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ABSTRACT

The Pro-Trade Effect of Immigration on American Exports During the Late Nineteenth and Early Twentieth Centuries*

The belief that immigrants generate beneficial externalities in their host countries, specifically in the form of an increased opportunity and ability of firms to expand their foreign trade, has recently been challenged by George Borjas in *Heaven's Door* (1999, p. 97) as having no empirical support. Borjas' assertion ignores several recent papers that provide precisely that evidence of a powerful pro-trade effect of international migration. Here we extend that body of evidence by looking to history. We show that immigration, primarily from Europe between 1870 and 1910, had an important pro-trade effect on American exports. Our data set spans the exports of 44 commodities to 17 countries observed at 5 year intervals. We use a modified gravity model to examine the migrant stock-export relationship and find that United States exports to a country were positively related to the size of the migrant stock of immigrants from that country. The estimated strength of the effect varied across "Old" Europe, "New" Europe, and non-Europe groupings of the trading partner countries. Exports were also found to have been greater to English-speaking countries, and to countries with per capita incomes similar to the United States. This relative per capita income effect became stronger during the latter part of the period, whereas the migrant stock effect diminished after 1885.

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The Pro-Trade Effect of Immigration on American Exports During the Late Nineteenth and Early Twentieth Centuries

> *Immigration…expands the size of the market. It will almost certainly enable many new interactions among workers and firms, so that both native workers and native-owned firms might potentially learn valuable information without paying for it. …American firms…gain, because they can now use the social and information networks that link immigrants and the source countries to better market their products in foreign markets. George J. Borjas,* Heaven's Door, *p. 96.*

The question of whether immigrants generate positive externalities in their destination countries is both *per se* of interest and potentially important in the debate over immigration policy. George Borjas, as quoted above, identifies a key way in which immigrants might make an intangible contribution to their destination country. Borjas, however, almost immediately following the above passage, goes on to assert, "Although these intangibles are believed to be important by many observers of the immigrant experience, there is *no* empirical evidence supporting their existence…."[1]

Contrary to Borjas's assertion there have been at least three recent studies that have examined the very immigrant-trade nexus that Borjas questions, and in all three cases powerful, pro-trade effects of immigration are identified. David Gould (1994), for instance, has found pro-trade effects of recent immigrants on both U.S. import and export trade flows. The strength of these effects ranges from the trivial for some immigrant nationalities to the profound for other nationalities. Similarly, Keith Head and John Ries (1998) have investigated the effects of current immigration on the international trade flows of Canada. Again, a significant pro-trade effect was found for each of Canadian imports and exports. James Dunlevy and William Hutchinson (1999) used history to

[1] George J. Borjas (1999), p. 97, emphasis in the original. See Richard Vedder (2000) for a review of Borjas's book that specifically considers this particular issue.

further pursue the question. They found compelling evidence of a pro-trade effect of immigrants on United States imports over the period from 1870 to 1910. While that paper was limited to the links between immigration and American import trade, we complete the story here by conducting a similar investigation of immigrant links to American exports during that same historical period.

Background

Immigrants may serve to link the trade of their home and host countries in at least three ways. First, immigrants may have a taste for the goods of their homeland, and the presence of an immigrant community beyond some minimum critical mass can create a market for imports of these goods. Presumably, this taste effect would apply especially to the importation of finished manufactures and foodstuffs. A second link can develop as immigrants recognize opportunities for trade between their home country and the host country. Awareness of cost differentials, of product differentiation, or of the immigrant taste factor, noted above, could promote trade links between the two countries. This link is that of an "information bridge." Third, related to this information bridge is the pro-trade effect of ethnic networks. Immigrants may well have an advantage, due to issues of mutually understood culture or of trust, in dealing with their countrymen who remain at home. This is a direct application of ethnic network theory to international trade in goods. (See, e.g., Fawcett, 1989; Landa, 1994; and Rauch 1995.)

These links, based on tastes, information, and transaction costs parallel the links between earlier migration and later migration that goes under the terms "chain migration" or "family and friends effects." (See, e.g., Nelson, 1959; Massey, 1993; Greenwood, 1969; Dunlevy and Gemery, 1977, and Dunlevy and Saba, 1992 address this

phenomenon in the nineteenth century, American context.) There is reason to anticipate, therefore, that earlier settled immigrants simultaneously promote a greater flow of traded goods and a greater flow of new immigrants.

