$  sufficiently close to  $(\bar{K}, \bar{k}^P)$ . Since (30) and (35) imply that  $K_t > \hat{K}$  in this case, the optimal price for group  $P$ ,  $p_t^P$ , is given by (28), and  $L(K_t, p_t^P) < \hat{L}$  from Lemma 2. Now note that, in view of (A1) and (14),

$$F_L(X, L_t)L_t < F(X, L_t) < \hat{c} \quad \forall L_t \in (0, \hat{L}).$$

Using this result for (29) shows that  $\partial I_t^P / \partial p_t < \hat{c}$  if  $p_t > p_t^{\min}$ , because  $\bar{k}^P / \bar{K} = 1$ . If  $p_t \in (0, p_t^{\min})$ , on the other hand,  $L_p(K_t, p_t) = 0$  and thus  $\partial I_t^P / \partial p_t = 0$ . Thus, noting the continuity of  $I_t^P$  with respect to  $p_t > 0$ , one finds that  $p_t^P$  equals the minimum feasible price,  $p^w$ .  $\square$

Thus, the economy ultimately adopts free trade, which enhances capital accumulation in this regime, and then the pair  $(K_t, k_t^P)$  develops as in the case of the conditional dynamics. These results establish the proposition below.

**Proposition 4** *Under (A1)-(A4), the pair  $(K_t, k_t^P)$  converges to the free trade, egalitarian, steady-state equilibrium  $(\bar{K}, \bar{k}^P)$ .*

**Political Conflict** Because the economy converges to the egalitarian steady-state equilibrium, it is predicted that between-group heterogeneity and class conflict dissipate in the long run.

**Proposition 5** *Under (A1)-(A4), in the long-run the no-tariff price level  $p^w$  is (at least locally) optimal for all individuals .*

*Proof.* As discussed above, the economy completely specializes in manufacturing and landlords have no rent in the long run. In this case, one can apply the proof of Lemma 8 to show that  $\partial I_t^R / \partial p_t < \hat{c}$  for  $p_t = p^w$ , noting  $k_t^R \geq K_t$  from Lemma 18. This indicates the local optimality of  $p^w$  for group  $R$ . The result for group  $P$  follows from Lemma 8 and Proposition 4.  $\square$

This result should be interpreted carefully. It does not suggest that the eventual return to liberalism and the dissipation of class conflict are universally inevitable. Since, as mentioned in the introduction, many developed economies currently protect agriculture, the proposition should be interpreted as a predicted outcome in highly advanced stages of economic development, and reaching such developed stages requires highly productive technology in the industrial sector.

## 5 Concluding Remarks

This article has developed a theoretical framework for understanding the evolution of trade policy, underlying internal class conflict, and growth performance over the last few centuries. It has analyzed the dynamic interaction between trade policy and economic growth, and has thereby bridged a gap between two strands of the literature: open-economy growth theory and endogenous tariff theory. On the one hand, trade-policy preferences and the resulting trade policy depend

on the stage of economic development. Because of the distributional effects of trade liberalization, income sources and income levels—both of which expand with economic development—characterize individual attitudes toward trade policy. On the other hand, engaging in international trade affects aggregate output, factor prices, and income distribution by promoting specialization in sectors in which the economy has comparative advantages. This mutual dependence between trade policy and industrialization facilitates an understanding of the evolution of economies.

The paper's focus is on 19th-century Western Europe, which had a comparative advantage in manufacturing in global markets and pulled ahead of other nations through trade. Consistent with this historical experience, the theory developed in this paper argues that this type of economy may experience a retreat into protectionism during the growth process. Nevertheless, it is predicted that the economy liberalizes foreign trade in highly advanced stages of development.

Although this article has taken a novel approach to analyzing the relationship between trade policy and economic development, it ignores several aspects relevant to the world economy during the period under consideration. First, the model abstracts from technological progress, particularly improvements in transportation productivity, which has promoted the integration of global markets. Second, the analysis of this paper is limited to the direct, quantitative impacts of trade in commodities on trading economies. However, as argued by Irwin (2001, 3), it is important to consider Asian commodities, which were traded in small quantities, because these may have conveyed embodied new technology to Europe. Third, it is worth considering political games between trading countries that adopt strategic policies. For this purpose, it is necessary to extend the small-open economy framework, which abstracts from other countries' trade policies. Finally, this paper has analyzed an economy that produces a single manufactured good and, hence, has ignored the protection of manufacturing sectors. Although the paper's focus on agricultural protection is a reasonable simplification for studying European trade policy before the 20th century, it would not be appropriate for analyzing contemporary issues; currently, the protection of domestic industries would affect advanced economies more than would the protection of agricultural industries. Future research should be directed to addressing these issues.

