TRADE AND IMMIGRATION, 1870-2010

David S. Jacks
John P. Tang

ABSTRACT

In this chapter, we describe long-run trends in global merchandise trade and immigration from 1870 to 2010. We revisit the reasons why these two forces moved largely in parallel in the decades leading up to World War I, collapsed during the interwar period, and then rebounded (but with much more pronounced growth in trade than in immigration). More substantively, we also document a large redistribution in the regional sources of goods and people with a shift from the former industrialized core countries—especially Europe—to those in the former periphery—especially Asia—as well as a very striking change in the composition of merchandise trade towards manufactured goods precisely dating from 1950. Finally, using a triple differences framework in combination with a dramatic change in US immigration policy, we find evidence that immigration and trade potentially acted as substitutes, at least for the United States in the interwar period.

David S. Jacks
Department of Economics
Simon Fraser University
8888 University Drive
Burnaby, BC V5A 1S6
CANADA
and NBER
dsjacks@gmail.com

John P. Tang
Research School of Economics
26 LF Crisp Building
Acton ACT 2601
Australia
jptang@gmail.com

1. Introduction – the rise, fall, and resurgence of global immigration and trade flows

Trade and immigration have reappeared as major policy issues in the present day and for good reason. The past century and a half has witnessed a dramatic rise, fall, and resurgence of globalization as measured in the collective movement of goods and labor. In this chapter, we describe long-run trends in merchandise trade and immigration as well as attempt to determine the relationship between the two. Although there are a number of limitations on the data available—particularly for immigration—and hence on our ability to be truly global in our outlook, this chapter is one of the first to take a very long-run perspective on these two phenomena while capturing the bulk of recorded trade transactions and immigration patterns.

What we observe is that these two forces moved largely in parallel in the decades leading up to World War I, collapsed during the interwar period, and then rebounded but with much more pronounced growth in trade than in immigration. There was also a large redistribution in the regional sources of goods and people with a shift from the former industrialized core countries—especially Europe—to those in the former periphery—especially Asia—as well as significant variation in these flows within regions over time and a striking change in the composition of merchandise trade towards manufactured goods dating from 1950.

In a long-panel analysis of Canada and the US, which together received the bulk of both goods and immigrants for most of this period, their bilateral exports are positively correlated with inward migration from those trade partners, suggesting complementarity based on factors of production. However, a more rigorous analysis using a triple differences framework in combination with a dramatic change in US immigration policy in the interwar period indicates the opposite. This result may be due to unaccounted-for policy changes in immigration policy and/or the specific decades covered, but it does suggest the need for more empirically rigorous work in this area. These results and the historical patterns of the trade in goods and immigration are explained in greater detail below.

2. Global trends in immigration and trade, 1870-2010

This section is intended to provide the reader with an overview of developments in immigration and trade over the period from 1870 to 2010. Apart from the evidence at the global level, the various sub-sections consider immigration and trade at different levels of granularity, allowing us to identify the moving parts which are sometimes obscured at the highest level of aggregation. Thus, we consider, in turn, immigration flows into six settler economies for the full period, immigrant stocks in the United States for the full period, and immigrant stocks in twenty-one advanced economies from 1960 to 2010. Likewise, we consider, in turn, regional shares in world exports, country shares in regional exports, and the share of manufactured goods in merchandise exports, all over the full period from 1870 to 2010.

2.1 Immigration flows and stocks

To begin, we must make it clear what constitutes immigration for the purposes of this chapter. Most succinctly, immigration is not synonymous with migration. What we have ideally in mind here is the voluntary movement of individuals across national borders for purposes of permanent relocation. Thus, we *exclude* from consideration large migration streams associated with:

(1) changing borders (as in the case of individuals born in British India but finding themselves resident in one of its subsequent partitioned states, either by choice or by force);

(2) displacement due to domestic conflict, famine and natural disaster, and/or inter-state conflict (as in the case of various waves of refugee from the time of World War II);

(3) immigration flows which largely proved to be temporary in nature and to not have had a dramatic bearing on the demographic profile of destination countries (as in the case of the significant out-migration from China and India in the nineteenth century); and

(4) within border movements of individuals as frontiers were settled (as in the case of the United States or the opening up of Manchuria for Han settlement in the nineteenth century).

Although there is a significant historical literature which speaks to these issues, we abstract away from them for the purposes of this chapter, due to our desire to only address developments with—relatively speaking—hard and fast numbers attached to them (cf. McKeown, 2004 and Moses, 2012). That being said, the broad trajectory of immigration's rise, fall, and resurgence sketched here corresponds in the main with the trajectory of the forms of migration enumerated in (1) through (4).

Even in this case, our task is complicated for the fact that much of the data we possess on immigration flows and stocks conflate the movement of individuals across international borders for purposes of permanent versus temporary relocation. With these caveats in mind, we next consider the accumulated evidence of immigration in the form of immigrant flows and stocks, with particular emphasis on areas of comparatively recent settlement and into advanced economies, respectively.

2.1.1 Immigrant flows into six settler economies, 1870-2010

In recent work, Madsen and Andric (2017) have compiled records of immigrant flows into the six primary settler economies of the nineteenth century. These are Argentina, Australia, Brazil, Canada, New Zealand, and the United States. Their purposes lie in assessing the connection between immigrant flows and the subsequent trajectories of unemployment in these destination countries. Our concern chiefly lies with documenting the size and composition of these flows.

To this end, Figure 1 starts with Madsen and Andric (2017) as a building block and supplements it with the figures for bilateral immigrant flows reported in the DEMIG TOTAL database (DEMIG 2015). The first series for total annual flows of immigrants (in millions) highlights the growth in immigrant flows from 1870 and the role of 1913 acting as the highwater mark with 2,261,644 individuals landing in these six destination countries in that year. The sources of this marked rise in the late nineteenth century are typically thought to be found in the combination of large gaps in economic and political opportunity in between source and destination countries, liberal immigration policies in destination countries, low costs of passenger transportation, and, in some instances, the relationship between metropoles and their colonies (Hatton and Williamson, 1998; Magee and Thompson, 2010).

These developments proved to be relatively short-lived as immigrant flows ground to a near halt with the combination of disruption arising from the World Wars and restrictive policy in destination countries—but above all, the United States—starting in the 1920s. Not surprisingly then, 1943 marked the nadir with a mere 41,247 individuals landed. Seemingly, there was nowhere to go but up from there: the immediate post-WWII period gave rise to a significant burst in immigrant flows, then followed by a gradual rise up to the 1980s which seem to be an inflection point in the series. Indeed, only starting in 1988 do flows consistently exceed one million individuals per year. With nearly 1.5 million individuals entering these settler economies in an average year in the period from 1900 to 1914, it would seem that we have witnessed these flows nearly re-attaining the heights of the 1900s.

However, some caution is warranted in pushing this observation too far: the population base of the six destination countries considered here increased dramatically in between the 1900s and the 2000s (more specifically, by a factor of 4.5 in between 1910 and 2010). Thus, the second series in Figure 1 depicts these immigrant flows as a percentage of the combined population of the destination countries. Over the entire period from 1870 to 1910, this percentage averaged 0.89% with a significant uptick to over 1.25% in the decade before World War I and with significant country-level variation around this mean: for instance, Brazil averaged 0.45% throughout the period while New Zealand averaged 3.37% in the same (and with an astounding figure of 11.98% for the single year of 1874). Not surprisingly, this ratio collapsed in the period bookended by the world wars for the reasons outlined before. The equivalent average for the period from 1915 to 1950 was a mere 0.25% and an equivalent low of 0.02% was separately registered in both 1943 and 1944. From 1950, there has been a remarkable consistency in the ratio of flows-to-resident population with an average figure of 0.23% from 1950 to 2010. In any case, it is clear that we are presently experiencing nowhere near the same rates as prevailed in the age of mass immigration in general and the 1900s in particular.

Turning to the issue of composition, Figure 2 depicts the shares of these immigrant flows into settler economies over the same period from 1870 to 2010. In large part, this is a story of the receding and then burgeoning role of the United States in absorbing immigrant flows.

There is relative stability in the share for the US from 1870 to 1914 with the US absorbing 61.60% of all immigrant flows.[1] Restrictions in the form of the Literacy Act of 1917, the Emergency Quota Act of 1921, and—most importantly—the Immigrant Restriction Act of 1924 significantly cut into this American share so that by 1933 it reaches an all-time low of 14.72%. At the same time, there are only seven years out of 141 in which the US was not the single largest destination of immigrant flows. This is the period from 1932 to 1938, a period not exactly known for being a time of economic resilience for the US. From this point forward, the US continuously increases its share until roughly 1980. In the subsequent 30 years, the US alone absorbed 68.16% of all immigrant flows. Other significant developments in this regard can be seen in the virtual collapse in immigrant flows to South America and, in particular, to Argentina from 1940. Whereas Argentina and Brazil respectively absorbed 11.98% and 8.38% of all immigrant flows from 1870 to 1940, they respectively absorbed only 2.87% and 2.31% of all immigrant flows from 1940 to 2010. As a corollary, the former dominions of Australia, Canada, and New Zealand picked up most of the slack, absorbing 21.61% and 33.93% across 1870-1940 and 1940-2010, respectively.