A fourth linkage between immigrants and exports that might be identified is that the prospect of exporting to the origin country might encourage the development of new industries by immigrant entrepreneurs. While it might be difficult to separate this effect from the earlier identified pro-trade effects of immigration, we believe it is worth separate identification. In the case of immigrants and imports, it has been noted that immigrant entrepreneurship will lead to import substitution and, hence, to a reduction of imports. The effect of entrepreneurship on exports, however, is pro-trade. This, then, may compensate for the lack of a pro-trade "taste" effect on the export side of international trade. To the extent that foreign capital flows with the immigrants, this entrepreneurial effect could be enhanced.

The period from 1870 to the onset of the First World War, the period of classical international liberalism and mass migration, is an ideal setting in which to observe immigrant-trade linkages. Dunlevy and Hutchinson found broad support for the posited pro-trade effect of immigration to the United States on American imports during this period. That paper considered immigration and imports of 78 commodities from 17 countries, observed at five year intervals from 1870 to 1910. The strength of the pro-trade effect was found to vary over time, becoming weaker toward the end of the period; it also differed across partner country groupings of "Old Europe," i.e., the countries of northern and western Europe, of "New Europe," i.e., the countries of southern and eastern

Europe, and of non-Europe.[2] The strength of the effect was also greatest for processed foodstuffs and manufactures for consumption and weakest for crude foodstuffs and crude material. This last result was viewed as especially supportive of the immigrant-import link in that it follows uniquely and directly from the hypothesis insofar as migrant taste effects are considered.

In this paper we turn our attention to the link between immigrants and American exports during the late nineteenth and early twentieth centuries. The same set of 17 trading partners of the United States is used, and the commodity set consists of 44 commodities. Observations, again, are for every fifth year from 1870 to 1910.[3] The commodities chosen were selected to be a mix of goods that were important in U.S. export trade and of goods for which a migrant effect might, *a priori*, be expected. As in the earlier paper our purpose, therefore, is not to strictly represent all U.S. exports of the period, but rather to determine the nature of the immigrant-trade effect, if it existed. Nevertheless, the commodities selected did account for over 75 per cent of U.S. exports in the period under study, and the 17 trading partners included accounted for approximately 85 per cent of total U.S. exports.

We present our model, data, and results in the sections that follow. As in the import paper we report the results for American exports for the overall sample, and then with the data disaggregated by the geographic region of the trading partners, by year, and by groupings of the commodities according to their stage of production. In a final section our findings for the immigrant-export link are compared with the findings of our earlier

[2] This division of Europe follows the division that was current in the contemporaneous American literature. See, e.g., Paul Douglas (1912).

paper regarding imports so as to allow us to further draw inferences on the overall effect of immigrants on American trade in the late nineteenth and early twentieth centuries.

Empirical Model and Data

In order to isolate the impact of immigration on American exports, we must control for those factors that are generally considered to explain export flows. Therefore, we employ a modified gravity model of the sort found in the empirical international trade literature. The basic gravity model portrays the volume of trade, imports or exports, between a pair of countries as a positive function of the size of the two countries and as an inverse function of the distance between them. Size is measured as some combination of population and gross income; we use population and per-capita income. Variables are then added to capture the effects of other factors that are specific to the case under investigation; this is the practice we employ. [4]

Let us represent the volume of exports as

(1) $Exports_{ijt}$ = f($Per\ Capita\ Income_{jt}$, $Population_{jt}$, $US\ Per\ Capita\ Income_{t}$, $US\ Population_{t}$, $Distance_{j}$, $Migrant\ Stock_{jt}$, $English\ Language_{j}$, $Relative\ Income_{jt}$, $US\ Terms\ of\ Trade_{t}$, $Recession\ Year_{t}$, $Year_{t}$) + $random\ error_{ijt}$

The motivation for this model[5] is as follows: $Exports_{ijt}$ measures the real value of American exports of commodity *i* to country *j* in year *t*. Exports to country *j*, *ceteris*

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[3] The countries and commodities are given in the Appendices to Tables 1 and 3. The data sources are found at the end of the paper.

