

# Growth from Globalization?

## A View from the Very Long-Run\*

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### I. INTRODUCTION

What is the connection between globalization and economic growth? Free international trade is traditionally seen as welfare enhancing and Pareto optimal. Since Adam Smith formulated his dictum that the extent of the market determined the division of labor, economists have both theoretically and empirically confirmed the gains from trade. Skepticism about the benefits of international market integration has always been on the scene however. Observe, just to name a few, the delusions of mis-informed mercantilists, the protectionist policies promoted by figures as diverse as Alexander Hamilton or Friedrich List, the Prebisch and Singer thesis that commodity exporting nations would fare poorly in the open international markets, the price-theoretic analysis by Newbery and Stiglitz (1984) showing trade to be inefficient in the presence of certain

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types of uncertainty, all the way to the loud squelches of protest from anti-globalizing activists.

Beyond these stark and extreme views, a voluminous theoretical and empirical body of scholarly research exists analyzing the subtle details of the connections between globalization and economic growth. Much of the literature continues to agree with Smith's bottom line that there are significant gains from trade for all parties involved. Then again, a healthy dose of well-informed skepticism exists, arguing that globalization is not unambiguously beneficial. This view has emerged from careful analysis of the long-run record and greater thought about the interaction between market failures and globalization. This chapter surveys a select amount of the large literature mainly written or influenced by economic historians in order to provide one view about what the long-run record has to say globalization and growth.

The explosion of empirical and theoretical work on the connections between globalization and growth that occurred over the last several decades has greatly improved our understanding of this process. It has broadened the scope of analysis to include the impact of integration not only in goods markets but also in the markets for labor, capital and even ideas relevant to the economic process also known as "production technologies." The findings of this literature, as they pertain to economic growth, are largely, but not uniformly, supportive of the idea that globalization has been positively associated with growth. Those who are less supportive often suggest that the relationship is conditional and certain other factors might influence the gains from the process.

Economic historians have long argued that the industrial revolution could not have occurred without international trade. Recent research continues to support this notion albeit with some new views on the mechanisms behind this relationship. An earlier literature also looked at whether European economies gained dominance because of exploitative international relationships with colonies and traditional societies. There turns out to be little evidence these relations were decisive as we will see. Another strand of the literature argues that colonization and the slave trade damaged the prospects for growth in non-European economies. While these are old ideas, new data and new methodologies continue to support this notion.

Finally, a new and exciting strand of the literature which is less supportive of the positive association between trade and growth argues that globalization can help explain

the large gap in incomes between Europe and its selected offshoots and the rest of the world that opened up circa 1800 and which persists today. This gap has come to be known as the Great Divergence.<sup>1</sup> This is not to pin the entire blame on globalization. Other factors such as factor endowments, institutional quality and political factors seem to interact with globalization to enhance or limit the gains. Economists and historians are only beginning to understand the origins and persistence of these institutions and their complex interaction with global forces, but recent research leaves little doubt about their importance.

The new literature on growth and globalization gives many specific reasons for how the positive relationship might break down. These reasons often center around the patterns of specialization induced by international trade. Commodity price volatility has been one major problem (Williamson, 2011). The historical record suggests that for small open economies specialized in resources or agriculture, globalization enhances commodity price volatility. There is also economic volatility directly related to financial crises which have their roots in the globalization of capital flows. Certain types of countries specializing in natural resources have also faced political and economic challenges broadly labeled the “Resource Curse”. Globalization may have negative side effects in certain circumstances. The systematic study of the conditions that determined the historical relationship between globalization and growth is in its early stages. Still, because of these observations from the long-run, economists are not yet able to say that globalization is unambiguously associated with higher growth.

Before arriving at this conclusion, the chapter offers an introduction to how economists and economic historians measure and track globalization or more precisely global integration. Section III provides a limited survey of some relevant insights from the literature linking economic growth and market integration. Section IV, the first of three sections on the historical connections between economic growth and globalization, gives a review of the period 1500 to 1800. The next section illustrates how recent research views the connection between the British Industrial Revolution and globalization. Sections VI and VII supply critical reviews of what we know about the

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<sup>1</sup> Some evidence suggests that between 1970 and 2006 this divergence of outcomes has begun to be eliminated as global inequality has fallen (Pinkovskiy and Sala-i-Martin, 2009). Yet, many countries remain much poorer than the richest nations, and as an historical matter, the Great Divergence is certainly an important phenomenon.

diffusion of the industrial revolution to other parts of the world and the role of globalization. The focus is on the cross-country comparative literature. Here I also take a look at the role of globalization in explaining the Great Divergence. In light of this evidence, the conclusion discusses the rationale behind the assertion that globalization may not always have a positive association with economic growth.

## II. Measuring “Globalization”

### II.A Commodity Markets

Globalization is defined broadly as the economic and social connections between the world’s nations. Economic historians have recently debated the question of when “globalization” began, and come to no conclusion. This is largely because it is a semantic question (O’Rourke and Williamson, 1999 versus Flynn and Giraldez, 2004). Jan de Vries (2010) differentiates “hard” globalization or market-based connections familiar to modern economists from “soft” globalization which concerns other more qualitative connections between regions. International economists and many economic historians often prefer to study and measure “integration” between different markets. Roughly speaking integration is the degree of connection between any two markets, regions or nations. Numerous ways of looking at integration exist of course, and these vary depending on whether one is investigating commodity markets, labor markets, capital markets or the market for ideas or production “technologies”.

In commodity markets, economic historians have a long tradition of investigating the price gap between markets of single homogeneous goods. The logic of the *law of one price* demands that arbitrage eliminate price differentials until no further profit opportunities exist. Any price gap that exists must be less than or equal to the transaction or trade costs of eliminating the price gap via arbitrage operations. Price differentials in this framework persist due to physical or political barriers to trade such as tariffs or transport costs. Figure 1 illustrates this logic. The barriers to trade are defined as the length of line segment  $tt$  in the simple supply and demand framework of Figure 1. When  $tt$  shrinks to  $tt'$  in panel A, integration is said to have risen. We might also see trade volumes rise as the supply curve  $S$  shifts down to  $S'$  in Panel B of Figure 1, but there is no reduction in trade barriers between two countries in this case. Looking

at trade volumes alone to say something about *integration* can be misleading according to O'Rourke and Williamson (1994). The level of trade has risen, but in this case it could be due to productivity advance or other favorable supply shocks with no reduction in the cost of trade. Trade has obviously grown, but integration, which is related to the sum total of all barriers to international trade, has not changed.

Further conceptual refinement on this topic by Jacks (2006) looks not only at the time-varying price gaps between markets for a standardized commodity but also at the dynamics of the price differential itself. The approach models the price gap between two markets as a threshold auto-regressive process.<sup>2</sup> To understand this, begin by noting that in a competitive market with forces of arbitrage, the difference in price  $P$  between market  $o$  (origin) and market  $d$  (destination) must be within a narrow band as follows

$$-\tau_t^{do} \leq P^d - P^o \leq \tau_t^{od}.$$

Here the variable  $\tau_t^{od}$  measures the total cost of sending one unit of the good from market  $o$  to market  $d$ . When the price differential holds there is a band within which it can fluctuate equal to  $\tau_t^{od} + \tau_t^{do}$ . The width of this band is determined by the cost of arbitraging price differences. When shocks hit either market causing price differentials to escape the band, one of these inequalities is violated. At this point, price differentials are eliminated, but not instantaneously. The forces of arbitrage take time to eliminate these profit opportunities as information travels slowly and shipping takes time. Therefore the price differential is assumed to follow a random walk within the bands but it follows an autoregressive process if the price difference jumps outside of the bands. The width of the bands can therefore be estimated to give an indication of all of the economic barriers impeding arbitrage otherwise referred to as trade costs. Note that these trade costs can include shipping costs, tariffs and other trade policies, as well as the financing costs of arbitrage or even the impact of uncertainty on the market.

Price-based measures have their pitfalls as do all measures of integration. In the case of price differentials, there is no micro-founded theory to the price differentials in

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<sup>2</sup> Jacks (2006) analyzes an asymmetric model where route-specific trade costs can matter. The exposition here simplifies and require that trade costs be the same in both directions between trading nodes. The possibility of storage is also ignored here.

question. The voluminous literature on pricing-to-market for goods in the industrial sector where market power is often evident suggests that price differentials can be the outcome of preferences manifested as market-specific elasticities of substitution -- as well as technologies of arbitrage. Coleman (2007) makes the subtle, but crucial, point which is often disregarded in many historical studies of this sort, that a necessary condition to infer trade costs between two markets  $o$  and  $d$  is that trade between  $o$  and  $d$  be strictly positive. In other words there are significant errors in many of the studies that have used price differentials between two unconnected markets to infer something about trade costs. Finally, in two markets where factor endowments, preferences and technologies are the same, and shocks are perfectly correlated, prices will be equal with or without barriers to trade. Price equalization is not guaranteed to be perfectly correlated with integration.