Again, caution may be warranted in interpreting some of these figures, particularly for the period of mass immigration before World War I. Underlying the series reported by Madsen and Andric (2017) is the work of Ferenczi and Willcox (1929). The latter relied upon compilations by the US Bureau of Immigration of manifests of all passengers taken aboard in foreign ports which were provided by shipping companies as required by the Passenger Act of 1819. However, there are many sources of measurement error and leakage, all the way down to the reporting of passengers by individual ships and all the way up to the State Department's treatment of aggregated data, which have recently been revisited by Bandiera, Rasul, and Viarengo (2013). In their work, they find that immigrant flows into the US in 1900-10 and 1910-20 may have respectively been 20% and 170% higher than reported by Ferenczi and Willcox (1929). Thus, we are left uncertain of the quality of data for years outside the range of their consideration and for outside of the US which presumably relied on similar primary sources.

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[1] This stability is even more marked if we consider Northern America as a unit of analysis: that is, Canada and the United States absorb fully 72.30% of all immigrant flows in this period.

One way forward, then, may be in considering stocks of the foreign-born in census data for which there seem to be no known problems. This approach, however, is not entirely unproblematic for it likely lumps permanent and temporary immigrants together. More importantly, there is surprisingly little consistent evidence across countries on the stock of the foreign-born, except for the US from 1870 to 2010 and for 21 advanced economies from 1960 to 2010.

2.1.2 Immigrant stocks in the United States, 1870-2010

Recognizing that there may be limitations in the data on immigrant flows, we first consider immigrant stocks in the US over this period as being illustrative of developments further afield. Here, the key word is illustrative as we cannot presuppose the US is in any degree representative of trends in world immigration. At the same time, the US alone was home to 30.31% of the world's 140+ million immigrants enumerated in 2010 by the OECD (Dumont, Spielvogel, and Widmaier, 2010).

Bearing this in mind, Figure 3 depicts the evolution of the stock of foreign-born in the US from 1870 to 2010. As Figures 1 and 2 would lead us to believe, there was a significant rise in the number of US residents born abroad in the period from 1870 to 1910 from 5.57 to 13.52 million. This rate of increase declines significantly in between 1910 and 1930 with the latter date apparently representing the peak of pre-World War II immigrant stocks.[2] What follows is a slow decline into 1970 when there is a sharp reversal in the series which continues until the end of the period and which coincides with significant changes in US immigration law, in particular, the Immigration and Nationality Act of 1965.

More dramatically, Figure 3 also depicts the ratio of the foreign-born to total population. In between 1870 and 1910, there is relative stasis as the foreign-born register, on average, as 14.15% of the total population. Thus, the significant increase in the number of US residents born abroad was almost exactly matched by proportionate increases in the native-born stock. From 1910, this ratio is in constant decline as immigration flows slowed and then ground to a near halt in the 1930s and 1940s.

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[2] We say apparent as this stock is more likely to have actually peaked in 1920 than in 1930 as depicted in Figure 3. This stems from the fact that the combined number of self-reported Austrians and Germans fell by 895,057—or 28.35%—in between 1910 and 1920 (Jacks, 2005).

Given the lag in between immigrant flows and stocks, it is not surprising then that this ratio bottoms out at 4.73% in 1970. In that year, immigrant stocks in the US begin to rise again and at a rate which greatly exceeded the proportional increase in the native-born stock. Consequently, in 2010, this ratio stood at 13.72%, suggesting that—at least in the case of the US—the process of immigration has nearly made up for the ground lost in the previous century.

Figure 4 decomposes this series of total immigrant stocks into six regions of origin: Africa, Asia, Europe, North America, Oceania, and South America. Perhaps the single most striking change over this period has been the rapid erosion of the share of those individuals born in Europe in the period from 1960. In 1870, this share stood at 88.81%. Although generally declining, it still stood at 74.98% in 1960, but by 2010, it stood at a relatively paltry 14.20%.[3] Although there has been some gain from 1960 in those of African and South American origins, those of Asian and North American origins have been the standouts in this regard.

Asia began with 1.16% in 1870, grinding upwards to 5.07% in 1960. From there, a veritable explosion occurred particularly up to 1990 so that its share stood at 27.80% in 2010. Likewise, the share of North America begins at 9.85% in 1870, increases up to 18.30% in 1960, and settles at 46.90% in 2010. Critically, we define North America to include Canada, the Caribbean, Central America, and Mexico. This catch-all term masks significant changes within the designation of North America. Those born in Canada were 90.09% of all immigrant stocks from North America in 1870, 53.77% in 1960, and 4.69% in 2010. The equivalent figures for Mexico are 7.75%, 32.51%, and 60.13%. Thus, apart from the rapid rise in the share of Mexico, there has been a significant increase for the Caribbean and Central America as well. The role of the Immigration and Nationality Act of 1965, which broke the link between immigration flow quotas and past immigrant stocks, ended the virtual ban on Asian immigration, and also provided for extensive family reunification, is almost

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[3] The literature traditionally emphasizes the changing composition within this category of Europe—from a wide predominance of those of northern and western European descent towards those of southern and eastern European descent (Abramitzky and Boustan, 2017). That is, in 1870 the former regions represented 87.04% of all immigrant stocks while the latter regions represented a mere 1.69%. However, by 1930, the respective figures were 41.19% and 41.67%. We note that this near parity has been maintained from that point forward.

certainly the key in understanding the changes in US immigrant stocks—both in terms of composition and count—in the last half century.

2.1.3 Immigrant stocks in advanced economies, 1960-2010

Having explored the trajectory of immigrant stocks in the US over the period from 1870 to 2010, it is then an open question of how representative the prevailing patterns for the US are for the developed world's experience with immigration *writ large*. Unfortunately and somewhat surprisingly, there is very little by way of long-run historical data on immigrant stocks in advanced economies. However, we can pick up the story from 1960—a year already flagged as marking a critical turning point for the United States—for the 21 advanced economies depicted in Figure 5. Admittedly, these are exclusively nations in North America, Oceania, South America, and Western Europe so we are thereby excluding from consideration immigrant stocks in Africa, Asia, and Eastern Europe. Yet, again, our sample is home to 67.62% of the world's 140+ million immigrants enumerated in 2010 (Dumont, Spielvogel, and Widmaier, 2010).

With this caveat in mind, Figure 6 depicts immigrant stocks in these advanced economies from 1960 to 2010. There, the total stock in millions does not have a clear inflection point in 1970 as it does for the US. Rather there is relatively constant growth with the figures nearly doubling from 33.04 million in 1960 to 60.74 million in 1990. From then, an additional 34.61 million immigrants were added into 2010. This pattern is mirrored in the immigrant stock-to-total population ratio as it rises from 5.34% to 9.63% in 1960 and 2010, respectively. Thus, the near tripling of immigrant stocks over this period outstripped the proportional increase in population from 618.38 million to 990.47 million.

Figure 7 considers these stocks in the context of where immigrants went to. That is, the shares of immigrant stocks by destination are plotted for Europe, North America, Oceania, and South America. For the most part, there is relative constancy across destinations: Europe begins and ends with values of 39.96% and 45.16%; North America begins and ends with values of 42.45% and 46.38%; and Oceania begins and ends with values of 6.16% and 6.40%. All of these gains, of course, come at a cost to a single region, South America, which sees its share of foreign-born plummet from

12.43% to 2.73% over these 50 years. This view is corroborated by the shares of immigration flows depicted in Figure 2: after the 1940s and—in particular—the 1960s, Argentina and Brazil register few fresh arrivals on their shores.[4]

Figure 8 decomposes this series of total immigrant stocks into six regions of origin: Africa, Asia, Europe, North America, Oceania, and South America. It repeats many of the patterns established in Figure 4 for the US: the relative constancy of the share for Oceania (+0.79 pp over the period), the gradual increases in the African and South American shares (+6.18 pp and +5.64 pp, respectively), and the rapid increases in Asian and North American shares (+18.31 pp and +10.71 pp, respectively) with the latter being primarily driven by Mexican immigration to the US. All of these increases, of course, came at a time when the share of individuals born in Europe and living abroad was in rapid decline (−41.64 pp). Thus, apart from some idiosyncrasies—primarily related to the more pronounced decline in its European stock and more pronounced rise in its North American stock—the US experience does not look dramatically different when we zoom out to the level of these 21 advanced economies. Given the even larger role which the US played in absorbing immigrant flows historically, this would suggest that the patterns outlined in Figures 3 and 4 for the period from 1870 to 1960 might not be terribly misleading as a guide to immigration trajectories at the global level.