[4] Jeffrey Frankel (1997), especially chapter 4, surveys the issues involved. The theoretical foundations of the gravity model as applied to trade have been extensively developed by Jeffrey Bergstrand (1985, 1989, 1990). See also Jon Haveman and David Hummels (1997). The papers by Gould and by Head and Ries provide specific examples of gravity models applied to the immigrant-trade relationship.

[5] This model is slightly different from that used in the import paper. The differences are not critical to the inferences we draw.

paribus, should be proportional to the per capita income and population of *j* and the per capita income and population of the United States. *Distance* is a standard variable of gravity models; it proxies not only shipping cost related to distance, but all frictions that are correlated with distance. *Migrant Stock* is our variable of primary attention. It is the number of persons born in country *j* living in the U.S. in year *t*. Our interest is in determining the strength of pro-export effects of a larger immigrant stocks. *English Language* is a dummy variable equal to 1 if country *j* is English speaking, and equal to 0 otherwise. It is included to capture transaction costs and information-cost advantages that may have existed between American and other English-speaking entrepreneurs. This variable might also capture pro-trade effects that can be traced to the shared cultural and legal systems of the U.S., Britain (including Ireland), and Canada which are the only English-speaking countries in our sample. *Relative Income* is employed to capture taste effects that, according to Staffan Burenstam Linder, should lead countries with similar per capita incomes to engage in heavier than normal intra-industry trade in differentiated products.[6] It is measured as (the logarithm of) the absolute value of the difference between United States per capita income and the per capita income of country *j* relative to the per capita income of *j*. Hence, the anticipated sign of its coefficient is negative. The *Terms of Trade*, the ratio of America's export unit values to its import unit values, is included as a measure of the overall advantage to the U.S. of its participation in the international exchange of goods. It also is a rough measure of the attractiveness of

[6] See Frankel, page 60.

American goods in the market relative to the goods of other countries.[7] *Recession Year* is a dummy variable equal to 1 for the years 1875 and 1895, both of which were recession years in the United States, and equal to 0 otherwise.[8] The impact of a domestic downturn on exports cannot *a priori* be signed.[9] *Year* is a variable whose value ranges from 1 for 1870 through 9 for 1910; it is designed to control for trends not otherwise captured by the other included variables.

Estimation and Findings

We estimate the model described in (1) in the customary double logarithmic form, where all variables except the two dummy variables and the trend variable are transformed into their logarithms. Since approximately one-third of our observations on the dependent variable $Exports_{ijt}$ are zero in value, following Barry Eichengreen and Douglas Irwin (1995), we transformed the dependent variable to $(1 + Exports_{ijt})$ prior to the logarithmic transformation.[10] We also controlled for the wide variation in the magnitude of exports across specific commodities by including a set of dummy variables for each commodity (except for raw cotton, which constitutes our reference commodity). This fixed effects estimation improved the goodness of fit of all of our estimations, but it

[7] The export and import unit values are for overall trade, not specifically for the goods in our sample. Since a gravity model is a quasi-reduced form model we cannot specifically ascribe either supply or demand side properties to this variable.

[8] In unreported regressions the value of exports of good *i* to country *j* was deflated by the total value of all U.S. exports for the year in question. These results largely paralleled what is reported here except that *Recession* there, as would be expected, did not obtain statistical significance. Expressing the dependent variable as a share of total exports captures the recession effect insofar as all exports tend to rise or fall together during recessionary periods.

[9] See Dunlevy (1980) and Raynold and Dunlevy (1998).