## Appendix

**Lemma 9** *Suppose that group  $R$  owns the entire capital stock under autarky. Then, under (A1), the equilibrium condition for the goods' markets is given by (14).*

*Proof.* Since  $k_t^R > k_t^P = 0$  and  $L_t = \bar{L} \in (0, 1)$  under the assumptions, (5) and (9) show that  $I_t^R > I_t^P = p_t F(X, \bar{L})$ . Then it follows from (10) and (A1) that  $\hat{c} \geq c_t^R > c_t^P = F_L(X, \bar{L})$ .

Now consider the case in which  $\hat{c} > c_t^R$ . Since (10) implies that  $c_t^R = I_t^R/p_t$  in this case, no one demands the manufactured good. On the other hand, (6) implies that the supply of the manufactured good is positive. Hence this case is infeasible under autarky, and the market-clearing condition is given by (14), where  $c_t^R = \hat{c} > c_t^P = F_L(X, \bar{L})$ .  $\square$

**Lemma 10** *There exists a set of structural parameters for which both (14) and (A1) are satisfied.*

*Proof.* The production function  $F(X, L_t)$ , given by (1), is strictly increasing and concave with respect to  $L_t$ , and  $\lim_{L \rightarrow 0} F(X, L) = 0 < \lim_{L \rightarrow 0} F_L(X, L)$  and  $F(X, 1) > F_L(X, 1)$ . Hence, there exists a unique value  $L^{\min} \in (0, 1)$  such that  $F(X, L^{\min}) = F_L(X, L^{\min})$ . Now, define  $\lambda^{\max}$  as

$$\lambda^{\max} = \arg \min_{\lambda \in (0, 1]} |F(X, 1) - \lambda \hat{c} - (1 - \lambda)F_L(X, 1)|, \quad (38)$$

where  $\hat{c}$  is assumed to be on the interval  $(F_L(X, L^{\min}), F_L(X, 0))$ . It follows that for any  $\lambda \in (0, \lambda^{\max})$ , the equality in (14) is satisfied by a unique  $\bar{L} \in (\hat{L}, 1)$ , where  $\hat{L}$  is a value such that  $\hat{c} = F_L(X, \hat{L})$ . Furthermore, the first inequality in (A1) holds if  $\lambda$  is sufficiently close to  $\lambda^{\max}$ , noting that  $\bar{L} \rightarrow 1$  as  $\lambda \rightarrow \lambda^{\max}$ .  $\square$

**Lemma 11** *If  $\alpha \in (0, 1)$  is sufficiently large,  $z_{pp}^R(K_t, 0, p_t) > 0$  for any  $(K_t, p_t) \gg 0$  such that  $0 < L(K_t, p_t) \leq \bar{L}$ .*

*Proof.* Noting that  $\omega(K_t, p_t) \equiv w(k(K_t, p_t))$ , where  $w(\cdot)$  and  $k(\cdot)$  are from (4) and (8), the wage equality condition (5) and the Implicit Function Theorem show that for any pair  $(K_t, p_t)$  under the assumption,

$$\omega_p(K_t, p_t) = w'(k_t)k_p(K_t, p_t) = \gamma_t F_L(X, L_t) > 0, \quad (39)$$

where

$$\gamma_t \equiv \frac{\alpha}{\alpha + (1 - \delta)\Gamma_t}; \quad \Gamma_t \equiv \frac{1 - L_t}{L_t} \cdot \frac{aX^\delta}{aX^\delta + (1 - a)L_t^\delta}.$$

Recalling  $\delta < 0$  and  $a, \alpha, X, L_t \in (0, 1)$ , one finds that  $0 < \gamma_t = (\partial w_t / \partial p_t)(p_t / w_t) < 1$ . Furthermore,

$$\begin{aligned} \eta(X, L_t) &\equiv F(X, L_t) - (1 - \lambda)\gamma_t F_L(X, L_t) \\ &= F(X, L_t) \left[ 1 - \frac{\alpha(1 - \lambda)(1 - a)}{aX^\delta L_t^{-\delta} [\alpha L_t + (1 - \delta)(1 - L_t)] + \alpha(1 - a)L_t} \right]. \end{aligned}$$

where the denominator in the square bracket increases with  $L_t$  on the interval  $(0, \frac{\delta}{\delta + \alpha - 1}]$ . Thus, noting that  $\bar{L}$  in (14) is independent of  $\alpha$ , one finds that  $\eta_L(X, L_t) > 0 \forall L_t \in (0, \bar{L}]$  if  $\alpha \in (0, 1)$  is sufficiently large. Since  $L(K_t, p_t)$  is strictly increasing in  $p_t$ , these parameter conditions assure that  $z_p^R(K_t, 0, p_t)$  in (23) is strictly increasing in  $p_t$ .  $\square$