2.2 Trade flows

In order to outline major developments in world trade flows, we rely on two previous data collection efforts: one for the period from 1870 to 2000 (Jacks, Meissner, and Novy, 2011) and one for the period from 1910 to 2010 (Jacks and Novy, 2018). To this, we add new data for a select number of countries to account for differences in the two samples using the sources cited in the previous two papers. In the final reckoning, we have an annual data set on aggregate merchandise exports for 52 countries over the period from 1870 to 2010. Figure 9 summarizes the sample graphically. Countries in white are those in our sample. On average, they represent 86% of world GDP in the period from 1870 to 2010 (Maddison Historical Database, 2014). Thus, somewhat in

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[4] This is not simply a story of relative decline either: from 1870 to 1940, there were 10,982,062 cumulative immigrant arrivals in Argentina and Brazil; and from 1940 to 2010, there were only 3,243,599.

contrast to the previous figures for immigration, we are confident that the figures presented for world exports below are highly representative of the underlying population. Finally, we abstract away from international trade in services which, although fairly negligible in 1870, climbed from 9% to 20% of the value of all international trade from 1970 to 2010 (cf. Loungani *et al.*, 2017 and WTO, 2010). In large part, this choice is predicated by the fact that systematic evidence on the trade in services is hard to come by even for the 1990s and 2000s, much less for earlier periods (Francois and Hoekman, 2010).

2.2.1 Global trends

Figure 10 plots aggregate merchandise exports for our 52 countries. As it illustrates, the variation in the growth of international trade over this period was substantial. From 1900 to 1910, trend growth in global exports was 3.25% per year relative to trend growth in global GDP of 2.06%. The sources of this trade boom are fairly easy to locate in the form of burgeoning incomes and declining trade costs (on average 33% lower in 1913 than in 1870) due to maritime and overland transport revolutions, the liberalization of commercial policy, and the development and improvement of transaction technologies, in particular, the classical gold standard (Jacks, Meissner, and Novy, 2011).

The series also indicates that World War I was clearly a traumatic event for the global economy. Even following its conclusion, many of the previously prevailing trends in trade costs confronted countervailing forces in the form of cartelization in the transport sector, the creation of new nation states and new borders, the resurrection of a hobbled gold standard, but, above all, a lingering sense of discord and distrust in international relations. Thus, a sharp recovery into 1929 was fully reversed with the descent into the Great Depression, setting a seesaw pattern in which real trade volumes in 1950 were no greater than they were 40 years earlier and with trade costs on average 13% higher in 1939 than in 1921 (Jacks, Meissner, and Novy, 2011).

The period from 1950 to 2000, however, witnessed a distinct resurgence in global trade. This was primarily a function of dramatic changes in commercial policy and openness along with the creation of institutions to facilitate international exchange and a distinct—albeit more limited—role

for technological change in the transport sector (with trade costs on average 16% lower in 2000 than in 1950). This process continued throughout the early 2000s, but at an accelerated pace in large part due to the rise of China and its dramatic return to world markets following its ascension to the WTO. Finally, Figure 10 also depicts the projection of the prevailing trend for the period from 1870 to 1913. Thus, over the course of the twentieth century, World War I introduced a long period of disruption in the pace of globalization which was only completely recovered in the 1970s and only consistently surpassed in the 1990s.

As is standard in this type of exercise, it is also instructive to consider aggregate exports normalized by the sum of GDPs for the sample countries to capture the relative degree of openness over time. This exports-to-GDP ratio indicates that the high water mark of 1913 was re-attained only in 1974. The subsequent 35 years then bore witness to some fits-and-starts, but demonstrated an otherwise upward trend so that the ratio attained an all-time high in 2008 of 0.1676.[5]

Finally, Figure 11 plots world export and world output growth rates by decade for this period. Thus, we can identify periods in which the globalization of trade surged and those periods in which it languished. This approach may also serve to minimize some of the concerns highlighted in footnote four since such deep changes in the structure of production and trade are less of a concern at the horizon of a decade as opposed to a century. With this mind, there are particular decades where trade

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[5] We treat these figures as only illustrative as two issues remain and cannot be corrected for, given the current state of data. First, aggregate exports figures are in gross terms whereas GDP figures are in value-added terms, suggesting it would be inaccurate to think of this ratio as accurately capturing how much of GDP is traded in a given year. Furthermore, there have been large changes in how much value-added is traded over time: the rise of vertically integrated production processes across international borders (that is, global supply chains) could act to "inflate" the value of the openness ratio relative to a world in which only final capital and consumption goods are shipped over international borders (Johnson and Noguera, 2016).

Second, in the period from 1870 to 2010, there has been a remarkable change in the composition of final output in all of the sample countries as the service sector began to rise significantly from the nineteenth century. For example, the service sector comprised roughly 25% of US output in 1870 whereas in 2010 the equivalent figure is 80%. In light of this, the degree to which *tradable goods* are actually traded will necessarily differ from the degree to which *all goods* are actually traded (notwithstanding the measurement of gross versus value-added figures). As an example of how this distinction matters, Feenstra (1998) documents that, for the US, the ratio of merchandise trade-to-merchandise value-added rose from 13.2% to 35.8% in between 1913 and 1990 whereas the openness ratio of the US only rose from 0.0668 to 0.0678 over the same period. Thus, secular changes in the composition of domestic output towards services could then act to "deflate" the value of the openness ratio relative to a world in which the share of non-tradables remained constant. Recent work suggests that the ratio of world exports to world GDP would be roughly 25 percentage points higher in 2015 if expenditure patterns had remained unchanged from 1970 (Lewis *et al.*, 2018).

On balance, these two forces would serve to cancel each other out, but it remains unclear *a priori* which force would predominate in this instance.

growth significantly exceeds output growth: 1870-1880, 1940-1950, 1970-1980, and 2000-2010.

Likewise, there are particular decades when output growth significantly exceeds trade growth: 1910-1920, 1920-1930, 1930-1940, and 1980-1990. Clearly, the interwar period looms large in this respect.

2.1.2 Changes in regional and country shares

Important changes in the composition of these aggregate export flows can be explored both in terms of regional shares of global exports and in terms of country shares of regional exports. Naturally, this approach brings perspective on the relative economic fortunes of various parts of the world over these 141 years. To begin, consider Figure 12 which decomposes world exports into shares by region. The biggest story in this respect is the decline of the European share which is notable for the fact that apart from the time of the world wars, total European exports have been the largest for any particular region for every year from 1870.[6] In any case, there is an obvious and pronounced downward trend beginning in 1870 with the European share dropping from 69.90% in 1870 to 57.73% by 1913. Apart from the shocks of the world wars, the other largest movement occurs from 1945 to 1990 (or from 27.19% to 55.48%, respectively) which clearly represents the significant integrative effort of the EEC, ECU, and EU. Interestingly, this share stalled in the 1990s and instead resumed its downward trend with Europe accounting for 44.44% of world exports in 2010.

The other important macro-regions in this regard are Asia and North America. Asia begins in 1870 with a 9.03% share, experiences significant growth until 1919 with a 17.72% share, and returns nearly to its 1870 level in 1960 with a 9.47% share. From there, it has experienced nearly uninterrupted growth, hurtling to a 29.29% share in 2010. North America is interesting not so much for its relatively placid end-to-end trajectory which began in 1870 with a 11.55% share and ended in 2010 with a 17.06% share. Rather, what is most noticeable about this series is the tremendous peaks corresponding with 1917 and 1944 where North America alone was the respective source of 37.68% and 55.86% of the world's exports. The remaining three regions of Africa, Oceania, and South America collectively begin with a 9.51% share and end with a 9.21% share of world exports. Some

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[6] Here, we have simply added exports of all European countries to arrive at European exports and likewise for all other regions. Thus, this figure necessarily includes trade within regions, e.g., intra-European trade.

churning occurs within this group of regions, but the most noticeable development in this regard is the decline in exports from South America which peak in 1915 at 12.55%, recover somewhat in the immediate post-World War II period, and then go into a state of near terminal decline, ending in 2010 with a 4.18% share.

Likewise, a perspective which focuses on shares within regions gives a sense of the relative economic fortunes of particular countries. The six panels of Figure 13 demonstrate:

(1) the relative stability of Algeria and South Africa in African exports (collectively, 41.70% and 46.02% in 1870 and 2010); the dramatic rise in the Nigerian share from 1970 as it emerges as a petro-state; and the dramatic decline in the Rest of Africa category which itself reflects the continuous decline of Egypt as a dominant source of exports (e.g., 53.07% of all African exports in 1870 and 9.43% of the same in 2010);

(2) the decline in Indian predominance in Asian exports from a maximum of 60.28% in 1871 to a minimum of 3.28% in 1986; the corresponding rise of Japan from a share of 3.60% in 1870 to maximum of 68.42% in 1986 (with significant variation in between primarily associated with World War II); and the late yet massive surge in the Chinese share which had previously peaked in 1922 at 22.2%, languished during much of the twentieth century, and experienced nearly uninterrupted growth from 1978, attaining a 46.47% share in 2010;

(3) the remarkable constancy of the French share of European exports—notwithstanding the disastrous interwar period—with an average value of 12.35%; a dramatic reversal of fortune in northern Europe with Germany and the UK beginning the period with respective shares of 17.21% and 28.08% and ending the period with respective shares of 24.68% and 7.86%; and appreciable growth in the Rest of Europe category from 38.99% to 57.53% over this period;

(4) the (unsurprisingly) overwhelming share of the US in North American exports with a minimum value of 60.72% in 2005; the appreciable gain in shares by both Canada and Mexico with Canada's run-up primarily being achieved by 1970 and Mexico's

rise starting in the wake of NAFTA in the 1990s; and the near collapse of exports

from the Caribbean and Central America, from 11.01% to 0.79% in 2010;

(5) the similar dominance of Australia in Oceania coupled with a still-strong performance by

New Zealand throughout, given the fact that the Australian economy was, on average,

five times as large as New Zealand during this period; and

(6) an early dominance of Argentina in South American exports, reaching a peak of 73.20%

in 1915 with a rough maintenance of this figure until 1929, at which point the

Argentine share is in terminal decline, bottoming out at 11.34% in 1975; a later

dominance of Brazil which emerges in 1945 when its share first exceeds that of

Argentina and which is maintained into 2010 with a share of 41.72%.