[10] For large values of *Exports* the logarithm of the transformed variable is close to the logarithm of *Exports*, for small values of *Exports* the logarithm is close to zero; hence, the transformed variable approximates the semi-log Tobit relationship.

did not alter our findings in any material way. We then corrected for possible heteroskedasticity using White's method.[11] The results of estimating the model across all countries, commodities, and years appear in column (1) of Table 1.[12]

Migrant Stock, the variable of primary interest, obtains a statistically significant coefficient of 0.08, which indicates that for exports across the 17 trading partners a 10 per cent increase in the number of nationality-specific immigrants living in the United States generated slightly less than a one per cent increase in exports to the respective trading partner. A sense of the impact of this effect can be had by comparing the implied change in exports due to the change in migrant stock with the actual change in exports. For this purpose consider the effect of the increase in the overall migrant stock from 1880 to 1900, which equaled 2,793,000 persons, on American exports. The actual increase in total exports (goods both in and outside our sample) in 1913 dollars was $889,509,000, and the actual increase of exports of goods in our sample in 1913 dollars was $699,962,000. The increase in American exports attributable to the change in migrant stock implied by the estimated elasticity of 0.08, evaluated at the end-of-period means is $30,633,500 (1913 dollars), or 4.38 per cent of the actual increase of in-sample exports. While we take this result as suggestive of the posited pro-trade effect that we seek, the effect of *Migrant Stock* on exports, as we report below, varied across the geographical

[11] The results reported in this paper were obtained using the Stata 7 software program. Tests run on the fixed effects regressions on the overall sample and on sub-sample groupings for heteroskedasticity using the White procedure rejected the hypothesis of homoskedasticity. The Stata "robust standard errors" procedure was used to correct for heteroskedasticity. Correcting for heteroskedasticity raised most t-statistics but had little other effect; in particular, the conclusions drawn after adding fixed effects and correcting for heteroskedasticity are largely those we obtained from ordinary least squares estimation.

[12] In order to keep the tables of manageable size we do not report the constant or fixed effects coefficients. We would be happy to provide the full set of results as well as the ordinary least squares results to any reader who is interested in seeing them.

groupings of America's trading partners and was considerably stronger there than the results here for the overall aggregation of countries.

The large and statistically significant coefficient of 2.70 on the English language variable suggests that the pro-export effect of migrant stock was reinforced for English-speaking trading partners. This coefficient indicates that American exports to Britain and Canada, after controlling for the other explanatory variables, were over fourteen times as great as exports to non-English speaking countries.[13]

Relative Income has a statistically significant coefficient of –0.56, indicating that U.S. export trade was, *ceteris paribus*, larger with trading partners whose per capita income was similar to that of the U.S. This supports the Linder hypothesis.

The core gravity variables perform as expected. The coefficient on *Distance* is negative and highly statistically significant. The per capita income and population variables for the United States' trading partners obtain positive and statistically significant coefficients; neither of the U.S. variables is statistically different from zero.

The effect of the *Recession* dummy variable, as expected, is both negative in sign and statistically significant. The *Terms of Trade* variable is also indicated to have a statistically significant negative effect on exports. This suggests that demand side factors dominated in the role of the terms of trade on export performance. The trend variable, *Year*, is a statistically significant –1.70, indicating that after controlling for the effect of

[13] See Kennedy (1992). The share of total exports (including those not in our sample) was 3.9 % in 1870 and 9.0 % in 1910. The share going to the United Kingdom was 53.6 % in 1870, it peaked at 59.6 % in 1880, and it equaled 29.8 % in 1910. The in-sample values are 3.9 % for Canada and 64.3 % for the UK in 1870, 7.1 % for Canada and 79.8 % for the UK in 1895 (the peak year for the UK), and 7.6 % for Canada and 44.7 % for the UK in 1910. The peak year for Canada was 1905 when it took 8.0 % of all U.S. exports in our sample. The estimated effect of English Language reported in the text, therefore, is quite reasonable.

the other included variables American exports trended significantly downward over the 1870 to 1910 period.