As an alternative to the study of price gaps, gravity models of international trade have been used. Empirical gravity models are a powerful, yet parsimonious tool to measure international integration. The gravity approach is inspired by Newtonian physics and has been pondered in economics, as James Anderson (2011) recently emphasized, since at least the nineteenth century (e.g., Ravenstein, 1889). Gravity says international trade is positively related to the size of two markets and negatively related to distance. Size in economics is related to total expenditure or incomes, and distance is a proxy for the barriers to trade or trade costs. Micro-founded partial or general equilibrium models of international trade give rise to gravity as discussed in Anderson (1979), Bergstrand (1985), Head and Ries (2001) amongst many others. Anderson and van Wincoop (2004) go so far as to argue that gravity is consistent with *any* underlying structure of production. In other words, both Ricardian *and* factor endowment based models of trade with positive trade costs give equivalent gravity models. This makes it hard to distinguish which forces are “causing” trade, but in some cases, where integration is the object of analysis this turns out to be irrelevant. A particularly intuitive expression of the gravity model is given as

$$x_{ij}x_{ji} = \frac{x_{ii}x_{jj}}{(\tau_{ij})^{(\sigma-1)}} \tag{1}$$

where  $x_{ij}x_{ji}$  is the product of trade flows or expenditure on foreign goods between country  $i$  and  $j$ ,  $x_{ii}x_{jj}$  is the product of the two countries' expenditure on *tradable*

domestic goods,  $\tau_{ij}$  is the product of the ratio of international trade costs to domestic trade costs, and  $\sigma > 1$  is the (constant) elasticity of substitution between any two goods, domestic or foreign.<sup>3</sup> Higher barriers to trade, also referred to in the literature as simply trade costs, reduce expenditure on foreign goods, pushing demand towards domestic goods. This equation can be estimated by using proxies for domestic trade (e.g., total GDP minus exports) and trade costs (e.g., tariffs, distance, shipping costs, common monetary standards and languages etc.). Coefficients on the trade costs proxies then provide the partial effect of such frictions on international trade, and under certain assumptions allow for inference on the elasticity of substitution. The gravity model also leads immediately to a very useful measure of integration. Solving (1) for the trade barriers allows one to infer “trade costs” as the scaled ratio of foreign trade to domestic expenditure. If an estimate of the elasticity of substitution is at hand, or a value is assumed, a particular value for these trade costs in tariff equivalent terms is readily available.

To measure the degree of international integration over time and across countries, Jacks, Meissner and Novy (2011) solve equation (1) for the unobservable trade cost term. This value is the difference, or the *wedge*, between total expenditure on domestically produced tradables and total expenditure on foreign produced tradables. This ratio is directly related to trade costs by inspection of equation (1). With an elasticity of substitution of 11, the (un-weighted) average bilateral trade costs for the US between 1870 and 1913 were the equivalent of a 70 percent tariff on foreign goods while for the UK they equaled about 50 percent. With a lower elasticity of substitution one finds higher trade costs. The average tariff equivalent for a large sample of bilateral pairs is 140 percent in 1910, 158 percent in 1933 and 124 percent in 2000. During the period before World War I, the average annual growth rate of bilateral trade costs was on the order of -0.8 % prior. Between the world wars, these grew at roughly +0.4%, and after World War II they fell at a rate of -0.5%. A U-shaped pattern of long run integration emerges clearly from such data. Integration was high in the nineteenth

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<sup>3</sup> In this specification trade costs are modeled as a trade cost factor equal to one plus the tariff equivalent of trade costs. Normalize the domestic trade cost (i.e., the cost of getting something from the factory or farm gate to the consumer) to one. Then, the total import price in country  $j$  for a good shipped from  $i$  is  $p_{ij} = \tau_{ij}p_i$ .

century, fell in the interwar period and then rose to new heights by the end of the twentieth century.

One can also think of this trade cost measure as a residual in the spirit of growth accounting exercises. In this case, the residual is the gap between actual international trade and that predicted by the size of the two nations alone. Jacks, Meissner and Novy (2011) show how the gravity equation allows for an accounting exercise similar in spirit to growth accounting. Here, any growth not accounted for by expansion of the domestic trade terms is attributed to changes in trade costs. This is just as in growth accounting where changes not attributed to changes in inputs would be attributed to changes in total factor productivity. The gravity model exhibited above is consistent with a wide range of demand side and supply side frameworks as one can easily show. More general translog expenditure functions however yield different expressions for bilateral trade as do nested CES functions that allow different elasticities of substitution across varieties of goods (Novy, 2011 and Feenstra, Obstfeld and Russ, 2011). The assumption that the elasticity of substitution is not homogeneous across goods or countries does not seem to give highly misleading results as discussed in Jacks, Meissner and Novy (forthcoming), but is certainly one of the potential pitfalls for using this structural approach.

## II.B Integration in Capital Markets

Global financial flows are also governed by arbitrage and gravity-like relationships (Obstfeld and Taylor, 2004, Clemens and Williamson, 2004). In terms of the gravity approach, flows are larger when the share of the receiving economy in the global economy is larger. Simple portfolio theory in a frictionless world would dictate that the portfolio share of a nation's assets would correspond to the share of total world output. Of course informational frictions loom large in global capital markets as they do in local markets.<sup>4</sup> Another consideration for the direction of capital flows is the correlation structure of the returns on various assets, based on the logic of the international capital asset pricing model (ICAPM). Nations that have lower correlations

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<sup>4</sup>**Bordo (2000) provides an excellent survey to the information problems of global capital markets in the nineteenth century.**

(i.e., lower betas) with the market portfolio would be in higher demand under normal circumstances.

Obstfeld and Taylor (2004) study interest rate differentials from the late nineteenth century until the present period for several different kinds of assets including long-term sovereign bond yields and short-run money market funds. They find strong evidence for high levels of integration based on the small observed deviations from exchange-risk-free interest parity. In the interwar period, integration is found to be much lower by this same measure, while in the 1970s, the data demonstrate tight integration once again. For long-term sovereign bond yields, there is evidence of significantly lower coefficients of variation on bond yields in 1910 than in 1870. Mauro, Sussman and Yafeh (2006) compare the nineteenth century sovereign bond markets to those of the late twentieth century. They undertake a series of event history analyses to measure the reaction of bond prices to news. Their finding is that co-movement is much higher today than in the past when bond prices reacted much more to local news than global shocks.

On the quantity side, the portfolio positions of investors are extremely hard to track historically. What we do possess is data on gross capital flows from the major capital exporting economies of the nineteenth century. These can be used to trade foreign assets relative to global or the investor country's GDP. Schularick (2006) estimates that the ratios of gross world assets divided by global GDP was about 20 percent in 1913 while today that ratio stands at roughly 75 percent. Gross inflows (which are widely assumed in the literature to equal net flows in the nineteenth century) into the less developed world were much larger in terms of receiving country GDP in the first era of globalization compared to today as Obstfeld and Taylor (2004) and Schularick (2006) discuss.

### II.C Integration in Labor Markets

Price and quantity based measures of integration are also available in labor markets. The relevant price in the labor market is the wage, and often the wage of unskilled labor is used to minimize problems in comparability across occupations. Analogous to the goods market, with free movement of labor, workers gravitate to localities with higher wages subject to several economic constraints. The standard

metaphors in the economic history literature for these constraints are *push* and *pull* forces. These connote factors in the sending and receiving country respectively. Flows would be larger when wage gaps are higher, where the sending country has a large percentage of the population that is male and of prime working age, and where previous migration has been high (Hatton and Williamson, 1994).

During the nineteenth century, the world witnessed some of the biggest waves of migration in the history of the global economy. Wages, and then wage gaps, of unskilled workers for the nineteenth century have been meticulously constructed by Jeff Williamson (1995) and subsequently by O'Rourke and Williamson (1997). A recent large scale project on comparative real wages goes back much further in time. Bob Allen and his collaborators have also contributed unique data on wages of building craftsmen and laborers in dozens of cities in Europe and Asia beginning in the fourteenth century. Allen (2001) calculates wages in 20 European cities in terms of silver, a common monetary standard over the long run, and also in terms of a real wage (nominal divided by a price index) and a subsistence wage. The latter is in terms of a fixed bundle of common consumables such as bread or grain-based victuals, alcoholic beverages, fuel, clothing and lodging. While wage gaps closed and convergence was the rule in the nineteenth century 'Atlantic' economy according to O'Rourke and Williamson, large wage gaps opened up within Europe between 1300 and 1800 in Allen's data. This divergence is consistent with the notion that labor market integration within Europe was low prior to the nineteenth century or that offsetting forces inhibited convergence. Again, the caveats of using price-based data apply.

## II.D Ideas and Technology

Flows of ideas and technologies are central to the growth and globalization literature. Nevertheless, because of measurement difficulties, the empirical historical research on integration in this domain is minimal. Because of the heterogeneous nature of ideas and technology, no observable, well organized market in ideas and technology truly exists. Price-based measures are not systematically available as they are for commodities like wheat, coal or iron. Equal challenges exist for quantity-based measures. Madsen (2007) argues that foreign knowledge is embodied in current and past

imports of high technology goods. For the period since 1950, he uses trade within several industries (chemicals, machinery and scientific instruments) as the key proxy for flows of ideas, while before 1950 overall imports are used.

The economic history literature has also focused on qualitative information regarding technology transfer, miscellaneous prices on factory equipment and the pre-fabricated factories for shipment to foreign countries in the nineteenth century. Fragmentary evidence based on patent citations has been used but the quality of information from these is low due to the variability in patent regulations prior to the twentieth century and the lack in many cases of domestic rules for citation of foreign patentees.