**Proof of Lemma 4.** (a) Given  $0 < L_t < X$ , L'Hospital's Rule reveals that as  $\delta \rightarrow -\infty$ ,  $-\delta(L_t/X)^{-\delta} \rightarrow 0$  and thus  $\gamma_t \rightarrow 1$  in (39).

(b) Since  $F_L(X, L_t) = (1 - a)[a(X/L_t)^\delta + (1 - a)]^{(1 - \delta)/\delta}$  is increasing in  $X/L_t$ , the equality in (5) implies that  $\partial L_t / \partial X > 0$  and  $\partial(X/L_t) / \partial X > 0$ . Hence  $\partial \Gamma_t / \partial X < 0$  and  $\gamma_t$  increases with  $X > 0$ .  $\square$

**Proof of Lemma 1.** As follows from (22) and Lemma 9,

$$z^R(K_t, 0, p^w) - z^R(K_t, 0, p_t^c) = [y_t^w - (1 - \lambda)w_t^w - \lambda p^w \hat{c}] - y_t^{M,c}, \quad (40)$$

where the superscripts  $w$  and  $c$  are, respectively, used to denote variables under free trade, and variables under autarky. They are defined as

$$\begin{aligned} y_t^w &\equiv p^w F(X, L_t^w) + MK_t^\alpha (1 - L_t^w)^{1 - \alpha}; \\ w_t^w &\equiv \omega(K_t, p^w); \quad L_t^w \equiv L(K_t, p^w); \\ y_t^{M,c} &\equiv MK_t^\alpha (1 - \bar{L})^{1 - \alpha}, \end{aligned}$$

where  $L_t^w = \arg \max y_t^w$ .

(a) Since  $\check{K}$  is such that  $L(K_t, p^w) = \bar{L}$ , it follows that  $y_t^w = y_t^{M,c}$  and  $\partial y_t^w / \partial K_t = dy_t^{M,c} / dK_t = r(K_t / (1 - \bar{L}))$  if  $K_t = \check{K}$ . Thus, noting that  $w_t^w$  increases strictly with  $K_t$ , one finds that  $z^R(K_t, 0, p^w) < z^R(K_t, 0, p_t^c)$  for  $K_t = \check{K} + \varepsilon$ , where  $\varepsilon > 0$  is sufficiently small.

(b) Suppose that  $K_t \geq \hat{K}$ , where  $\hat{K}$  is a critical value such that  $L(\hat{K}, p^w) = \hat{L}$ . Since  $L_t^w \equiv L(K_t, p^w) \leq \hat{L}$  and  $w_t^w \equiv \omega(K_t, p^w) \geq p^w \hat{c}$  in this case,

$$y_t^w - (1 - \lambda)w_t^w - \lambda p^w \hat{c} > \alpha M K_t^\alpha (1 - \hat{L})^{1-\alpha}.$$

Thus,  $z^R(K_t, 0, p^w) > z^R(K_t, 0, p_t^c)$  in (40) if  $\alpha(1 - \hat{L})^{1-\alpha} \geq (1 - \bar{L})^{1-\alpha}$  or equivalently if (A2) holds.

The results in (a)-(b) above ensure the existence of a value  $\tilde{K} \in (\bar{K}, \hat{K})$  in the lemma.  $\square$

**Proof of Lemma 6.** Consider the following two possible cases of  $K_t (> K^{\max})$ .

(a)  $\beta r(K_t) > 1$ . In this case (34) shows that  $\psi(K_t, k_t^P, p^w) > k_t^P \forall k_t^P \geq 0$ .