Results by Geographic Region

We now report the results of estimating the model by geographic region. Differences in the export-immigration link can be expected to have existed across the various national groups. The "Old" and "New" Europe groups correspond, respectively, to the nations that had been dominant sources of immigrants prior to the 1890s and to the nations whose immigrants dominated the flows after the 1890s. These groupings, as a result, may capture not only cultural differences but also cohort and longevity effects in the role played by immigrants in the U.S.[14]

Columns (2), (3), and (4) of Table 1 report the estimated results for export trade with the countries of Old Europe, New Europe, and Non Europe, respectively.[15] *Migrant Stock* has the expected sign and is statistically significant for each of the regions. These within-region estimates of the *Migrant Stock* effect range from four to fifteen times more powerful than the estimate for the overall sample, and they are decidedly stronger than what we found for the geographically-specific import trade effects. For export trade immigrants from New Europe are estimated, ceteris paribus, to have had a stronger effect on exports to their countries of origin than did immigrants from Old Europe, and the impact of immigrants from Old Europe is estimated to have been stronger than that of immigrants from the Non-European countries. It would appear that for export trade, aggregation across the regions is unwarranted.

[14] Discussion of cohort effects dominated much of the contemporaneous debate on American immigration, see, for instance Douglas (1919) and Hourwich (1912).

[15] The country groupings are found in the Appendix to Table 1.

To estimate the importance of migrant stock for exports by geographic groupings of America's trading partners, we repeat the *ceteris paribus* experiment that we ran on overall exports. For each geographic grouping we determine the change in the predicted volume of exports from 1880 to 1900 attributable to the associated change in migrant stock, based on the estimated elasticity and evaluated at the relevant sample means. We then report this predicted increase as a percentage of the actual increase of our in-sample exports. For Old Europe the predicted increase in exports is $182,168,000, and this is 39.5 per cent of the actual in-sample increase of exports of $461,664,000 (all values in 1913 dollars). For New Europe the predicted increase in exports is $99,553,000 which is over four times as great as the actual increase of $24,511,000. For the Non Europe group of countries, the predicted increase in exports is $15,560,000, which is 7.29 per cent of the actual increase of $213,787,000. While the measured effect of immigrants from New Europe appear implausible, the values for Old Europe and, especially, Non Europe seem both possible and worthy of note.[16]

English Language is estimated, ceteris paribus, to have been a deterrent to export trade for both the Old Europe and Non Europe groups.[17] Since English Language represents only Britain in Old Europe and Canada in the Non-Europe group, the

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[16] We do admit that our priors on the effect of immigrants on trade were vague. Gould and Head and Ries both report the trade payoff per immigrant. Head and Ries estimate that the per capita contribution of immigrants is $3000 to Canadian imports and $8000 to Canadian exports; Gould reports the per capita contribution of immigrants on a nationality-specific basis; his numbers run from less than $10 per (Filipino) immigrant on each of U.S. imports and exports to a high of over $29,000 on each of exports and imports per immigrant (from Singapore). Our results, on a per immigrant basis (in 1913 dollars) are $10.98 of increased exports per person increase of overall migrant stock, $147.73 per person increase of Old European migrant stock, $85.75 per person increase of New European migrant stock, and $39.00 per person increase of Non European migrant stock. These values are consistent with those reported by Head and Reis and by Gould.

[17] There were no English-speaking countries in the New Europe group.

appropriate interpretation most likely is that American exports to Britain and to Canada were less than would be predicted on the basis of the estimated group-specific country characteristics. Canada and Britain were, nonetheless, the major destinations for American exports during this period.[18]

For the Old European group of trading partners the elasticity of *Distance* on export trade is estimated to have been a virtually infinitely negative 49.8.[19] For New Europe the estimated Distance elasticity was a very strong –12.6. We believe these results are due to the minor differences in distance across countries within a given group being associated with large variation in the real value of exports to these countries. For the Non Europe group, the estimated elasticity of *Distance* on American exports is a statistically significant –0.58.

The estimated coefficient on *Relative Income* is negative in every case, as expected, but only for Old Europe is the estimate statistically different from zero. We believe this is due to the general similarity of per capita incomes among the countries within a geographic group; the greater dispersion across the country groupings then yields the stronger results found in the other sets of regressions.[20]

Results by Year

[18] Over the period 1870 – 1910 Britain and Canada accounted for some 30 per cent of U.S. imports and some 50 per cent of U.S. exports.

[19] For American imports from Old Europe, the estimated *Distance* elasticity was an essentially identical –51.7.

[20] The mean values (and standard deviations), across all time periods, of the natural values of relative income are for Old Europe 0.300 (0.252), for New Europe 0.195 (1.10), and for Non Europe 2.682 (1.71).