2.1.3 Changes in the composition of trade over time

There is also some limited evidence in the historical record which allows us to speak to

changes in the composition of trade, not so much by way of destination and origin countries, but

rather by way of the composition of trade flows in terms of the constituent commodities. However, to

our knowledge, no one until now has produced consistent evidence on even the simplest of

commodity classifications—manufactured goods versus primary products. Figure 14 draws on various

sources to chart the share of manufactured goods in world exports from 1880, the earliest date for

which such tabulations have been made at a global scale. What is remarkable about the share of

manufactured goods is its stability in the sub-period of 1880 to 1950. The average value in this time is

41.49% with an estimated linear trend growth rate of 0.01%.

This constancy seems congruent with a very influential line of thought which sees trading

relationships in this period, but especially prior to World War I, as one in which an industrial core

traded its manufactures for primary products from a periphery of far-flung, oftentimes colonial

nations (cf. O'Rourke and Williamson, 1999; Findlay and O'Rourke, 2008). What is surprising in this

regard is that the share remains stable even during a period of time in which former peripheral nations

like Canada, Japan, and the United States industrialize. While there is evidence that intra-regional

trade flows changed in composition, for example, the growing share of manufactured exports from

Japan (Meissner and Tang, forthcoming), primary production and the trade of therein must have significantly increased on both the extensive and intensive margins of an ever-changing periphery. Furthermore, the stability of this world system is surprising in that it seemed to have survived the two World Wars intact.

However, Figure 14 is clear in identifying 1950 as being a critical turning point in this series. The trade in manufactures share rises from 41.22% in that year to a local maximum of 68.82% in 1972. Apart from setbacks associated with the commodity—and in particular, oil—price shocks of the 1970s, this share continued to rise in value, cresting at 80.67% in 1998.[7] Seeking the sources of this dramatic departure from the long-standing composition of trade in 1950, we can point to the rise of intra-industry trade which refers to the degree to which firms compete with one another in the global marketplace within—and not across—industrial classifications (Grubel and Lloyd, 1975). We also note that the primal forces behind the rise of intra-industry trade itself likely lies with the establishment of the GATT in 1948 which specifically targeted tariff reductions on industrial products as well as the golden age of western growth from 1945 to 1973 and its attendant implications for income per capita in combination with burgeoning populations in these countries.

There was another important change in the structure of production and trade which began in the early 1970s, but only saw its full articulation in the 1990s and 2000s. Namely, the process of vertical specialization took hold and likely pushed the manufactured share to even greater heights. At its heart, vertical specialization relates to how multinational firms—which now dominate international trade—have developed global supply chains which can see the parts of final goods traded many times over international borders (cf. Feenstra, 1998; Johnson and Noguera, 2017; and Hummels, Ishii, and Yi, 2001). Thus, the degree to which vertical specialization takes root will mechanically increase the manufactured share even if the level of trade in finished goods remains constant (which it certainly did not in the late twentieth century).

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[7] Not coincidentally, 1998 marked the beginning of another massive run-up in real commodity prices throughout the 2000s (Jacks, 2013).

3. The relationship between immigration and trade

Having now described the contours of immigration and trade over these 141 years, we next address the relationship between the two. A long-standing tradition in economic theory suggests that they are inversely related: as trade increases, returns to the factors of production—particularly, labor—become equalized between trade partners and reduce the incentives for migration (Mundell, 1957). This result is derived from the Heckscher-Ohlin-Vanek model of trade where countries differ in factor endowments and, thus, factor mobility is motivated solely by the differences in factor prices. In this context, trade and immigration act as substitutes.[8]

Complications arise, however, when factors are not completely mobile, firms are monopolistically competitive, and/or specific factors exacerbate differences within and between countries (Venables, 1999). For example, trade and migration costs impede factor price equalization, and the same industries across countries may vary in which factor is used intensively. Apart from the special case of trade based on factor endowments, increased trade may correspond with more immigration or a combination of immigration responses (that is, an inverse U-shaped relationship) that depends on the composition of endowments, technologies, and trade and immigration costs.

While there is a large body of empirical research examining the impact of immigration on receiving countries, particularly on wages, few modern studies place immigration in an open economy context linked to trade flows or across multiple countries (Kohli, 1999). The historical evidence is also mixed: the first wave of globalization in the nineteenth and early twentieth centuries was marked by both growing trade and immigration, in contrast to the post-World War II era that strongly favored the movement of goods. Thus, how well the data correspond with the various models may depend on the period being studied. For instance, endogenous frontier models, which apply to settler economies like Argentina and the US in the nineteenth century, are more likely to predict complementarity between trade and factor mobility and not substitution.

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[8] A separate, but related issue, is the role of capital mobility, which may compound or mitigate the effects from either trade or immigration (see Markusen, 1983). The chapter on capital flows by Eichengreen and Esteves in this volume provides the historical context of capital market integration.

We noted earlier that the challenges in tracking immigration over time make a comprehensive analysis of the link between trade and immigration infeasible. We can partially address these concerns by using bilateral trade and immigrant flows for each major trade and migration partner of Canada and the United States between 1870 and 2000 (measured every ten years). That is, we match gross export and import shares of Canada and the US with immigrant inflows from the same country. In Table 1, bilateral export shares are positively and significantly correlated with migrant shares over the entire period, particularly for the United States (0.37). The coefficients for the US are positive in each sub-period, particularly during the first wave of globalization before World War I (0.42). In contrast, import shares are generally not statistically significant, with only the sub-period following World War II positive and weakly significant for the US and negative and significant for Canada.

Of course, one should be careful in assessing the complementarity or substitutability of trade and immigration in the context of raw correlations in the data. Other forces may be driving their co-movement and establishing the true relationship between the two variables is difficult for the lack of exogenous variation in either of trade or immigration. One potential way forward is in exploiting dramatic changes in immigration policy on the part of the United States in the early twentieth century. In particular, the introduction of immigration quotas in the 1920s induced large changes in the growth rates and subsequent stocks of immigrants, differentiated by country-of-origin. These changes by country-of-origin could then conceivably be related to changes in bilateral trade patterns in a more causal fashion. Thus, the trade of countries "treated" with quotas which were binding can be compared with those which were unaffected in a standard gravity model.[9]

With respect to our specification of the gravity model, one of the strongest conclusions to have emerged from the extensive related literature is that precise inference relies upon a proper treatment of so-called multilateral resistance (Anderson and van Wincoop, 2003). The best way to think of this is as an unobserved average trade barrier effect which may potentially bias any estimates

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[9] The full implementation of the quota system in 1924 was associated with a drop in European immigration to the United States from 4.5 million between 1910 and 1914 to less than 800,000 between 1925 and 1929 (Ager and Hansen, 2017). Some countries were more affected than others due to the fact that quotas were assigned on the basis of the foreign-born population in 1890 and not 1920. Consequently, Belgium, Greece, India, Italy, Japan, Russia, and Turkey are in our sample and were determined to have binding immigration quotas on the basis of data from 1890.

of the effects of changes in bilateral trade costs. That is, there may have been either countervailing or reinforcing changes in the bilateral trade costs separating other countries from one another which accompanied any potential reduction in the supply of immigrants to the United States.

This perspective requires the inclusion of time-varying exporter and importer effects in the gravity model. Consequently, we combine Canadian bilateral trade data with the equivalent from the United States from 1920 and 1940, allowing for (an admittedly scant) 17 precise country matches. In this case, we augment a standard difference-in-differences specification to allow for any differential growth in Canadian versus US trade with quota-affected countries. The resulting triple-differences specification pools observations on Canadian and US bilateral trade in two periods (1920 and 1940) and includes indicator variables for bilateral pairs involving a quota-affected country, for bilateral pairs involving the United States, and for bilateral pairs in 1940 along with a full set of interaction terms. The coefficient of interest in this case will be that for the full interaction of *Quota-USA-time* which indicates the degree to which the United States' bilateral trade with quota-affected countries changed at a differential rate than that of Canadian bilateral trade with the same.