Greg Clark and Rob Feenstra (2003) and Robert E. Lucas (2009) use a structural approach and match the data on aggregate labor productivity to say something about technological catch-up in the nineteenth and twentieth centuries. Assuming a Cobb-Douglas production function, Clark and Feenstra report massive gaps in total factor productivity between countries that can only be explained by a failure to adopt best practice technologies in the less developed world. Clark and Feenstra note that the telegraph and shipping technologies connected the far reaches of the globe and allowed for rapid transmission of ideas and information when necessary. Politically, European empires often provided transfer of institutional technologies including strong property rights and other necessary cultural, social and legal conditions. British and American firms also began to specialize in the production of startup packages for hopeful entrants to the textile industry in the nineteenth century. These packages often included capital goods as well as human capital in the form of consulting on engineering and managerial issues. Still, despite all of this, many countries lagged behind. Clearly then, ideas and technologies in important industries have had the potential to be widely shared across space and increasingly so since the 18<sup>th</sup> century, however, systematic measurement of this process remains highly qualitative, and when it is quantitative, there are only a very limited amount of studies to date.

### III. Channels: The Theoretical Links between Globalization and Growth

### III.A Static Models and the Gains from Trade

There are many different views on the channels through which globalization, or integration might affect economic growth. It must be recognized that most theoretical results which provide inspiration for numerous investigations of these links were derived in static environments. The history of the global economy is dynamic by definition, and many of the standard arguments are in fact *not* well suited to explaining long-run growth or helping us understand the dynamic interaction between trade and economic growth. The intuition for the static gains from trade may not carry forth to a long-run environment where inter-temporal factors affect current investment decisions. Investments in physical and human capital and of course in research and development are the key drivers of long-run growth. It took until the 1980s and 1990s for a significant literature to develop a coherent view of the connections between trade, investment, innovation and growth, and still, much of these ideas have yet to filter into the analysis of the long-run of economic history despite their importance. Here we review a limited set of views on the connections between trade and growth and which have been oriented to understanding problems in economic history.

The textbook starting point has always been the recognition that limited international integration impedes the efficient allocation of resources. It is easy to show in a static model with almost any micro-structure that under free trade, in a small open economy, a representative consumer has higher welfare than under autarky. Consumer gains in standard models arise from improvements in the terms of trade. Increases in the terms of trade are associated with higher welfare and higher incomes. Still, the gains, from eliminating inefficiencies and the barriers to international trade are not all that large when all resources are fully employed or nations have large domestic markets.

Recent research has also emphasized the gains from variety. For consumers, increasing variety in the consumer basket due to trade bring welfare gains from what are essentially new goods in the consumption basket. Feenstra (1994) shows how to measure the drop in the consumer price index from such changes. This allows one to show another set of gains in real incomes from international trade. Romer (1994) suggests similar gains for producers from increased variety of intermediates allowed for by international integration. Desmet and Parente (2010) argue that international trade

brings forth higher price elasticities. In this case, profitability rises as output expands to serve foreign (or large domestic) markets. This endogenously raises the rate of growth of technological change since more profitable producers can afford the fixed cost of technological change. Little work has been done on estimating the magnitude of these effects in the past.

To get a handle on the size of the gains of trade, a particularly intuitive expression for the gains from trade has recently been derived in research by Arkolakis, Costinot, Rodriguez-Clare and (2009). They investigate the gains from trade in several leading models of international trade including perfect competition, monopolistic competition and trade with intermediate goods. Under fairly standard conditions these gains are given by the formula

$$(\lambda)^{\frac{1}{\varepsilon}} - 1$$

where  $\lambda$  is the share of total expenditure devoted to domestic production or 1 minus the ratio of imports to total income, and  $\varepsilon$  is the elasticity of imports with respect to a change in trade costs. The modern literature's estimates of this elasticity are in the range -5 to -10. The gains from trade are interpreted as the percentage change in real income needed to compensate a consumer for a move to complete autarky. For a nation with an import share of 15 percent and with a fairly low elasticity of -5 the "gains from trade" are roughly equal to 3 per cent. Higher elasticities would give smaller gains. To find the rise in income attributable to a rise in trade Arkolakis et. al. present another calculation. Consider a move to free trade, say for the United States in 1890. This would be going from the historical average ad valorem tariff equivalent of 40 percent to no tariffs. The relevant calculation for the rise in income is calculated by Arkolakis et. al. as

$$1 - \left(\frac{\lambda}{\lambda'}\right)^{\frac{1}{\varepsilon}}.$$

where  $\lambda'$  is the share of domestic expenditure after tariffs are lower and  $\lambda$  is the share before tariffs are lowered. In the case where the trade cost elasticity is -5, imports rise threefold. In the late nineteenth century American case, an actual import to income ratio of roughly 6 percent might have become 18 percent. The gain from this move to

free trade is then calculated as 2.7 percent of income. The elasticity of income with respect to trade is then a very small 0.0135. Recent empirical estimates from Feyrer (2009) produce a much larger elasticity of 0.5.

Calculations similar to those above but for a small open economy instead of the United States can also be done, but the bottom line from such calculations is that the gains from trade in commodities alone *cannot* easily account for the massive rise in living standards witnessed over the last 200 years. If one wants to pursue the issue and find a significant link between trade and growth then another tack must be taken. One possibility is that the static view of trade and income needs to be supplemented with a dynamic view for us to understand whether there can be any meaningful association between integration and growth.

### III.B The Dynamic Gains from Globalization

One simple way the literature has thought about dynamics is to study the one-off long-run impact on income of a change in integration in general equilibrium. Computable general equilibrium models yield predictions on how a *change* in globalization of trade, labor and capital markets can lead to a change in incomes and so forth. When trade barriers fall, nations specialize in goods in which they have a comparative advantage. Subject to several important assumptions, the Stolper-Samuelson factor price equalization theorem concludes that this will lead to wage convergence.

Williamson and O'Rourke (1999) summarize a large literature, which they largely pioneered, and argue that both trade and migration were a force for convergence in the 19<sup>th</sup> century in the Atlantic economy. Trade forced wages up in low wage labor abundant countries towards the level of labor scarce nations. Capital flows offset these convergence forces when they flowed from labor and capital abundant regions (i.e. Britain) to labor scarce but natural resource abundant regions (e.g., Canada, the US etc.). Labor flowing towards economies with high wages from low wage regions acted as a force for convergence as predicted by such models. The bottom line of this research program is that globalization is likely to lead to convergence (O'Rourke, Taylor and

Williamson, 1996). Convergence, however, is a disequilibrium phenomenon. According to standard models of trade, there is no reason for the *growth* rate of productivity to be higher in the long-run in a more globalized world. What was witnessed in the nineteenth century was essentially the comparative statics result outlined in a one-shot model general equilibrium model of the international economy.

A conceptual revolution in understanding growth emanated from new growth theory which promised something more in terms of the benefits from trade (Rivera-Batiz and Romer, 1991). The general view from new growth theory is that larger or more integrated markets enable entrepreneurs and inventors to more easily cover the fixed cost related to the development of a new idea.<sup>5</sup> Open international markets also promote the sharing of income enhancing ideas raising incomes and providing further stimulus for new ideas. As explained by Jones and Romer (2009), the growth rate of ideas rises as integration rises, or more generally, the incentives to innovate improve. The theoretical literature thus suggests that the growth rate is a positive function of the size of the market. Romer (1996) argues that American economic development in the nineteenth century was founded on economies of scale, and that America's size also helped increase the rate of advance of total factor productivity.

Another interesting avenue for dynamic gains is the possible interaction between institutions which facilitate innovation and productivity advance and the size of the market. Acemoglu, Johnson, and Robinson (2005) suggest that trade interacted with the political economy of European regions between 1500 and 1800. The urban merchant class, with an interest in strong property rights and low sovereign taxation saw their fortunes and political influence strengthen as the Atlantic economy burgeoned between the 15<sup>th</sup> and the 18<sup>th</sup> century. In regions where absolutist monarchs ruled, like in Spain, this did not occur. Here, exposure to the trade opportunities in the Americas and the

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<sup>5</sup>Dynamic issues were also considered in the earlier literature based on learning-by-doing and "infant" industry protection. Many exemplary case studies exist but the literature has not yet shown systematic evidence for such forces in history. David (1970) and Head (1994) find evidence of learning by doing in 19<sup>th</sup> century US cotton textiles and 19<sup>th</sup> century US steel rails. Head argues for welfare losses to users from protection. Irwin (2000) argues there were welfare losses from tariffs in the case of 19<sup>th</sup> century US tinsplate.

broader Atlantic basin failed to foment institutions supporting commerce, trade and urbanization.

Oppositely, outside of Europe in the nineteenth century, where societies came under the colonial domination of Europeans, weak institutional legacies often led to reduced incomes (Acemoglu, Johnson and Robinson, 2001). More specifically, in places where European settler mortality was high - due to endemic tropical diseases - Europeans looted and extracted resources but failed to invest in the establishment of strong property rights. These forces persist today long after de-colonization. Their evidence shows that places where settler mortality was higher have lower protection of property rights and hence relatively poor economic performance in the last half century.

Galor (2004) and Mountford and Galor (2004) give further theoretical insight on the conditions under which globalization may *fail* to lead to modern economic growth and instead keep some nations locked into a Malthusian regime. The Malthusian regime in this work is characterized as a situation where long-run living standards grow only very slowly. The Malthusian regime dominates until sufficiently high labor productivity is reached which can take a long time. In the most basic framework (cf. Galor and Weil, 2000), larger populations lead eventually to sufficiently high income per capita to spark a demographic transition. This allows for lower fertility and higher standards of living with a high rate of productivity growth. Families eventually opt for greater quality of offspring rather than higher quantity when incomes reach a certain threshold since the rate of return from investing in such human capital is high and the opportunity costs of raising children rises with incomes.