Table 2 presents the estimates of the model when the data are considered on a year-by-year basis.[21] The estimated effect of Migrant Stock is found to have been positive and statistically different from zero for only the 1870, 1875, 1880, 1885, and 1900 observations.[22] The overall effect, ignoring the issue of statistical significance, shows a relatively smooth decline, with the exception of the significant pro-trade effect in 1900, over the entire period after 1875. This is remarkably similar to what we reported for import trade, although for imports the strength of the *Migrant Stock* effect was statistically significant through 1900 and declined smoothly after 1880.

The English language dummy obtains a statistically significant, positive coefficient for 1870, 1875, 1885, 1890, and 1895. This broadly parallels what we found for the effect of English language on American imports. This is also consistent with the 22 percentage point decline between 1895 and 1900 in the share of (in-sample) total exports going to Canada and the United Kingdom, which was followed by a further 12 percentage point decline between 1900 and 1910 (compare footnote 13).

We find that *Relative Income* has a positive coefficient for 1870 and 1875; this is consistent with trade in raw and crude materials dominating our findings and suggesting that trade in the differentiated, high income products envisioned by the Linder hypothesis were of lesser importance. This result, however, is reversed over time; *Relative Income* obtains a significantly negative coefficient in 1880, its coefficient is insignificant but negative for 1885 through 1895, and thereafter its coefficient is highly negative and

[21] Note that the U.S. income and population variables, the recession dummy, and the trend variable, each of which is a constant in a within-year sub-sample, are excluded from the estimation.

[22] The 1900 result cannot be attributed to the surge of immigrants from eastern and southern Europe that began in the 1890s since there was no concurrent exceptional increase in exports to the countries of "New" Europe.

strongly statistically significant. We believe this is consistent with the U.S. export trade increasingly comprising differentiated products for final use over our sample period.[23]

The core gravity equation variables perform well in this set of estimations. *Distance* is negative and statistically significant for all years but 1895. *Foreign Per-Capita Income*, however, is positive only through 1895 and statistically significant only through 1890. Thereafter, it is negative, and statistically so in 1900 and 1905. This suggests that after 1900, U.S. exports, *ceteris paribus*, tended toward lower income countries. Note, that this provides some perspective on the negative coefficients that were found on *Foreign Per Capita Income* for the Old Europe and the Non Europe geographical sub-samples. The shift from a positive to a negative coefficient on foreign income over time may reflect a changing composition of U.S. exports as the United States and its trading partners developed industrially. *Foreign Population* is significantly positive also for seven of the nine years, and in the earlier years its point estimate is well above unity which indicates that size, per se, of a destination country generated a more than proportionately higher volume of trade. After 1900, the elasticites are all less than unity suggesting that the opposite was true.

Results by Commodity Grouping

The results of estimating the model by commodity groupings are presented in Table 3. The roles of *Migrant Stock* and *Relative Income* are expected to vary with differences in the stage of processing of the goods and with the degree of product differentiation. As argued above, consumer goods that would appeal to specific tastes

[23] In 1870 crude materials accounted for 57 per cent of all exports whereas in 1910 they accounted for 34 per cent of total exports. Combining crude food and crude materials provides the same perspective: they declined from 68 per cent of total exports to 40 per cent in 1910.

and goods of a specialized nature that would especially benefit from information flows are expected to have stronger migrant stock effects than crude materials and goods of a common quality. Likewise, the Linder hypothesis purports to explain trade in differentiated goods rather than crude or standardized products, and the effect of *Relative Income*, therefore, also is expected to vary across commodity groups.

The 45 commodities were divided into five groups following criteria described in Lipsey (1963). The categories are Crude Foodstuffs, Processed Foodstuffs, Crude Materials, Semi-Manufactures, and Manufactures for Consumption.[24]

The estimated effect of *Migrant Stock* is essentially zero for each grouping except Semi-Manufactures, for which the estimated elasticity is about 0.3 and statistically significant. It would appear that the importance of *Migrant Stock* in the overall estimation is related to variations in the commodity mix of goods the United States exported to its various trading partners. The pro-trade effect of English language was strongly positive for every commodity group except Crude Materials, indicating that American exports to Canada and Britain were well above what is explained here by the other variables in the model.