It should be emphasized that this particular specification controls for all country-specific, but time-variant unobserved variables, in particular GDP. As such, it is a fairly exacting specification to test for the relationship between trade and immigration. The results are reported in Table 2 below. In this case, the coefficient associated with *Quota-USA-time* for both exports and imports is positive, suggesting that for at least the interwar period trade and immigration may have been substitutes. However, we submit this evidence as being more suggestive than definitive, citing changes in Canadian immigration policy over the same period, the disruption of trade accompanying World War II starting from 1939, and the strong evidence for complementarity between trade and immigration emerging from recent studies using even sharper discontinuities in policy such as Parsons and Vézina (2016).

4. Conclusion

Trade and immigration have reappeared as major policy issues in the present day and for good reason: in relative terms, trade flows and immigration stocks are presently as high as they were

in the 1900s—necessarily, in absolute terms, they dominate the levels of the 1900s. Two world wars and a global depression notwithstanding, countries now appear as more inter-connected as ever before, even if the composition and sources of those goods and people have changed over time.

In this chapter, we have described the patterns of both trade in goods and immigration between 1870 and 2010, noting some of the differences and similarities in the two periods of globalization bookending this period. While our analysis is limited by the availability of data and the results suggestive, we are able to capture the bulk of recorded activity for both trade and migration and are among the first to consider the relationship between the two in the very long-run. That said, there still exist substantial gaps in our understanding of these two phenomena, such as coverage of undocumented immigration, of trade in services, and of some developing regions. Nor do we engage in normative discussions about the welfare gains or losses from both forces. Whether these two features of globalization continue uninterrupted in the future naturally remains to be seen.

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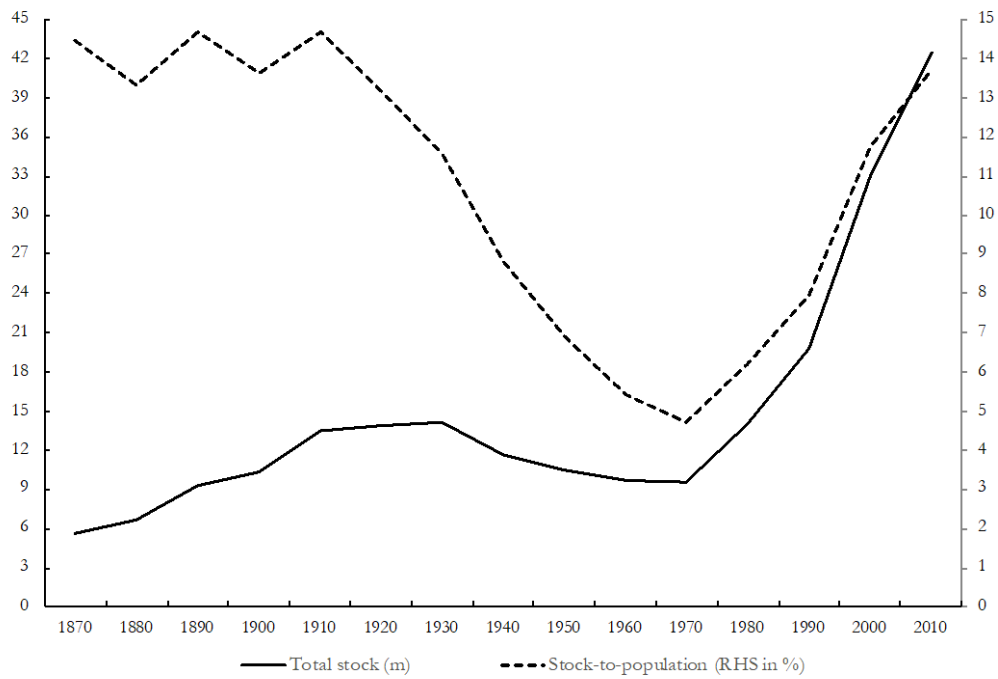**Figure 1: Immigration Flows into Settler Economies, 1870-2010**
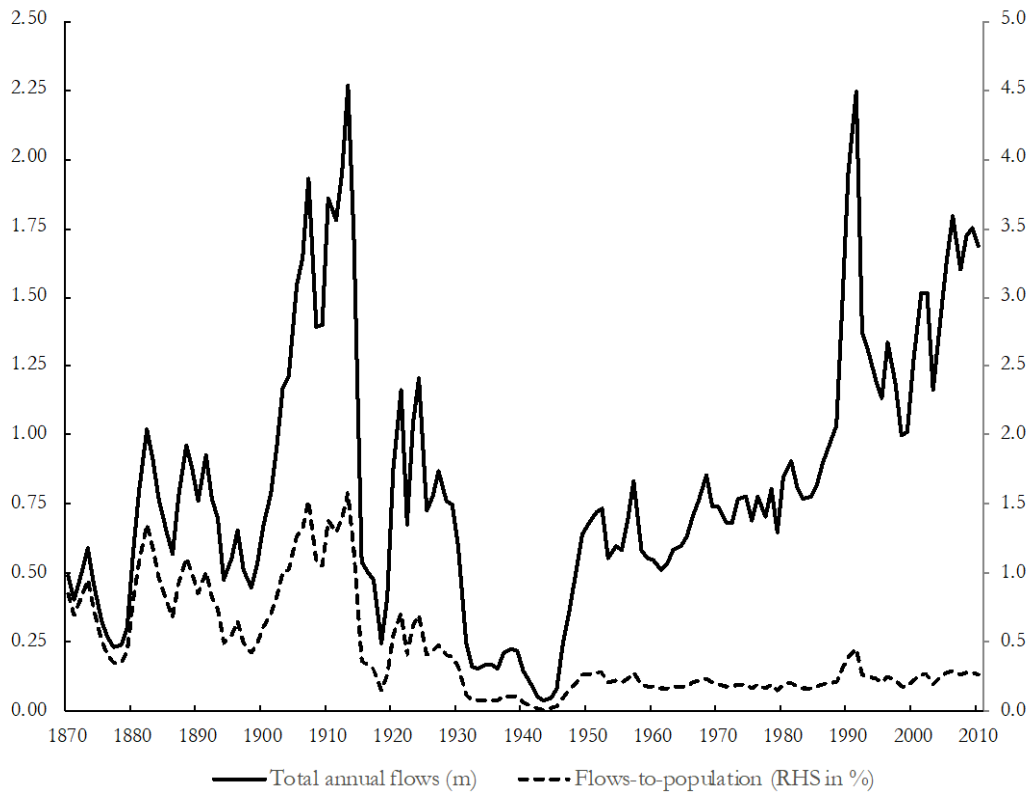
Source: Madsen and Andric (2017); DEMIG (2015).

**Figure 2: Shares of Immigrant Flows by Destination Country, 1870-2010**
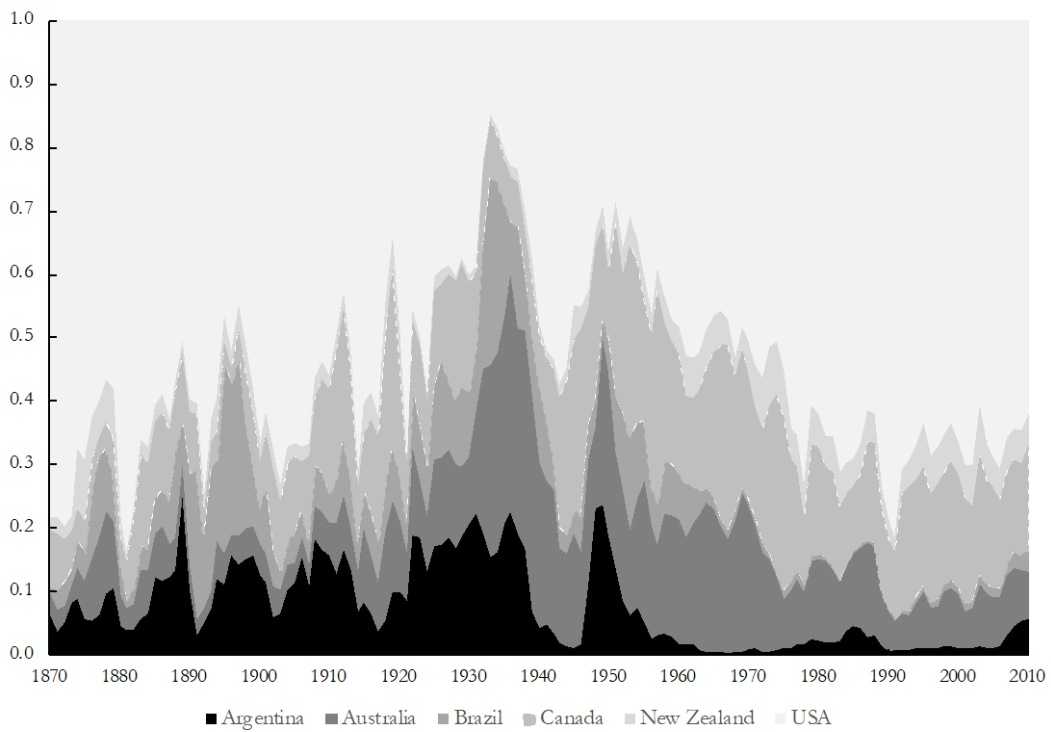
Source: Madsen and Andric (2017); DEMIG (2015).