In such models, international trade does not improve prospects for long-run growth in all regions. This is because some areas will not have a comparative advantage in skill intensive industry if they are resource abundant or labor-abundant. If productivity growth depends on skill intensity in the previous period, then regions forced to specialize in low-skilled activity may remain mired in a Malthusian equilibrium. They persist in producing unskilled intensive or non-industrial goods *due to their trade with higher income regions*. In such regions, population growth eliminates any gains in per capita incomes due to productivity growth, these regions stay relatively poor and modern economic growth never appears. Trade does not stunt growth in all

models of trade and growth of course. A simple exploration by Eaton and Kortum (2001) of a Ricardian model of trade shows that productivity advance is invariant to barriers to trade. Larger markets incentivize innovation, but trade makes it more difficult to come up with an idea to compete with foreign technologies. Which effect dominates, if any, determines the long-run rate of growth of an economy.

Williamson (2011) asserts that trade led to de-industrialization in many regions from the nineteenth century. This often occurred where regions did not have the appropriate comparative advantage to specialize in industry. He highlights four reasons why a failure to industrialize might harm growth. First, industry often gives rise to urban agglomeration effects. Dense urban factor markets also bring efficiency gains. The demand for high-skill technical staff and services that facilitate industry brings productivity gains too. Finally, knowledge transfer is facilitated in urban industry. Williamson also notes that places that specialize in non-industrial pursuits have often fallen victim to the Dutch Disease due to an overvalued real exchange rate. Commodity specialization also brings high export price volatility and hence lower investment. In a similar vein, Ross (2005) and Bulte, Meissner, Sarr, and Swanson (forthcoming) note that resources are often associated with political instability, low investment and low growth. Resources create rents and enhance the ability of a country to borrow on international markets. In situations where authoritarian regimes claim property rights over all resources, borrowing or the ability to export commodities on world markets for quick cash can lead to “hit and run” or looting strategies. The impact is often low investment in the wider economy, political instability and low growth. Ross (2005) examines conflict where local insurgents battle incumbents for the chance to control natural resource rents borrowing on the collateral of resource rents via “booty futures” to fund such activity. This type of conflict provides a drag on economic growth.

A proper historical treatment of the idea that trade limits economic growth would also model both supply and demand forces shaping human capital accumulation and account for the institutional and market forces allowing for movement into high-skilled products. Many nations specialized in non-industrial goods such as Canada, New Zealand, and Australia and also managed to maintain high incomes and high growth rates. Today, countries in East Asia and elsewhere are promoting labor-intensive

manufacturing and experiencing rising living standards although this process took a long time to appear.

International capital flows should also allow capital scarce countries to raise their standards of living and converge. Many observers believed that the historically unprecedented outflows of European capital during the nineteenth century were often associated with better infrastructure and allowed for capital accumulation in the private sector. Gourinchas and Jeanne (2006) calibrate a neo-classical growth model and find that growth rises slightly in the short-run from such infusions. Large impacts on living standards and growth can only arise in such a model when capital flows are associated with deeper institutional and social changes. These forces allow for a higher long-run level of income per capita and hence add to the potential for longer transition dynamics. Also it is worth noting that in the neo-classical model of growth, a permanent rise in the rate of capital inflow would be akin to a rise in the saving rate. This would lead to temporarily higher growth rates and higher incomes in the long-run but no permanent effect on growth rates.

Further work by Ranciere, Tornell and Westermann (2006) is suggestive that countries that proceed apace with financial liberalization grow more quickly as entrepreneurs leverage an expansion in the capital stock. This generates a higher probability of a financial crisis, but, overall, stronger growth dominates in the long run compared to nations that do not liberalize. In such a case, a country will have large negative skewness of credit growth and be more susceptible to systemic crises. This would not necessarily result in a more variable growth path for incomes, but *would* be associated with higher average growth rates. We now turn to a discussion of the historical record on the relationship between globalization and growth.

#### IV. Globalization and History: From Antiquity to the 18<sup>th</sup> Century

The time from antiquity to the 18<sup>th</sup> century encompasses a period when all regions of the world were constrained under a Malthusian growth regime. This implies increases in living standards occurred only sporadically when small technological

innovations arose. Higher living standards (i.e., incomes per capita) could not endure if population growth responded in the long run. Within societies, feudalistic and other anti-competitive institutional arrangements gave ruling classes opulent lifestyles, but, by and large, economic growth was limited. Inter-regional trade was historically always an important force for sharing ideas and reducing price differences in commodities. But since transportation technologies remained limited, institutional protections for long distance trade did not exist, and trade was not fully competitive, overall trade, specialization and income growth due to such exchange was limited.

Findlay and O'Rourke (2007) lay out the interaction between geography, military power and technology across these centuries. In a pulsating analysis of the Arab conquerors, Viking incursions, the Pax Mongolica, Venetian dominance, Chinese empire and European discoveries, these authors emphasize that cross-regional trade has long affected local economies. Indeed, the search for scarce commodities and trade opportunities drove many of the major geo-political convulsions of the past.

Arab traders from the 8<sup>th</sup> century defined a trade network encompassing the Iberian peninsula in the west to the Indus and the Oxus in the east. Strong trading connections would eventually reach as far as South Asia, China in the East, and western sub-Saharan Africa. Not surprisingly, the various Arab caliphates produced great, if not highly concentrated wealth, while intermediating trade between the East and western Europe. Such a network enabled the northern European economy to obtain Eastern textiles and spices. This trade was generally cooperative on both the purchasing and selling end, but underlying forces within the local economies were decidedly feudalistic leading to the (probably unanswerable) question of whether there were net welfare gains from such trade.

With the arrival in Europe of Genghis Khan and the Mongol conquerors from the East, a vast overland network that sheltered Eurasian trade unfolded. The Pax Mongolica strongly stimulated the transfer of ideas, techniques, and goods.<sup>6</sup> As it turned out, the Mongolian invasions led directly to the spread of the Bubonic plague which

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<sup>6</sup> Diamond (1999) emphasizes that over the long-run trade of ideas and techniques on the Eurasian landmass was at the root of the eventual dominance in the global economy by its inhabitants. Diamond placed emphasis on the transfer of agricultural techniques along areas of similar climate, movement of plant and pathogenic organisms, and the domestication of native animals for husbandry.

afflicted Europe beginning in the mid-14<sup>th</sup> century. The Black Death revolutionized the price and wage structure in western Europe by instantaneously raising the real wages of survivors. As a result, in western Europe, bargaining power shifted against the feudal elite towards laborers. Labor gained and labor-saving technological change was induced. Higher wages also promoted urban merchant power by raising trade imports to Europe from Asia of luxury goods.

The European voyages of discovery, intent on breaking the Venetian, Genoan and Muslim intermediation of the far eastern trade, began in the 15<sup>th</sup> century. The arrival of Columbus in the western hemisphere and the circumnavigation of the Cape of Good Hope initiated a new epoch in the international economy. By the late 16<sup>th</sup> century, massive silver flows to Spain led to the onset of Dutch Disease in Spain (Drelichman, 2005). Demand for luxury goods increased, while the price of non-tradables rose. Spain sourced its luxury imports from the Low Countries in return for American silver. This gave rise to a new division of international labor. Indigenous labor in the Americas extracted silver, northern Europeans produced fine cloth and other consumer goods while trade with the East in spices and textiles intensified. New goods such as coffee, tea, tobacco, sugar and cocoa enlarges the choice set for consumers and hence provided higher welfare. O'Rourke and Williamson (2009) investigate price convergence between Asia and Europe on spices after 1500 and find evidence of price convergence attributable to the Portuguese trade. The introduction of trade routes not only facilitated productivity gains due to improved division of labor, but it also increased consumer welfare. Voth and Hersh (2009) estimate the value of access to these new goods as 10 percent of a common English laborer's wages. Such large gains, due to the spread of Empire and the enhanced competition on trade routes, certainly helped habituate European consumers to a higher standard of living. The availability of a broader range of goods associated with this Commercial Revolution gave an incentive to work harder.

Jan de Vries (2008) identifies a positive impact on living standards of the rise in integration from the mid-17<sup>th</sup> century. The rise in the intensity of work which coincided with these changes was called an *Industrious Revolution* by de Vries. The argument is straightforward: as the barriers to international trade fell, and the range of consumption goods increased, the incentive to work intensely increased. Rapid changes in the consumption patterns identified in Holland and England from the 16<sup>th</sup> and 17<sup>th</sup> century

could only be had if productivity and hourly wages had risen –which is unlikely - or if workers increased total hours.

Dutch command of shipping routes gave Amsterdam its pre-eminent entrepôt status for tropical goods. On the back of these changes, urbanization rates increased in the Low Countries, and financial innovations allowed for Dutch pre-eminence in financial developments in the 17<sup>th</sup> and 18<sup>th</sup> centuries including sovereign lending and trade finance. Such advantages were soon to be eliminated by the English however. The roots of the industrial revolution in the early 18<sup>th</sup> century stem not only from the domestic institutional foundations that restrained sovereign profligacy (North and Weingast, 1989), but from the English policy priority of dominating maritime trade. Findlay and O'Rourke (2007) call attention to the French envy of the dual English focus on military domination and development of commerce and trade. Contrary to other continental powers (excluding the Dutch of course) which limited economic activity to older feudal patterns and privilege, the English “combined since the time of Elizabeth to promote trade” (Crouzet, 1981 p. 65). International trade therefore is seen by many authors as a critical component of the British Industrial Revolution.

Property rights may have also been shaped by exposure to international trade. Acemoglu, Johnson and Robinson (2005) argue that the exposure of European economies to a global economy shaped their subsequent economic growth. Regions that were heavily involved in international trade *and* which had greater checks on their rulers urbanized and grew more quickly than other regions in Europe governed by absolutist monarchs. Trade with Africa, the Americas and Asia enhanced the bargaining power of local merchants and allowed for greater security of property rights.