(b)  $\beta r(K_t) < 1$ . In light of (34), a non-trivial steady-state level of  $k_t^P$  satisfies

$$\Psi(K_t, k_t^P) \equiv \beta[w(K_t) + r(K_t)k_t^P - p^w \hat{c} - \theta] - k_t^P = 0,$$

where  $\Psi(K_t, 0) > 0$ . Note that  $\Psi_k(K_t, k_t^P) \equiv \partial\Psi(K_t, k_t^P)/\partial k_t^P = \beta r(K_t) - 1 < 0$ . On the other hand, the sign of  $\Psi_K(K_t, k_t^P)$  equals the sign of  $1 - k_t^P/K_t$  because

$$w'(K_t) + r'(K_t)k_t^P = (1 - k_t^P/K_t)(1 - \alpha)r(K_t).$$

Using the Implicit Function Theorem with these results, one finds that for any pair  $(K_t, k_t^P)$  for which  $\Psi(K_t, k_t^P) = 0$ ,

$$\frac{dk_t^P}{dK_t} = -\frac{\Psi_K(K_t, k_t^P)}{\Psi_k(K_t, k_t^P)} \begin{cases} < 0 & \text{if } k_t^P/K_t > 1; \\ = 0 & \text{if } k_t^P/K_t = 1; \\ > 0 & \text{if } k_t^P/K_t < 1. \end{cases}$$

Therefore, the value of  $k_t^P$  satisfying the condition  $\Psi(K_t, k_t^P) = 0$  is expressed as a U-shaped function of  $K_t (> K^{\max})$ . Furthermore, in light of (35)-(36), the function reaches the minimum level  $\bar{k}^P$  at  $K_t = \bar{K}$ . Hence the lemma is obtained by noting  $\psi(K_t, 0, p^w) > 0$  in (34).  $\square$

**Proof of Lemma 7.** Consider the following two possible cases.

(a)  $\omega(K_t, p_t^P) \geq p_t^P \hat{c} + \theta$ . In this case,  $y(K_t, p_t^P) - p_t^P \hat{c} - \theta \geq \alpha M K_t^\alpha [1 - L(K_t, p_t^P)]^{1-\alpha}$ , where  $L(K_t, p_t^P) < \hat{L}$  because of Lemma 2 and (30). Hence, the result follows from (A1) and (A3).

(b)  $\omega(K_t, p_t^P) < p_t^P \hat{c} + \theta$ . In this case,  $\rho(K_t, p^*) < \rho(K_t, p_t^P)$  so that  $k_{t+1}^P > 0$  in (37). This implies that  $p_t^P < p^*$  and thus, in light of (32),  $y(K_t, p_t^P) - p_t^P \hat{c} > y(K_t, p^*) - p^* \hat{c}$ . Furthermore, since  $K_t > K^*$  by assumption,  $\omega(K_t, p^*) > p^* \hat{c} + \theta$  and thus

$$y(K_t, p^*) - p^* \hat{c} - \theta > \alpha M K_t^\alpha [1 - L(K_t, p^*)]^{1-\alpha},$$

where  $L(K_t, p^*) < \hat{L}$  by noting the proof of Lemma 2. Hence, the result follows from (A1) and (A3). □

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Figure 1. Trends in the Franchise

Source: Flora et al. (1983)