Figure 3: Stock of Foreign-born in the United States, 1870-2010

Total stock (m) - - - Stock-to-population (RHS in %)

Source: Abramitzky and Boustan (2017).

Figure 4: Shares of US Foreign-born by Region of Origin, 1870-2010

■ Africa ■ Asia ▨ Europe ▨ North America ▨ Oceania ▨ South America
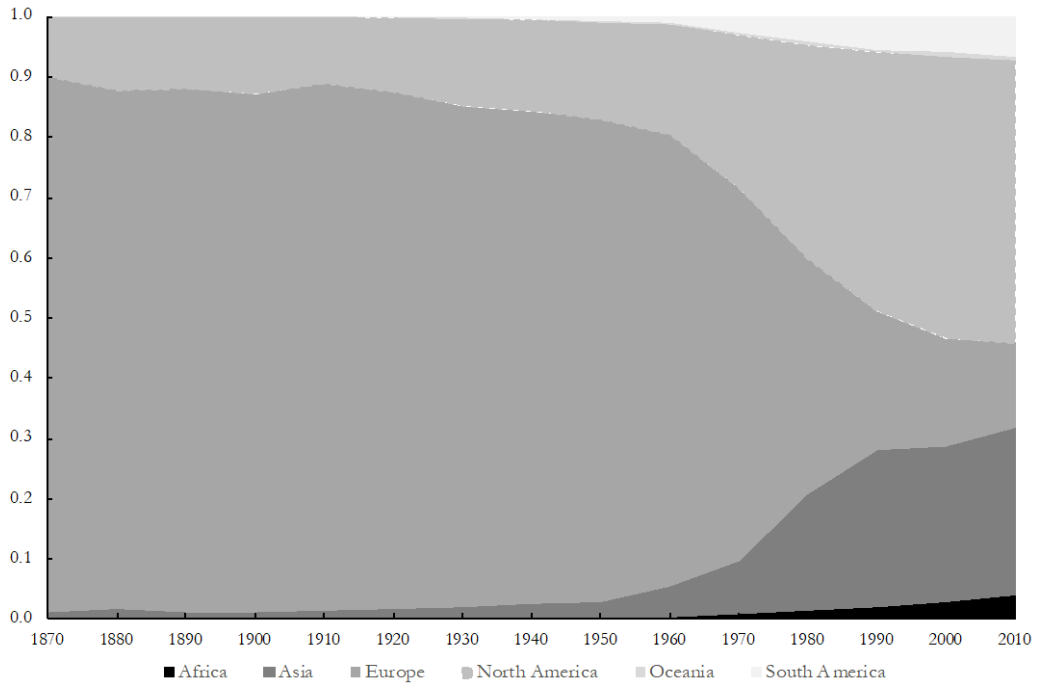
Source: Abramitzky and Boustan (2017).

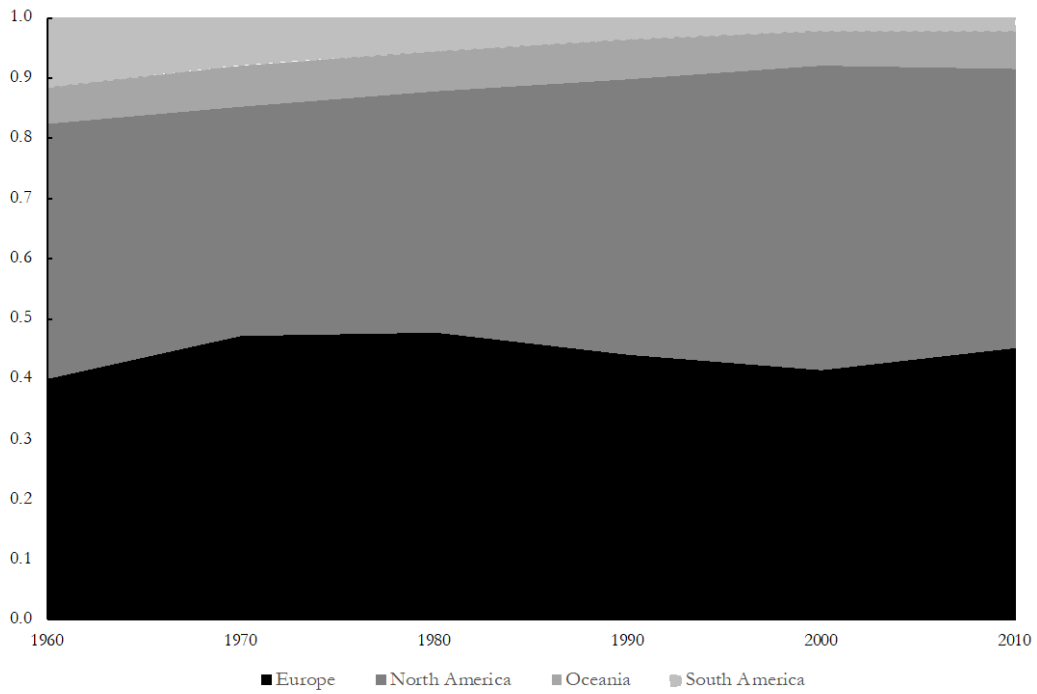**Figure 5: Sample Countries for Immigrant stocks (n = 21), 1960-2010**

**Figure 6: Immigrant Stocks in Advanced Economies, 1960-2010**
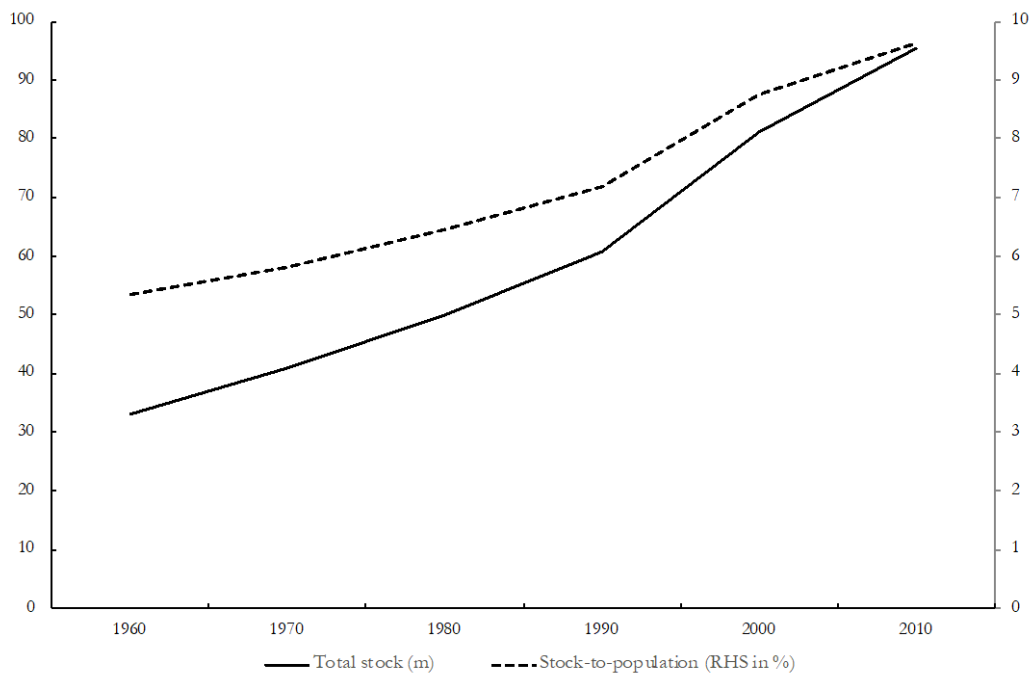
Source: Ozden *et al*. (2011); Dumont, Spielvogel, and Widmaier (2010).

Figure 7: Shares of Immigrant Stocks in Advanced Economies by Destination, 1960-2010

■ Europe   ■ North America   ■ Oceania   ■ South America

Source: Ozden *et al.* (2011); Dumont, Spielvogel, and Widmaier (2010).