## V. Globalization and the British Industrial Revolution

The British Industrial Revolution is of course a complex phenomenon and its causes include multiple factors and their interactions. This section briefly surveys the literature's views on how trade mattered for this process. It is now widely recognized that the British Industrial Revolution was a gradual process. The initial stages were

isolated in a few industries such as textiles and iron-making. The standard view is that the cotton jenny, the steam engine and improvements in iron making were some of the prime technological breakthroughs allowing greater productivity in many industrial activities. The latter two might be viewed as General Purpose Technologies that eventually had large spillovers for the modern sector.

Allen (2009) argues natural resource abundance, high labor costs, and extensive markets mattered for the Industrial Revolution. For instance, abundant coal, located next to rich iron deposits, along with high wages, made it rational for British entrepreneurs to substitute coal-using machines for relatively expensive labor. Eventually the cotton textiles industry was mechanized. Machines including the steam engine and the railroad allowed massive productivity gains in several sectors. All of this begs the question of what role global economic forces might have given rise to such invention and innovation? For Findlay and O'Rourke (2007, p. 348), one key pillar was "the role of parliament in promoting and fostering all forms of trade and economic activity." Exports as a share of income doubled between 1700 and 1800 from 8 percent to roughly 16 percent. Was this a symptom or a cause of British industrial success?

The clear supremacy of British cotton textiles on global markets dates from the early 19<sup>th</sup> century. Earlier, the colonial trade with India had introduced fine calico cloth to the British market. Competing domestic woolen textile manufacturers lobbied for higher tariffs and protection from such superior quality cloth. These tariffs spurred growth in English cotton manufacturing as well. Findlay (1982) classified this as an early example of (successful) import substitution. Later this gave way to "export diversification". By the first decade of the 19<sup>th</sup> century, British cotton textiles claimed the largest share of British exports due to high growth rates of productivity. The creation of foreign markets within the Empire, treaties with other nations assuring low tariff levels and protection from high-seas piracy from the Royal Navy all helped as well. Many authors have long viewed the inexpensive access to raw materials, particularly cotton, from the Western hemisphere as crucial in lowering input costs.

Indeed, an early view promoted by Eric Williams (1966) and later Inikori (1987) and Darity (1992), amongst others, suggested that England was able to accumulate capital and profits on the back of the slave trade and exploitation of the colonial

economies via coercive labor markets. Latter day Marxists lamented the colonial plunder which left England richer but the colonies destitute. O'Brien (1982) investigated the general "contributions" of the periphery to the first industrial takeoff to conclude that the profits arising from exploitation of the periphery were unlikely to be decisive in determining British fortunes. Since trade and the profits emanating from international trade were small, a maximum of 15% of gross investment could have been due to such interactions. Still, the opening of the Atlantic world and the broader global economy allowed for larger markets for British goods, lower cost raw materials, and finally some funds for re-investment. Clark, O'Rourke and Taylor (2008) conclude that trade with the entire world, but not simply the North American colonies, *was* crucial for the British economy. Their simulations show that without foreign markets, British industry would have shrunk by 35 percent and TFP growth would have slowed by 6 percent.

Eltis and Engerman (2000) survey the literature on slavery and the sugar economies of the Caribbean. Since the industrial revolution was founded on astonishing productivity advances in cotton textiles, and slave-produced raw materials added only a fraction to the final costs of making such goods, they find no convincing evidence of a role of the Atlantic slave trade in British economic success. Of course, all of this does not negate that the slave trade, colonization and competition from British exports mattered for the economic growth of the colonized economies.

The areas most affected by the Atlantic slave trade in western Africa seem to be significantly poorer today than comparable regions in Africa that were less exposed to the slave trade (Nunn, 2008). One possibility for this is that the slave trade encouraged slave raiding, kidnapping and lawlessness. The legacy is poor development of property rights and other crucial institutional foundations. Nunn and Wantchekon (2009) show convincing evidence that these places also exhibit low levels of trust and social capital which further impedes exchange and economic development.

Theoretical explorations of the causal relations between trade and the industrial revolution remain scarce notwithstanding the large literature. Standard Smithian explanations for increasing returns were ruled out early on by Findlay due to the small scale of British enterprise in the 18<sup>th</sup> century. McCloskey (1970) goes on to argue that such a small fraction of total expenditure and income relied on trade that it did not

seem plausible “a priori” to attribute any peculiar role to foreign trade as opposed to domestic trade. This is a point Findlay, echoing Mantoux (1961) vociferously disputes. The relevant metaphor is that only a small amount of yeast is necessary to ferment and chemically alter an enormous mass. Clearly, the non-linearities and the relationship between the micro-level activity and the macro outcomes are not well understood - even today. What seems likely however is that trade was the “child of industry” rather than the other way around.

Desmet and Parente (2009) take the view that market size was decisive in a theoretical contribution to the debate. In this model, larger markets spur innovation and productivity advance. The key link between market size and growth is that larger markets have larger demand elasticities. Firms that produce in a world of large demand elasticities see revenue and profits rise with expanded production. This greatly incentivizes innovation - in this case modeled as a sunk cost which can only be profitable with a sufficiently high elasticity. The elasticity in this model is a function of the size of the market. The calibrated model seems to roughly fit the stylized facts. The model predicts rising urbanization, higher TFP growth, and expansion of the domestic and foreign markets in the late 18<sup>th</sup> and early 19<sup>th</sup> century. Allen (2009) provides additional narrative support to the high elasticity theory. British cotton textiles benefitted both from local engineering and technology as well as the fact that global markets were competitive with high elasticities. Contrast this with France which produced high-end lace and knitwear and could not sell into ‘global markets’. Consequently the incentive to innovate and adapt new technologies was lower there since the demand for productivity enhancing inputs was lower. Theoretically, the Desmet and Parente model diverges from much of the standard trade literature which has focused on a constant elasticity case as per the Dixit-Stiglitz-Norman operationalization of the love of variety. Whether or not this particular view of British industrialization based on participation in a globally competitive industry will hold up in other data sets is an interesting question. Certainly this approach opens up many new avenues for further historical research.

Joel Mokyr credits the Enlightenment with the advent of the Industrial Revolution in northwestern Europe (Mokyr, 2010). This process of scientific awakening within Europe was unique, and it coincides with the flourishing of new scientific theories

and applications to practical problems. The Enlightenment in this view is a rise in the integration of the market for ideas. As Mokyr observes, during these years communities of scientific minds were frequently brought together in various scholarly societies in Great Britain and in northwestern Europe. Examples include the Royal Society and the Académie Royale both established in the 1660s which helped filter and “sanction” the intellectual leaders of the time. Eventually, the findings of those involved would help contribute not only to new general purpose technologies but innovative ways to enhance productivity and efficiency in a broad range of industrial pursuits. The Industrial Revolution in England, and its early diffusion throughout northern France, Belgium, the Low Countries and some of the Germanic territories was a result of these idea flows however imprecisely measured.

#### VI. Globalization and the International Diffusion of the Industrial Revolution: 1820-1913

From the early 1820s, international commodity markets became rapidly more integrated, whilst at the same time, economies outside of Britain began to experience the process of modern economic growth. A large literature sees these two processes as intimately connected. Not only did trade flows rise as transportation costs fell, tariffs dropped, and communications improved, but migration also surged, capital from Britain, Germany and France flowed into areas of recent settlement and less developed areas, and foreign direct investment as well as technology transfer accelerated. Growth takeoffs, demographic transitions, increased urbanization and sustained improvements in well-being significantly transformed the way of life of the average nineteenth century inhabitant of Europe and North America. Not every region shared equally in this increased prosperity, but most regions participated, and in most places higher incomes were associated with greater integration. Most regions were able to secure the gains predicted by static trade theory. It is an open question as to whether globalization limited attempts to achieve modern economic growth in places which specialized in non-industrial activity. Williamson (2011) suggests it did. His evidence, summarized and discussed below, notes that the first period of globalization set-off a process of de-

industrialization in many places outside of Europe which ultimately stunted long-run economic growth.

The British industrial revolution was founded on new technologies including the steam engine which also promoted market integration. Steam engines eventually powered the railroad engines that fused national and international markets. Iron hull ships and the steam engine made for higher quality maritime shipping (Allen, 2009). Lower tariffs reigned in England from the repeal of the Corn Laws in 1846. In 1860 the Cobden Chevalier treaty was signed. The explosion of Most-Favored Nation clauses afterwards promoted trade. The telegraph from the 1850s, monetary stability arising from the classical gold standard and construction of global European empires also enabled strong integration from the middle of the nineteenth century.<sup>7</sup> Commodity price gaps closed dramatically in the period, and world merchandise exports relative to world GDP rose eightfold between 1820 and 1913 from one percent to eight percent (Findlay and O'Rourke, 2003). Concurrent to these advances, Germany from the 1850s, Japan and the US from the 1860s and many other regions began the irreversible process of modern economic growth and/or industrialization. Per capita incomes in these places more than doubled between 1870 and 1913. In many cases, and in several ways, trade and globalization catalyzed this process.