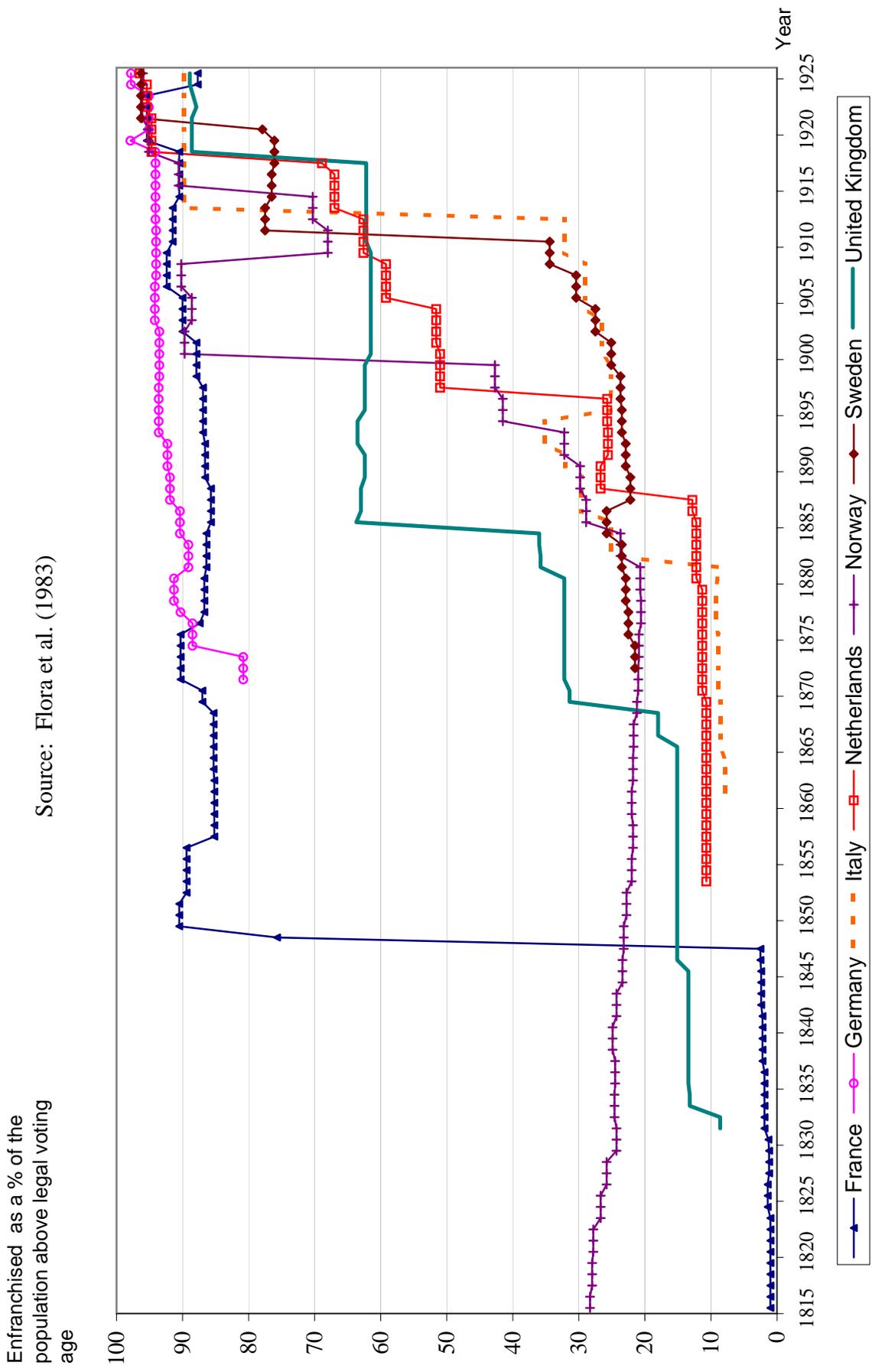


Figure 2(a). Trends in Import Tariffs, 1865-1913

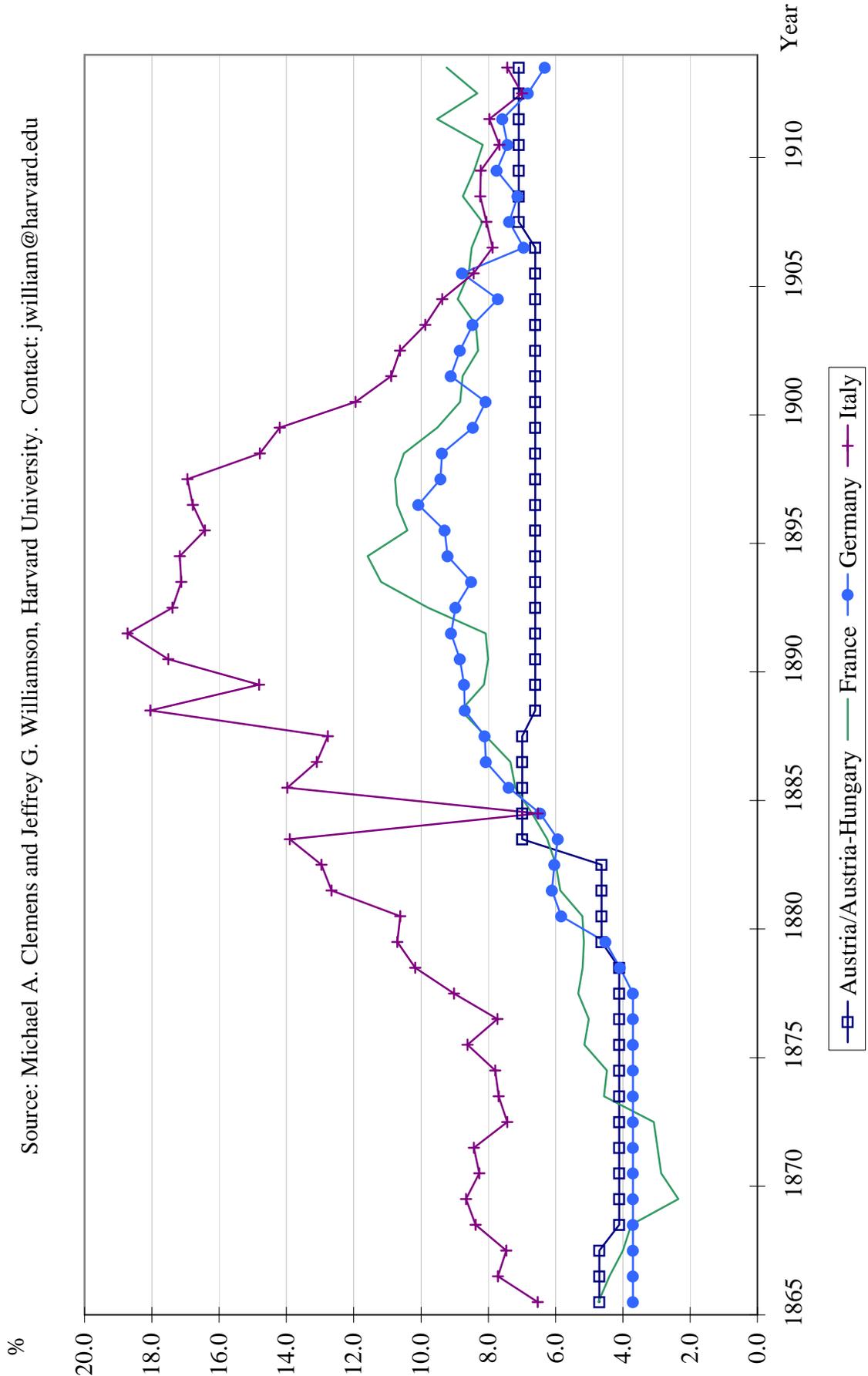


Figure 2(b). Trends in Import Tariffs, 1865-1913

Source: Michael A. Clemens and Jeffrey G. Williamson, Harvard University. Contact: [jwilliam@harvard.edu](mailto:jwilliam@harvard.edu)