Figure 8: Shares of Immigrant Stocks in Advanced Economies by Origin, 1960-2010

■ Africa   ■ Asia   ■ Europe   ■ North America   ■ Oceania   ■ South America
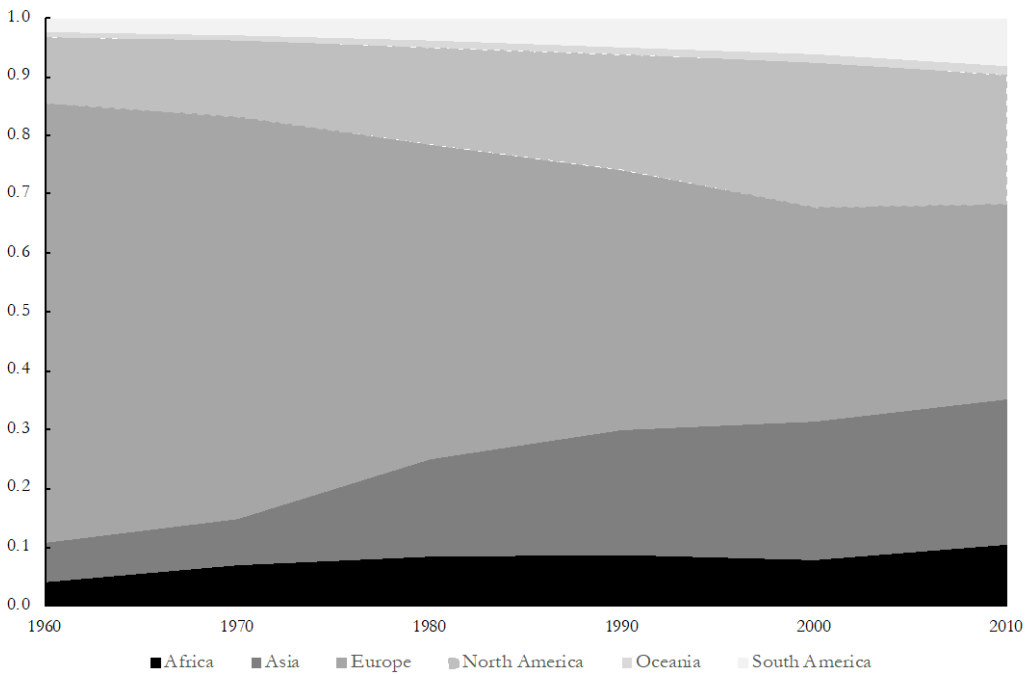
Source: Ozden *et al.* (2011); Dumont, Spielvogel, and Widmaier (2010).

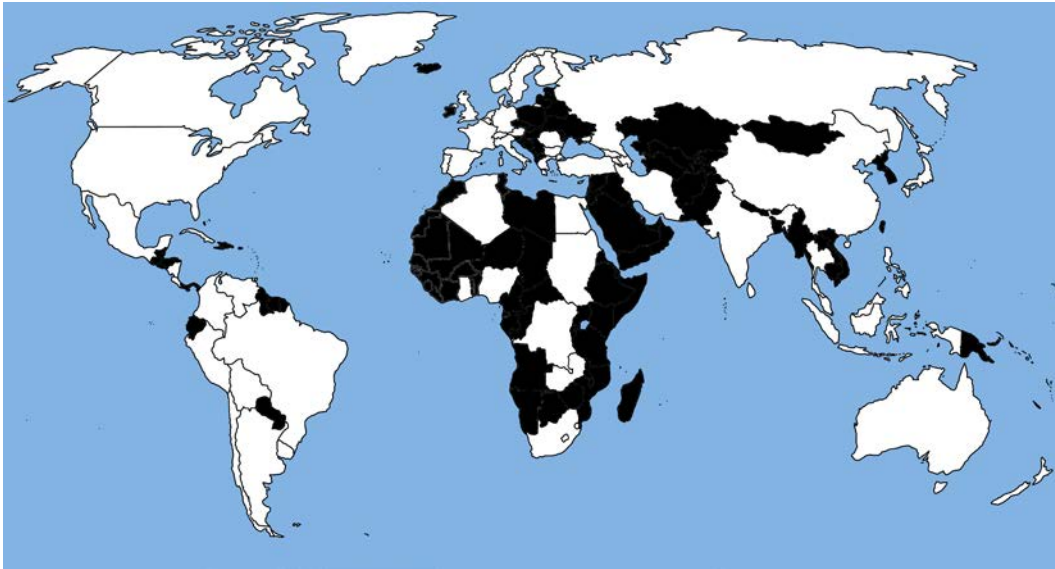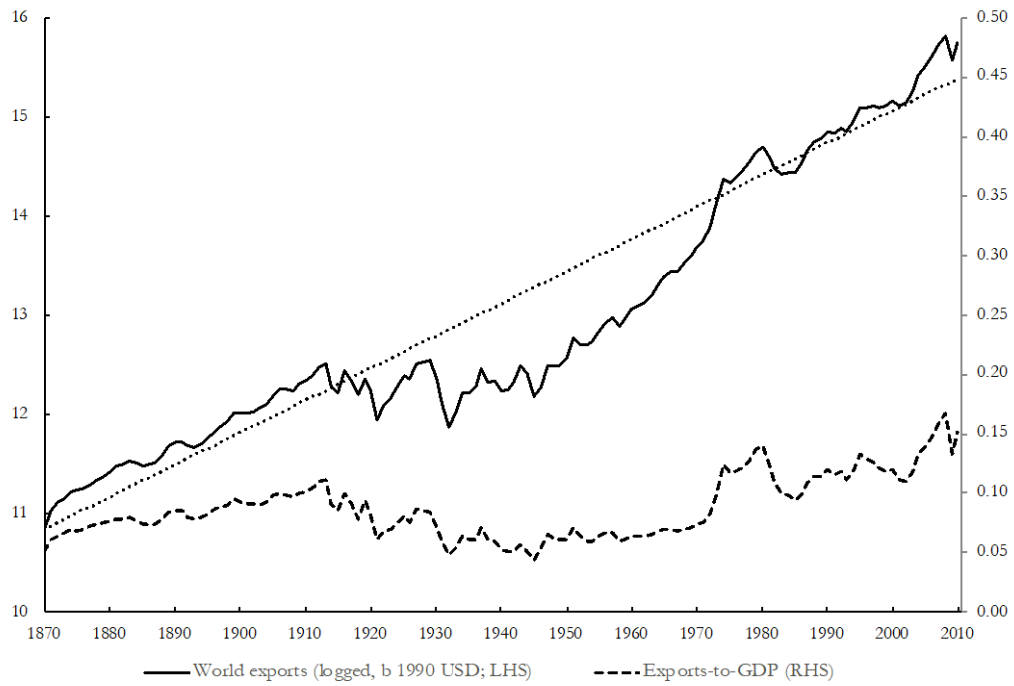**Figure 9: Sample Countries for World Exports (n = 52), 1870-2010**