The voluminous research of Kevin O'Rourke and Jeffrey G. Williamson summarized in O'Rourke and Williamson (1999) leaves little doubt that globalization led to wage and price convergence between the areas of "recent (European) settlement" and Europe. Wage gaps were pushed down by the large net emigration from Europe to the Americas. O'Rourke and Williamson show that while GDP grew at 0.7 percent in Ireland, GDP per capita grew at almost double the pace or 1.3 percent due to heavy emigration. Emigration mattered in many other places too. Eastern and Southern

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<sup>7</sup>See Lampe (2009) on the positive trade impact of the MFN clause and Accominotti and Flandreau (2005) for the opposite view. Cater and Lew (2006) argue the telegraph promoted international trade but almost always came along with new railroad lines. López Córdova and Meissner (2003), and Estevaderordal, Taylor and Frantz (2003) argue that the gold standard promoted international trade between 1870 and 1913. López Córdova and Meissner (2003) and Flandreau and Maurel (2005) show evidence that monetary unions enhanced international trade. Mitchener and Weidenmier (2005) find that empire was associated with higher foreign trade. Jacks (2006) notes that commodity price integration was higher due to institutional factors like the gold standard and empire. A large literature on tariffs, income and growth exists. We comment below.

Europeans migrated *en masse* to North and South America keeping wages down in the West and bringing them up in the East. O'Rourke, Williamson and Hatton (1994) estimate US real wages would have been about 9 percent higher in the absence of immigration during the nineteenth century.

O'Rourke and Williamson (1999) summarize the literature by noting that trade and migration were substitutes. In other words these forces worked in the same direction to promote convergence. Indeed, more than all of the large decline in real wage dispersion within the "Atlantic" economies is "explained" or accounted for by analysis in Taylor and Williamson (1997). Offsetting forces such as capital flows and trade responses worked to offset some of this convergence. The data from the nineteenth century for the now-advanced economies within Northwestern Europe and bordering the eastern Atlantic ocean are strikingly consistent with the predictions of the Stolper Samuelson theorem. Factor prices, especially wages, converged in the globalized Atlantic economy of the late 19<sup>th</sup> century.

The force driving this of course was integration which promoted specialization in products using their most abundant factors of production. In the Americas, this meant that growth in the resource intensive and agricultural sectors acted to put downward pressure on wages. Wright (1990) finds evidence that the USA was a net exporter of resource-intensive manufactures in the late nineteenth and early twentieth century. In Europe, increased specialization in labor intensive industrial output served to raise wages. Consequently in places like Belgium, and in Great Britain, Labour interests allied with industry to advocate free trade during the nineteenth century.<sup>8</sup> Cheaper grain imports and higher demand for their specialized industrial products abroad worked to raise incomes (Huberman, 2008).

What about integration in capital markets? To be sure, capital flows increased substantially and capital market integration rose from the mid-nineteenth century. New and competitive financial intermediaries based in the City of London, the telegraph, the gold standard and institutional arrangements such as the Council on Foreign

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<sup>8</sup> There was however a backlash to free trade emanating from Lancashire textile industrialists and workers in the late nineteenth century. This appears to be due to increased competition with other industrial nations and also penetration of Eastern textiles. The latter benefited from the continuous depreciation of silver against gold and hence eroded market share, jobs and profits (Wilson, 2001).

Bondholders and the British Empire promoted the supply of capital and deepened integration.<sup>9</sup> Net inflows to the receiving countries were significant. On average, the current account deficit/GDP in countries such as Australia, Canada, New Zealand and the US (mainly prior to 1860 in the latter), was on the order of three per cent and much higher in many years. Foreign investment often accounted for about 20 per cent of total investment in many net capital importers of the time and up to 50 per cent in Australia, Canada, Argentina and Brazil (Fishlow, 1985 and Williamson, 1964 on the USA). Clemens and Williamson (2004) reveal that the Lucas Paradox, the lack of capital flows to less developed countries, was somewhat less marked in the 19<sup>th</sup> century than in the late 20<sup>th</sup> century, but that richer countries still received a disproportionate amount of the world's capital inflows.

Clemens and Williamson (2004) also look at the demand side and the barriers to integration in nineteenth century capital markets. They show that capital chased migrants and natural resources. In other words it was drawn to destinations where the marginal product of capital would likely be highest. This also leads to the observation that, *ceteris paribus*, lower capital flows would lead to lower marginal products for other factors of production and hence lower factor incomes. O'Rourke and Williamson (1997) report one initial analysis for a limited set of countries. They suggest that capital-labor ratios were higher in several countries during the 1870-1913 period due to capital inflows, but many countries were hardly affected by the global capital boom. For instance in Italy, Portugal, Spain, and Ireland, capital-labor ratios and real wages seem not to have been affected by capital flows during the period since they received such small amounts. In Denmark, Norway and Sweden their estimates show an average increase in the capital-labor ratio of 16, 17 and 50 percent respectively, and significant rises in the real wage were had as a consequence.

Rather than look at the capital stock directly, for which the data are somewhat limited, a second approach has looked at the financial flows of the time and correlated them with incomes in the spirit of the cross-country empirical growth literature. Bordo

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<sup>9</sup> See Esteves (2007) for a recent analysis of the Council on Foreign Bondholders. Bordo and Rockoff (1996) and Obstfeld and Taylor (2003) study the gold standard and capital flows. Ferguson and Schularick (2006) argue that the British Empire lowered bond spreads. Mitchener and Weidenmier (2005) show that colonial ties with the USA lowered bond spread in the Americas.

and Meissner (2011) and Schularick and Steger (forthcoming) study the short and long run associations between capital flows and incomes between 1870 and 1913. Both studies find that foreign capital flows are associated with higher incomes. There is no evidence yet, however, that such flows raise growth rates over the long-run. Schularick and Steger provide evidence that capital flows in the 19<sup>th</sup> century raised investment rates allowing for higher incomes. Bordo and Meissner agree but also focus on the economic risks associated with financial inflows. Inflows in the 19<sup>th</sup> century appear to be highly correlated with the probability of a banking, currency or debt crisis and these bring income down in the short run by up to three per cent on average. The negative impact on incomes of the small number of debt crises studied is large and long-lasting as well.

Financial globalization's direct effect in the nineteenth century was to allow for rising living standards, but the indirect effect was negative via financial crises. Heterogeneity in other underlying determinants of financial crises such as reserve accumulation, trade openness, exchange rate policy and overall financial development made it so that experience in handling capital inflows differed. Some countries like those in Scandinavia, Canada, Australia and the US seemed to benefit from capital inflows. In nations with under-developed financial systems, non-credible commitments to fixed exchange rates and where the executive branch of government was relatively unconstrained, capital flows presented a threat to income stability due to the higher likelihood of a financial crisis.

## VII. Cross-Country Comparative Evidence from the late Nineteenth Century

A large literature studies the empirical connections between trade exposure and economic growth in the post-World War II period. Many of the same research designs have been implemented in the nineteenth century setting. The work-horse econometric model, underlying many of the studies surveyed below, is typically a regression of the

growth or level of GDP per capita on measures of trade exposure and other independent variables. Not all authors agree that free trade promoted long-run economic growth in the nineteenth century. In parallel to the debates that still rage regarding the connection between trade and growth in the post-World War II era, economic historians continue to debate the relationship between trade and growth in the past.

The starting point for many of these studies was the historical observation that despite the rise in the global trade share during the nineteenth century reported earlier, many countries imposed higher tariffs after 1870. O'Rourke and Williamson (1999) present unequivocal evidence that price gaps widened wherever tariffs were raised. American tariff policy generated the equivalent of a uniform tariff of close to 40 percent between 1870 and 1913 (Irwin, 2010). The southern cone of Latin America kept high tariffs as well (Clemens and Williamson, 2004). In Europe, Germany raised tariffs in 1879. France imposed the Méline Tariff in 1884. These continental giants famously increased protection for their agricultural sectors because of the so-called grain "invasion". Cheaper transportation and supply-side expansion led to a large rise in grain imports from the Americas and eastern Europe. In Germany, the political bargain involved extra protection for industrial interests. Contrary to these moves, we see that in Asia, Japan, India, China, Siam, and Indonesia signed treaties that limited rises in import tariffs from the mid-nineteenth century.

Bairoch (1972) undertakes a study of the impact of protection on growth prior to 1914 in Germany, France, Italy and Great Britain. The finding is that nations grew faster under higher tariffs. Since other forces are not considered in the study, this finding stands simply as an unconditional correlation that could have been due to omitted factors.

Kevin O'Rourke (2000) enlarges the sample and conditions on several other variables in a regression framework, also finding that growth in per capita income was slowest in those countries that had the *lowest* tariffs. While Britain maintained low tariffs, the US, Canada and Argentina boasted high average tariff rates. Recent work by Lehman and O'Rourke (forthcoming) supports this, and goes further suggesting that *what* countries protected mattered. Tariffs on manufacturing industries were associated with higher growth, but they were not associated with high growth in the primary

sector. The explanation is compatible with a story where tariffs raise the rate of return on activity that generates externalities such as research and development, improved product quality and an expanded variety of locally produced products. Implicit in the argument is that domestic markets are better than international markets at providing these incentives. This is at odds with much of the trade and growth literature which equates these outcomes with the overall size of the market. More research on this possibility must be a priority to fully understand the mechanisms since direct evidence has not yet accumulated. One other possibility is that tariffs are beneficial for growth but that this result is dependent on the external environment as discussed in Clemens and Williamson (2004).

Subsequent to the early findings that tariffs coincided with high growth, a series of papers argued strenuously that the opposite was true. Irwin and Terviö (2002) estimate an instrumental variables regression where GDP per capita was the dependent variable and total trade relative to total output was the key independent variable. Geographic determinants of trade were used to predict bilateral trade and the predicted shares were aggregated across all partners to build up predicted trade shares. The latter are used as an instrumental variable for actual trade following the lead of Frankel and Romer (1999). The data for 1913 show a positive and significant relationship between trade and output per person. Irwin (2002) also disputes the notion that higher tariffs caused higher growth. Canada and Argentina, for example, relied on capital imports to create export-led commodity based growth. When the sample is increased to include Russia, Portugal and Brazil, we see that they also implemented high tariffs but faced low growth. Schularick and Solomou (forthcoming) estimate no relationship between tariffs and income using GMM techniques.