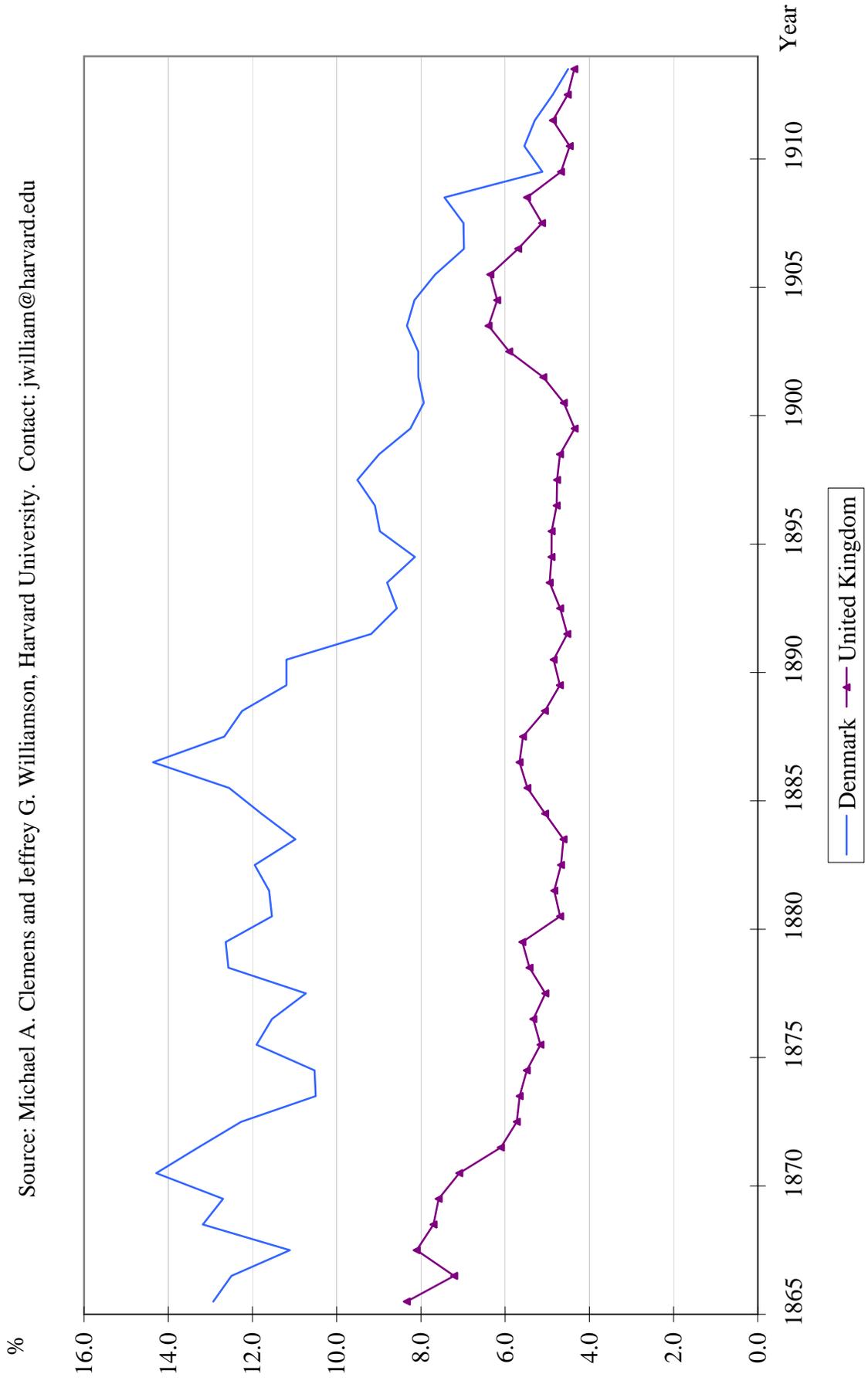


Figure 3. Landlords' Optimal Trade Policy in Regime I

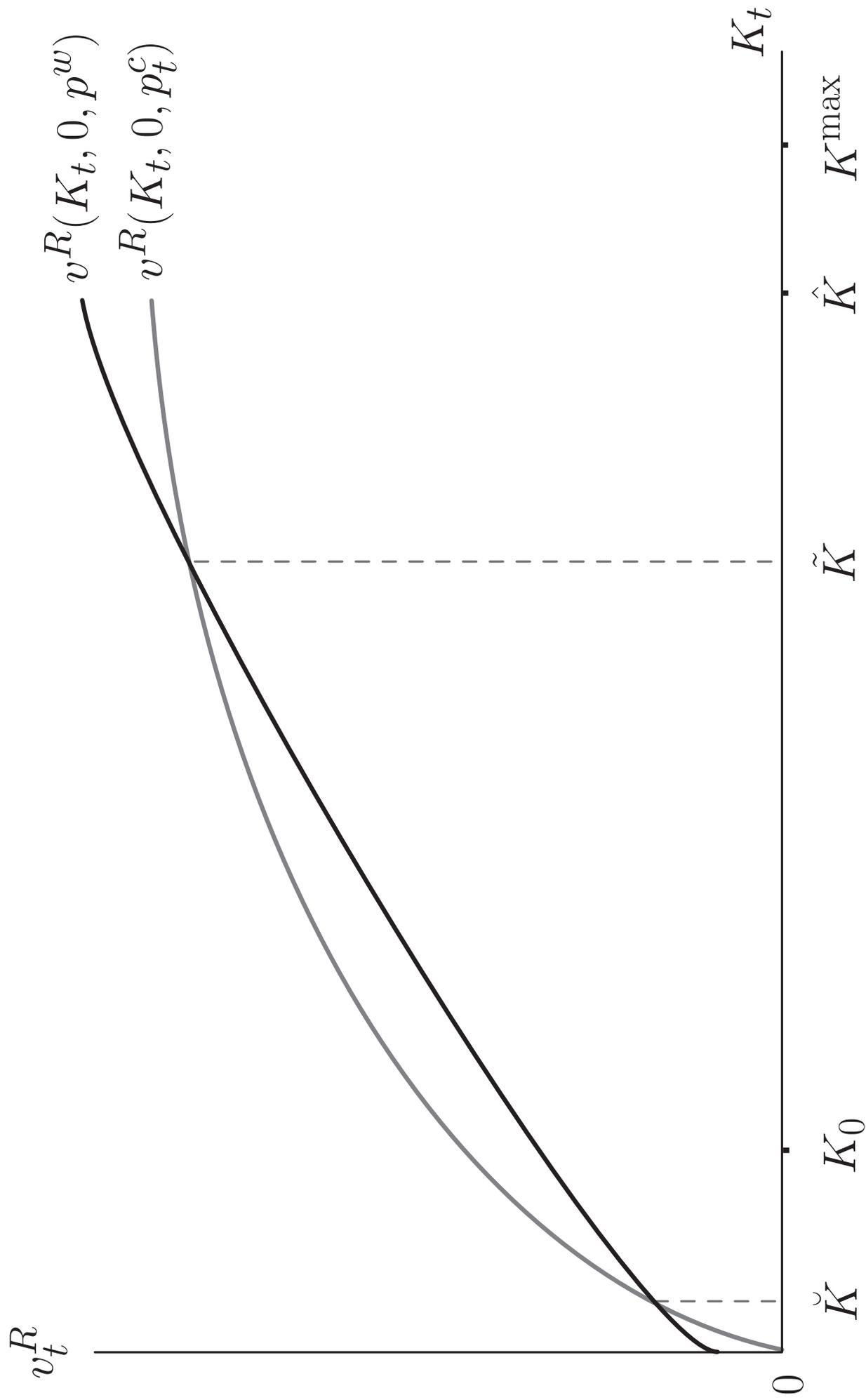