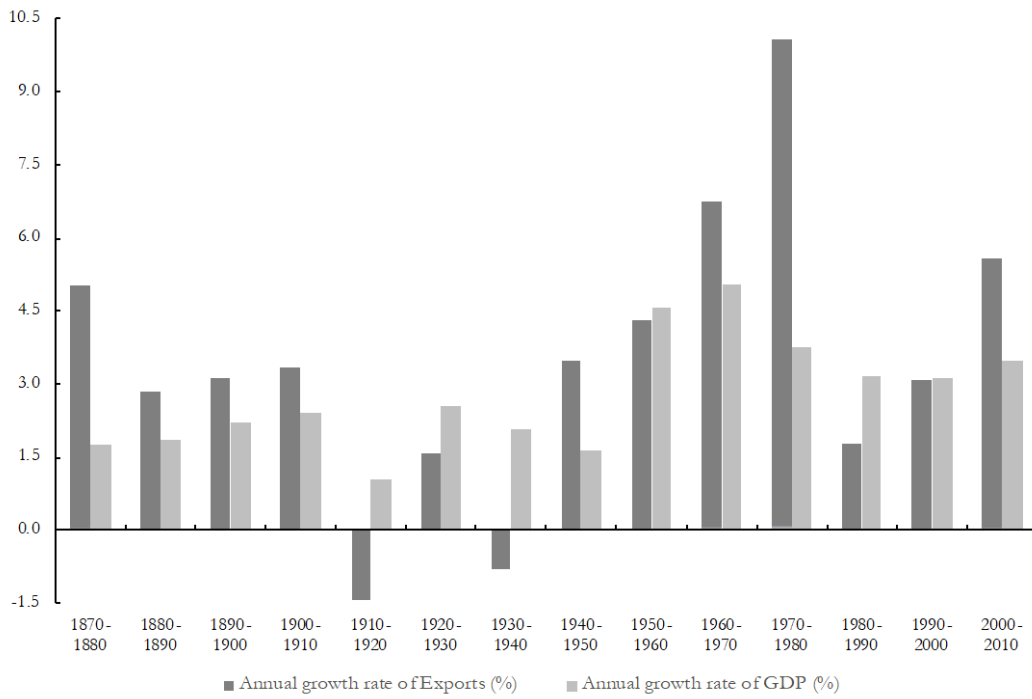**Figure 10: World Exports, 1870-2010**

World exports (logged, b 1990 USD; LHS) ----- Exports-to-GDP (RHS)
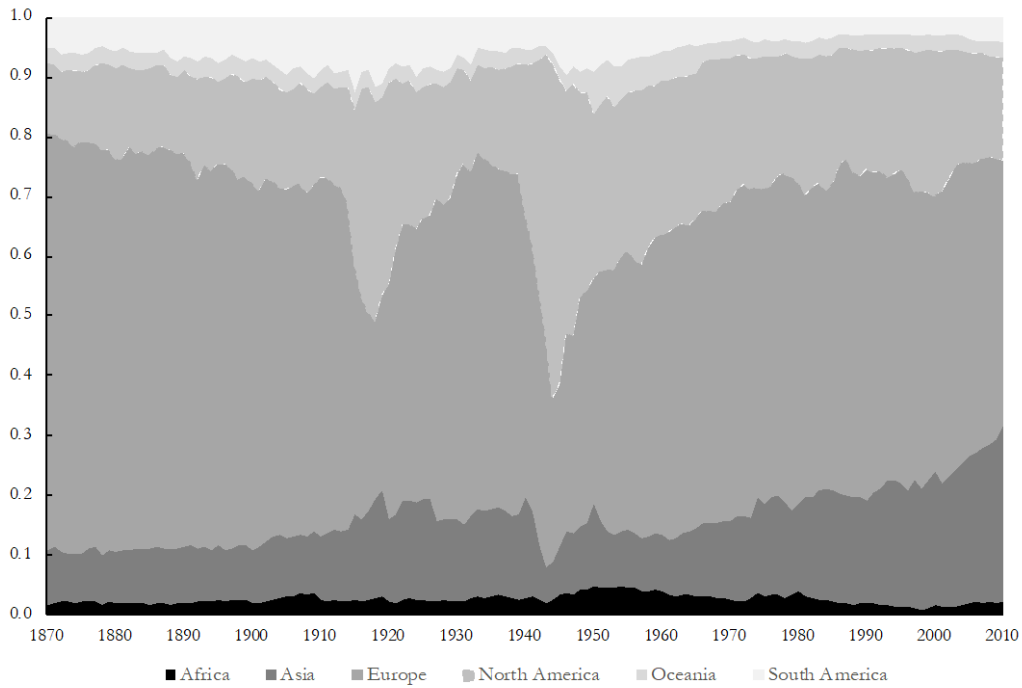
Source: Jacks, Meissner, and Novy (2011); Jacks and Novy (2018).

Figure 11: Growth of World Exports versus World Output by Decade, 1870-2010
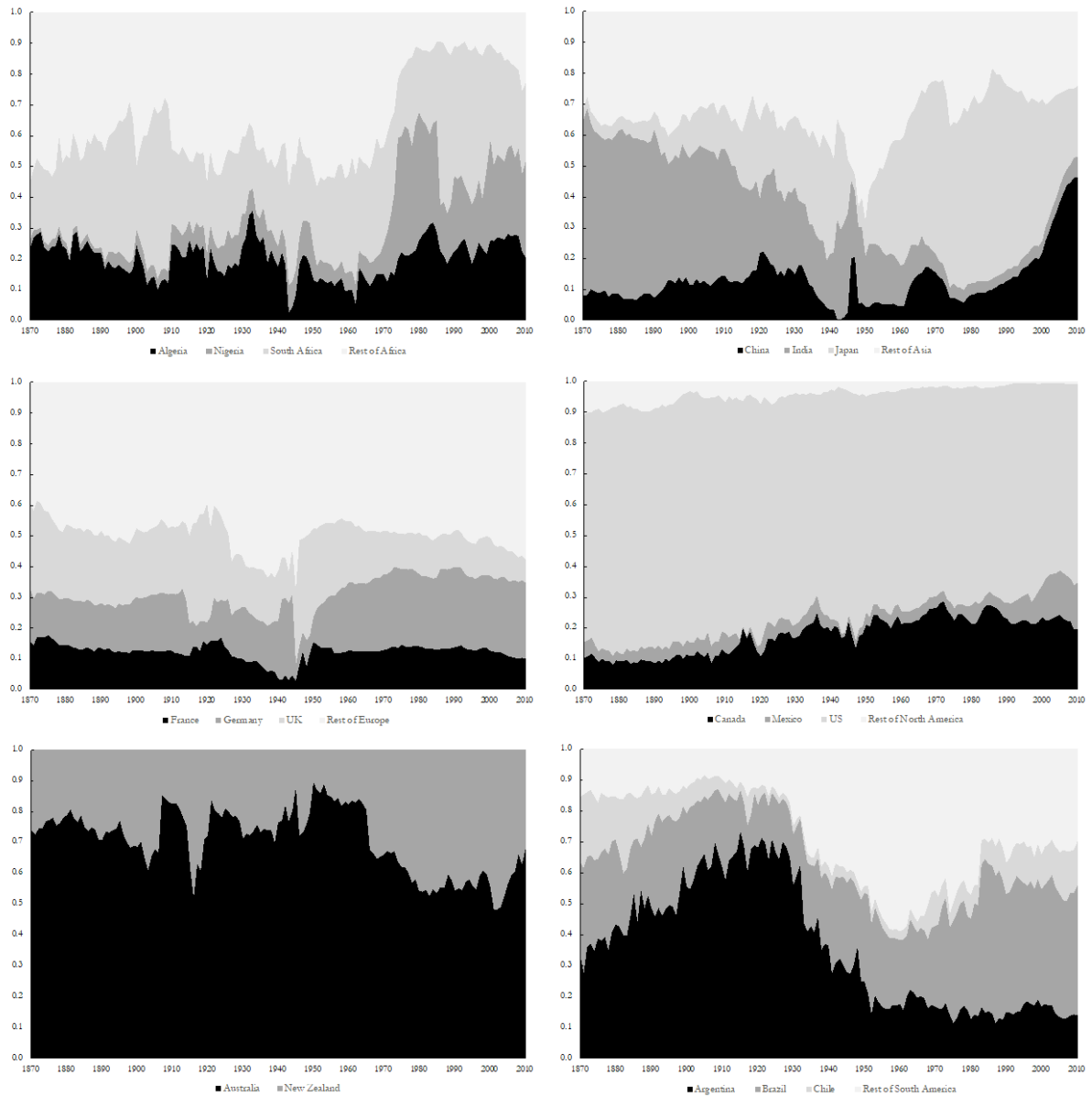

Source: Jacks, Meissner, and Novy (2011); Jacks and Novy (2018).

Figure 12: World Export Shares by Region, 1870-2010

Source: Jacks, Meissner, and Novy (2011); Jacks and Novy (2018).

Figure 13: Regional Export Shares by Countries within Regions, 1870-2010

Source: Jacks, Meissner, and Novy (2011); Jacks and Novy (2018).

Figure 14: Share of Manufactured Goods in World Exports, 1880-2010

Source: League of Nations (1945); Lewis (1952); United Nations (1962); United Nations Statistical Division (2003); World Trade Organization (2010); Jacks, Meissner, and Novy (2011); Jacks and Novy (2018).

TABLE 1—PAIRWISE CORRELATIONS BETWEEN TRADE AND MIGRATION, 1870-2000

	Northern America	Canada	United States
All years			
Gross Bilateral Export and Migrant Shares	0.299***	-0.033	0.374***
Gross Bilateral Import and Migrant Shares	0.011	-0.101	-0.008
Observations	429	167	262
1870-1910			
Gross Bilateral Export and Migrant Shares	0.375***	-0.051	0.422***
Gross Bilateral Import and Migrant Shares	-0.027	-0.082	-0.116
Observations	155	60	95
1910-1950			
Gross Bilateral Export and Migrant Shares	0.158*	0.015	0.177*
Gross Bilateral Import and Migrant Shares	-0.077	-0.115	-0.110
Observations	150	59	91
1950-2000			
Gross Bilateral Export and Migrant Shares	0.103	-0.093	0.207**
Gross Bilateral Import and Migrant Shares	0.102	-0.234**	0.175*
Observations	186	72	114

Significance: ***1 percent, **5 percent, *10 percent. *Sources:* Gross bilateral export and import shares are calculated from Jacks, Meissner, and Novy (2011) and Jacks and Novy (2018). Immigration shares are calculated using gross inflows as a share of total population and are from Madsen and Andric (2017). Northern America comprises the two-country panel of Canada and the United States and each of their bilateral trade and migrant flows by trade partner. Unidentified countries are omitted. The years used in the correlation analysis are every decade between 1870 and 2000 or as indicated.

Table 2: Gravity Model for Bilateral Trade of Canada and the US with Partner Countries

	(1) Dependent variable: NA exports	(2) Dependent variable: NA imports
Quota fixed effect	-1.2096	-1.1805
standard error	0.5036	0.4370
p-value	0.02	0.01
USA fixed effect	2.3075	2.3213
standard error	0.2668	0.4595
p-value	0.00	0.00
Quota-USA interaction	0.5398	1.2688
standard error	0.5377	0.4774
p-value	0.32	0.01
Time fixed effect	1.5877	1.4072
standard error	0.0875	0.1271
p-value	0.00	0.00
Quota-time interaction	-3.8223	-0.6545
standard error	0.5740	0.3570
p-value	0.00	0.07
USA-time interaction	-1.3752	-1.4942
standard error	0.0942	0.1406
p-value	0.00	0.00
Quota-USA-time interaction	1.5045	0.6567
standard error	0.6063	0.3826
p-value	0.01	0.09
	n=68	n=68

Notes: Results in column (1) are generated from a single regression pooling exports from 1920 and 1940. Results in column (2) are generated from a single regression pooling imports from 1920 and 1940. Poisson pseudo-maximum-likelihood (PPML) used for all regressions. Exporter and importer fixed effects have been suppressed while standard errors are clustered on countries. Belgium, Greece, India, Italy, Japan, Russia, and Turkey are in the sample and were determined to have binding immigration quotas.

Sources: Bilateral trade data drawn from Jacks and Novy (2016).