David Jacks (2006) looks at a slightly different sample than O'Rourke (2000) by lengthening the time dimension and adding countries. He finds evidence consistent with both strands of the literature: openness is positively related to growth but so are higher tariffs. Following the argument of Clemens and Williamson (2004), tariffs appear to have been associated with higher net exports and also the effect seems to be dependent upon the foreign level of foreign tariffs. In yet further work on a broader sample that includes many countries in the periphery, Blattman, Clemens, and Williamson (2002) claim that growth and tariffs were only positively associated with growth in the

European core and the “English speaking offshoots” (i.e., Canada and the USA for instance). In southern Europe and in Latin America, tariffs were high but did not correspond with growth. Their explanation is that a “country has to have a big domestic market, and has to be ready for industrialization, accumulation, and human capital deepening if the long run tariff induced dynamic effects are to offset the short run gains from trade given up.”

Another strand of the literature has taken a longer time horizon into consideration. Vamvakidis (2002) studies the 1870-1910, 1920-1940, 1950-1970 and 1970 to 1990 sub-periods. A positive relationship between growth and trade openness only becomes apparent after 1970. In the 1920 to 1940 period there is a negative relationship. Similarly, Clemens and Williamson (2004) identify a “tariff-growth” paradox noting that high tariffs are associated with high growth before World War II but not after. Their explanation is that the global environment matters. In the post-World War II world of low tariffs, nations may lower welfare by raising tariffs as penalties are imposed abroad. In a world where tariffs are high in a few large countries (i.e., prior to 1914), high tariffs might not be as damaging and may be associated with better economic performance.

#### VIII. Globalization and the Great Divergence: The Periphery Falls Behind

The case that trade is universally correlated with high growth and rising living standards has also been challenged based on the historical record of the periphery. How was it that during the nineteenth century, a period of deep integration, many nations fell behind and failed to industrialize? During the nineteenth century global boom, Galor and Mountford (2004) observe that (unexplained) early advantages in factor endowments were decisive for the now richest countries. Specifically, these nations were relatively technologically advanced being abundant in semi-skilled and high-skilled workers and hence less “land and labor abundant” by the early 19<sup>th</sup> century when the global trade boom erupted. In these nations, trade augmented the incentive to invest in human capital while in those nations endowed with natural resources or abundant in low skilled labor, the incentive to invest in human capital was low. These nations became increasingly specialized in low-skill intensive industries. Per capita incomes did not rise as fast in the “periphery” as in Europe and North America, there was a delayed demographic transition, and the gap between the richest and poorest countries

increased. This is not to say that the periphery did not see rising incomes in the 19<sup>th</sup> century. The best available evidence suggests that many nations did grow. However, they did not grow as fast as the core industrial countries and they failed to maintain these growth rates over the long run. The well-known reversal of fortune in Argentina - once one of the highest income countries in the world - is an extreme case here.

For this story to hold, the demand for human capital cannot be high even despite an apparently high rate of return in such countries. Galor and Mountford (2004) rationalize this by arguing these rates of return “reflect a suboptimal investment in human capital in an environment characterized by credit market imperfections and limited access to schooling.” Clearly, a better understanding of the market for education and the institutional foundations of the supply for education is merited here. These are likely to be very important constraints. Lucas (2009) also investigated the diffusion of the industrial revolution to poor countries and posited a “wedge” that inhibited accumulation of technology or know how. The traditional sector is large in poor countries and less receptive to frontier industrial technologies. The conclusion that “backward” countries would never converge does not stand in simple versions of this model. Eventually the incentive to adopt new industrial technologies would be large enough to induce a change. In the short to medium run however, gaps between rich and poor open up as there is also a strong incompatibility between industrial know-how and local traditional production techniques. Clark and Feenstra (2001) take one approach to studying these gaps in the nineteenth century and find that the incentive to adapt leading technologies was ostensibly too small to induce change in many non-European economies. Since the 1950s, many once poor nations have joined in the process of convergence, particularly those in East Asia, Chile in Latin America and several nations from Eastern Europe. The important role of human capital in this process has been highlighted in East Asia by Crafts (1999) amongst others. It may be the case that the theoretical models discussed above can explain this late industrialization. To do so they would need to explain the timing, and this should be related to the flow of useful ideas from the more developed part of the world or from domestic sources and the incentives to exploit them.

Williamson (2011) explores the historical dimensions of “de-industrialization” in what has now come to be known as the “periphery” or the Less Developed Countries.

These are places where manufacturing once flourished in the past but where such activity witnessed a steady decline over the nineteenth century and in the early 20<sup>th</sup> century. For example, India and China produced more manufactures as a percentage of world output prior to the nineteenth century than Great Britain and the rest of the western economies, but this obviously was not the case throughout the nineteenth and twentieth centuries. Such nations were not highly specialized in industrial activity over the last two hundred years. Williamson (2011) equates industrial activity with higher long-run growth and hence de-industrialization creates divergence by definition. In Williamson's view, urban industry creates high demand for skilled workers, it benefits from agglomeration, and it allows factor markets to be thicker and hence more efficient. The corollary is that specialization in non-industrial activity, induced by trade with places with a comparative advantage in industrial goods should lower the capacity for long-run growth. Resource-based economies fall victim to the "resource curse" as rents accrue to a wealthy elite and Dutch Disease lowers investment and productivity advances in the industrial tradeable sectors. Resources also give rise to conflict as actors compete to gain access to the rents created by these endowments. Terms of trade volatility, documented to be much higher in primary producing areas, also seems to have been correlated with lower investment and lower growth. Williamson builds the case that places like Japan, which was labor-abundant and resource scarce, was able to industrialize and avoid a resource curse precisely due to this set of factor endowments. In the late 20<sup>th</sup> century, countries that have actively promoted industry and especially labor-intensive exports have also fared better as in East Asia.

The striking divergence of different sets of resource based economies from the nineteenth century raises a challenge to Williamson's thesis however. After all, Canada, Australia, and to a large degree the United States built successful, high-growth economies from their resource-based comparative advantages (Keay, 2007, McLean, 2004, Wright, 1990). The staple theory of economic growth, as applied to Canadian development, proposes that an economy can build on forward and backward linkages (Watkins, 1964). Norway's oil-finds of the late twentieth century did not lead it down a conflict-ridden path followed by many of the west African states "blessed" by oil reserves nor has it fallen victim to a Dutch Disease. Chile may also be heralded as a success case. This nation has steadily managed to elevate its economic status in the last

three decades by becoming a net agricultural and resource exporter. These exceptions illustrate that resources and non-industrial pursuits are not always a curse. Systematic evidence from the recent past is examined by Robinson, Mehlum and Verdier (2006) and Mehlum, Moene, and Torvik (2006) who argue that where property rights, institutions, and political arrangements promote stability and efficiency resources do not bring a curse. What we know from the United States case is that government involvement in the US geological survey, promotion of technical ability and research in geology, agriculture and metallurgy and active entrepreneurs seeking to capitalize on a resource-oriented industrialization enabled a high income high growth outcome in the United States. In Australia, McLean (2004) notes a parallel development of public support for agricultural research. The history lesson is that even in agriculture, technical advance is not doomed to be slow. Olmstead and Rhode (2008) survey US agricultural development over the nineteenth century and provide ample evidence that innovation, based on careful experimentation and adaptation to climate and pest environments, allowed for rapid land and labor productivity advances in crops and livestock. What remains to be investigated systematically and using the experience of many countries over time is the determinants of demand for skill in the primary and agricultural sector and the political and economic determinants of the supply of institutions necessary to satisfy such demands.

The case of Mexico also proves interesting evidence in this debate. During the late-nineteenth century, Mexico is often seen as an early example of export-led growth based on primary products. Catão (1998) finds however that the Mexican export sector was “isolated” from the modern sector. Silver, lead, copper and petroleum made up 80 percent or more of total exports generating substantial surpluses for the Mexican economy. Mining processes used in Mexico were apparently highly capital intensive leading to no significant increases in the demand for labor as a complement in the production process. Forward linkages between the mining and industrial sector also never materialized despite their theoretical plausibility. As an illustration, it is estimated that only about 5 percent of the total mineral production of Mexico was refined or smelted domestically. Lead was shipped to New York to be refined rather than in Mexico itself. While imports failed to keep pace with exports, little of the surplus appears to have been absorbed domestically. Henequen production displayed

evidence of the Dutch Disease emphasized by Williamson. Foreign expertise and capital were ubiquitous – machinery and equipment for an entire henequen processing facility were reportedly shipped to Mexico from abroad in the late nineteenth century (Beatty, p. 400). It does not appear that barriers to trade in technology were a serious constraint. Instead, social and political problems persisted. Local land-owners preferred to over consume foreign luxury goods rather than save the proceeds of their surpluses which might have financed further growth.