Figure 4. The Agricultural Production Function for a Small  $\delta$

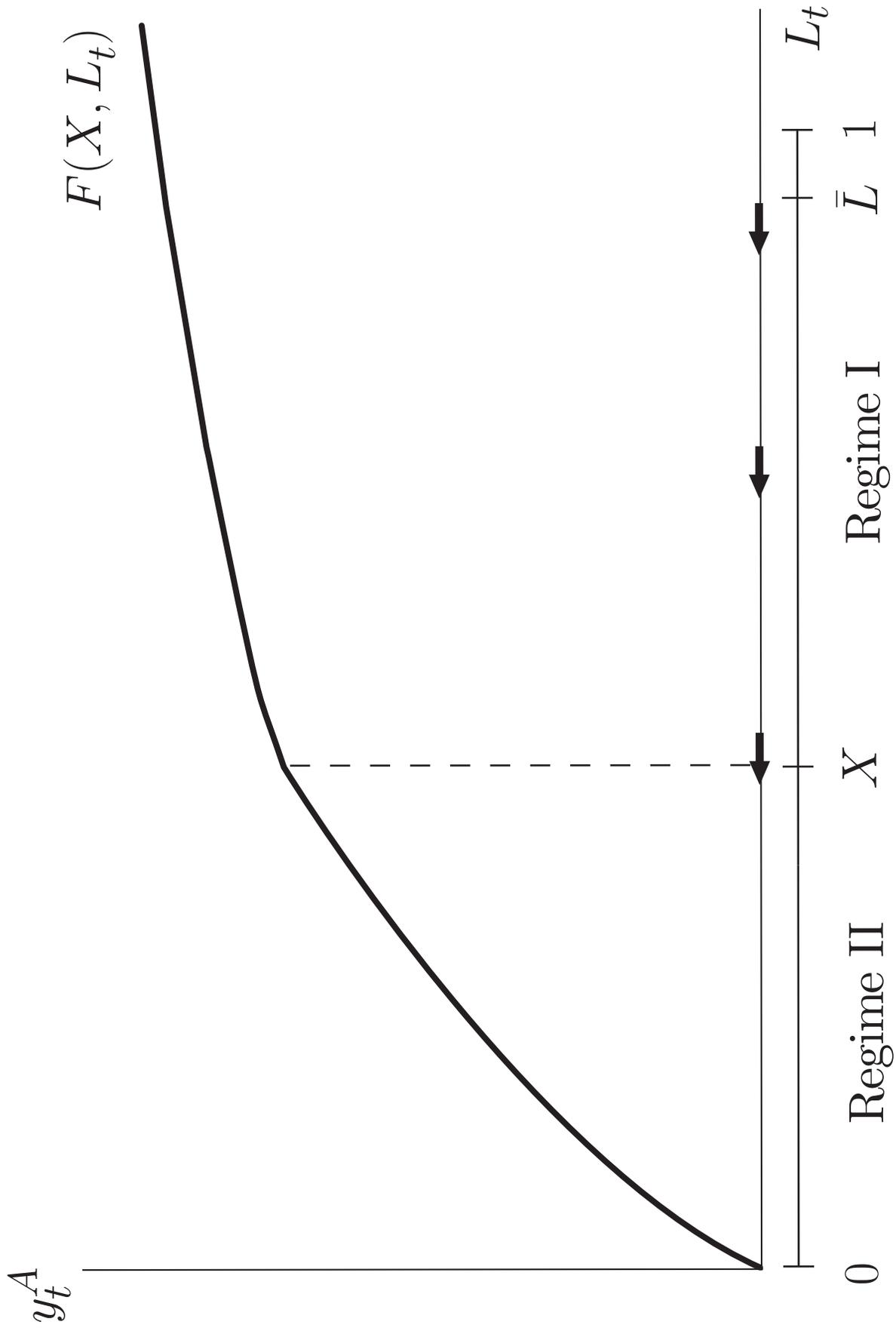


Figure 5. The Conditional Dynamical System in Regime II-B