Nevertheless, much of this story has been re-interpreted. Beatty (2000) documents a mineral-led export boom, but note Mexico's exports were only less diversified than Argentina and Peru out of all Latin American producers. Mexico's government played an active role in encouraging mining and primary production by sponsoring infrastructure investment which lowered the cost of such exploitation. By the early 20<sup>th</sup> century, Mexico's government attempted an early version of import substitution by raising tariffs on selected industrial imports and crafting a tax policy that subsidized various industries. The data reveal that many new industries had grown up to supplant imports of consumer goods during this period:

The list of such industries...includes both manufactured goods destined for consumers as final products (such as cigarettes, cotton textiles, beer, soap, footwear, candles, paper, ink, and food products) as well as goods destined for use in various kinds of extractive and manufacturing processes (such as diverse iron and steel products, explosives, window and bottle glass, cement, bricks, paints, leather, chemicals, and processed minerals)...(Beatty, 2000 p. 419)

Córtés Conde (1992) summarizes similar evidence from Argentina and Brazil prior to World War I. He suggests that in these nations there was a burgeoning local industry like in Mexico. Clearly, something more than de-industrialization was going on in these places.

## IX. Conclusions

Coming forward into the twentieth century, the connections between growth and globalization have exhibited an equally complicated relationship as during the golden age of globalization prior to World War I. The two decades of instability between the World Wars witnessed an up and then a down in global integration. The 1920s gave back some of the global linkages established prior to 1914 and growth was relatively strong as nations stabilized. The 1930s witnessed varying outcomes but by and large growth resumed as trade recovered.

Great Britain and its trade partners in the Imperial Preferences system forged a path to recovery by forming a trade bloc. British devaluation also helped fuel recovery via exports as in many other nations. Germany, with the aid of its satellites in the Reichsmark bloc and significantly more autarkic policies, re-armed for total war and witnessed economic recovery in the late 1930s. Meanwhile, the United States (re-) negotiated low tariffs with its trade partners from 1934 under the Reciprocal Trade Acts thus reversing the inability of periphery nations to export their way to solvency. Latin American withdrawal from world markets has its roots in the experiences of the inter-war period. As a consequence of all of this, while trade re-emerged, along with recovery from the Depression, trade grew much more slowly than world output after 1933 (Madsen, 2001).

After World War II, the best evidence is that tariffs and growth were negatively related. Latin American nations imposed prohibitive tariffs intended to spur local industry and reduce reliance on foreign manufactures. Taylor (1999) documents significantly lower investment and hence lower incomes for these nations. His paper, "On the Costs of Inward Looking Development" finds significant evidence that the post-war import substituting regimes damaged living standards and limited growth. Estevadeordal and Taylor (2010) provide recent evidence that nations that raised the price of foreign capital goods and machinery via trade policy experience lower growth.

From the 1970s onwards, cross-country economic evidence purported to show that distortions induced by trade policy and exchange control were associated with

lower economic performance. This contributed to the building of a “Washington Consensus” that liberal policies were best for growth. Subsequent analysis of the East Asian miracle by Rodrik (1995) argued that rather than engage in a laissez-faire model of growth, Taiwan and South Korea got “certain interventions right”. In South Korea, the government promoted heavy investment and accumulation of foreign equipment prior to the export boom. The early investment push led to a subsequent export boom. Rather than export-led growth, this successful program involved a number of distortions that subsidized and encouraged capital accumulation. Additional factors in the Korean case must include good initial conditions of high human capital, favorable demographics, and low levels of wealth inequality.

The lesson from the literature then is not necessarily that closing up is beneficial when a nation has fallen behind. The most obvious example is the dismal economic failure of North Korea, but many other nations have experienced equally poor outcomes by closing themselves off. Other conditions must obtain to achieve long-run economic growth in closed economies. And again, certain economies have grown *despite* high tariffs. Trade itself may not yield higher growth rates as some evidence suggests for the economies that de-industrialized in the 19<sup>th</sup> century. In terms of other forms of globalization, we have learned that international labor mobility acted as a force for convergence in the nineteenth century. Since the interwar period, global migration became a pale shadow of its former self ruling out the possibility that the international movement of people has played as decisive of a role for understanding growth and convergence in the global economy over the last 70 years.

As for global capital markets, the historical record shows that the large cross-border flows of the 19<sup>th</sup> century were a force for growth in the receiving countries but also led to divergence. Capital flowed to regions with abundant natural resources and working age males. Foreign capital helped raise incomes in institutionally advanced commodity-based exporters and industrializers. Elsewhere, these flows exposed many nations to financial crises. These events dealt large shocks to many receiving and sending countries across the 19<sup>th</sup> and 20<sup>th</sup> century. The Great Depression represented the end of the slavish adherence to the gold standard at historically defined parities and the severe constraints on achieving domestic macroeconomic balance this institution engendered. The rise of representative democracy and a lack of international

cooperation made the gold standard hard to maintain in the face of capital flows in the advanced core from the 1930s (Eichengreen, 1992). Nations also opted to forego significant international capital flows for many decades after World War II due to their fear of the “destabilizing speculation” they witnessed in the 1930s. The strong resurgence of those capital flows beginning in the late 20<sup>th</sup> century has been associated with the 1980s debt crisis, the Asian financial crisis of 1997-98, and even the global crisis that began in 2007-08. The research for the modern period prescribes proper sequencing of financial liberalization and other potential pitfalls to wholesale liberalization. Domestic financial conditions, policies and institutions need to be “adequate” and “sound” before opening up to international markets can yield positive growth benefits (Klein and Olivei, 2008). This means that it has been hard to find convincing evidence that liberalized capital accounts have always, over the long-run, been associated with significantly stronger growth in the long-run in all cases.

Adam Smith and David Ricardo’s logic that free trade brings benefits to both parties of the exchange is impeccable. Nations have generally experienced aggregate income gains from specialization whether they were distributed equally or not. But free trade may not yield the efficient outcome when more complex environments are considered and the program to be solved becomes dynamic. Using the long-run of history to investigate the relationship between *growth* and globalization reveals that the relationship between these two outcomes rather complex and nuanced. The historical record largely confirms that there is no one-way positive relationship between the growth and globalization at all times and for all countries.

It now appears that when globalization has demanded specialization in natural resources, Dutch Disease, low investment and physical conflict over “rents” can occur. Conflict over the right to control such endowments is clearly inefficient and it is very likely to be catalyzed by the incentive to export these goods to world markets and the ability to finance their exploitation with foreign capital under imperfect governance structures (Ross, 2005 and Bulte, Meissner, Sarr, and Swanson, forthcoming). This suggests one way in which institutional pre-requisites must be satisfied to fully enjoy the static *and* dynamic gains from trade.

Dynamic models that predict specialization in primary production by some countries may lead to welfare losses for future generations in places where globalization delivers low rates of human capital accumulation and lower TFP growth. Further research should sort out whether the historical record is at odds or is consistent with this view. In particular, it remains to be seen whether the specialization in primary products with low-productivity growth is a function of other underlying factors or not. If it is, then trade and specialization may not be at fault *per se*.

A second inefficiency associated with globalization arises when international capital markets are open. Information asymmetries, the unenforceability of repayment of debts, strong lender and borrower moral hazard, and other market imperfections generate inefficient levels of international lending. These forces can create significant welfare losses, crises and economic volatility in the growth rate of liberalized economies. These market imperfections are surely more important in international markets than in domestic markets where sovereignty is not an issue and where regulations are typically better enforced. Measured consideration of the benefits and costs of cross-border flows is necessary after a careful look at the long-run record.

The historical record suggests therefore that liberalizing international markets is not necessarily a policy that will raise economic growth. Other pre-conditions and other policies to promote growth seem to be just as important, if not more so, in many cases. All of this does *not* argue that adding further distortions to the policy mix by limiting the process of globalization in some narrow sense via tariffs or closed capital accounts is necessarily advantageous. Instead, the long-run historical record merely reminds us that economists be significantly more cautious when making the claim that “globalization” or “free trade” is unambiguously efficient.

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Figure 1 Panel A: A Rise in Integration and Trade between Two Markets as a Consequence of Lower Trade Costs

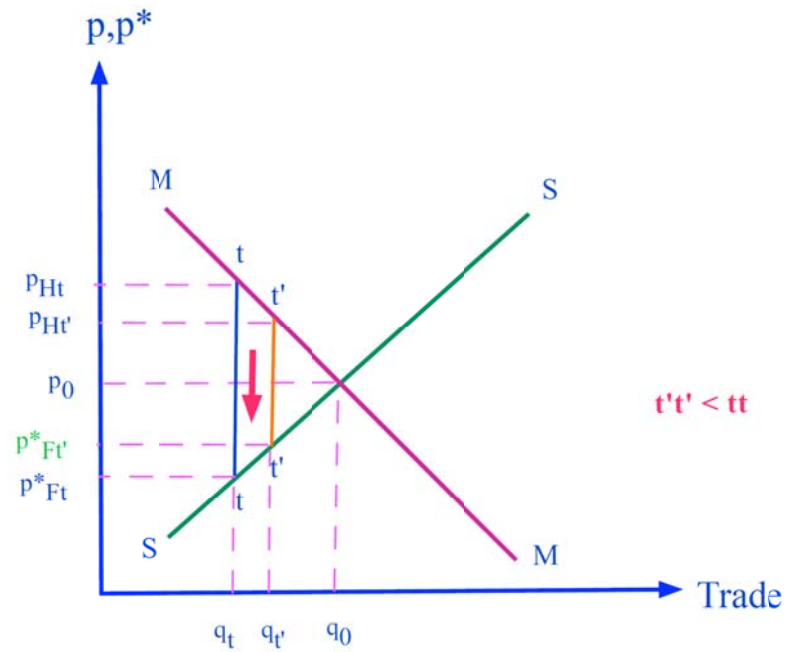


Figure 1 Panel B: A Rise in Trade between Two Markets with no Rise in “Integration”