Relative Income has a statistically significant, powerfully negative effect on exports of every group except Crude Materials. We have argued that the Linder thesis does not apply to Crude Foodstuffs (for which a significantly negative effect was found) or to Crude Materials (where a small, but significantly positive effect was found). The findings for the other three categories of processed and semi-processed goods provided further support for the Linder thesis.

[24] The grouping of commodities is found in the appendix to Table 3.

Comparison of Export and Import Findings

To complete the study of immigration on American trade during the late nineteenth and early twentieth centuries we now compare the findings of this paper with those of our earlier study of U.S. imports. There are a variety of reasons to anticipate immigrant effects on imports to differ from those on exports. First, the opportunities and incentives for immigrants to promote import trade likely differed from the incentives to promote export trade. Second, immigrants and natives had incentive to develop import competing businesses in the United States, which overtime would retard rather than develop trade.[25] Most importantly, however, there is little reason to expect that immigrant tastes, which the earlier study strongly suggested were powerful determinant of import flows, to have been important in the promotion of exports.

The variables of central interest are *Migrant Stock*, and *Relative Income*. For each variable we first discuss the result from the overall regressions, then the results by geographic region, then by year, and finally by commodity group. The estimated impact of *Migrant Stock* on imports in the overall regression is approximately two and one-half times as strong as what we find here for American export trade. While this may be a consequence of the particular commodities in our two samples, the coverage of both imports and exports is relatively broad. A natural explanation is that the ethnic taste effect was particularly powerful, during our sample period and that it operated

[25] We take the high U.S. tariffs on manufacturing during this period to be relatively stable, and, thus to have no explanatory power regarding the process of import substitution in this case of goods that catered to immigrant tastes.

exclusively on imports.[26] This explanation, however, demands elaboration when we consider the various sub-grouped regressions.

In the import study we estimated that the impact of immigrants on American imports was strongest for the Old Europe group and significantly positive for immigrants from Non Europe, while immigrants from the New Europe countries were estimated to have had a *negative* impact on import trade. Here we find that the impact of Migrant Stock on exports is pro-trade in every case and uniformly greater than for imports in each of the geographical groupings. Clearly, any "taste" advantage in the import process is indicated here to be more than offset on the export side by more powerful information and trust linkages. Hence, if we accept that tastes have at best a minimal role in export promotion, we are left with the conclusion that the information and trust factors associated with migrant stock were stronger on the export side of American trade than on the import side.

The by-year estimations suggest that migrant stock played a modest role in promoting exports in the 1870 to 1885 period, but that it played no important role thereafter. Migrant stock was found in the import study, consistent with acceptance of the dominating role of the taste hypothesis, to have had a stronger role in promoting imports over the 1870 to 1900 period. Similarly, and more importantly, we found in the import study that a larger migrant stock led to significantly greater imports of manufactures for consumption and of processed foodstuffs and to an increase in the

[26] Wright (1990), however, reports that machine made American shoes, both because of their fit and their style, became popular in Britain after 1894. Whether there was an immigrant effect involved in this is unknown. In general, we have not been able to document the presence of a "reverse immigrant taste" effect since we are largely limited to English language, and more narrowly, American sources. See our earlier paper for examples from the literature of immigrants seeking to copy the fashions of their countries of origin.

imports of semi-manufactures. The relative magnitudes of the coefficients accorded precisely to that predicted by the immigrant taste hypothesis. Here, we find a quite different pattern; *Migrant Stock* obtains a statistically significant coefficient only in the case of semi-manufactures. These commodities, including colored cotton cloth, tobacco manufactures, and leather, are items where quality assurance, that is, trust, rather than tastes, served as a key export-promoting vehicle.

Relative Income is estimated in the overall regression to have had an effect on U.S. exports virtually identical to what was found for its effect on U.S. imports, in each case the coefficient is approximately –0.50. This support for the Linder hypothesis, however, unlike the case of imports, is not confirmed for the export estimations on the basis of geographic grouping where *Relative Income* obtained a statistically significant coefficient for only the Old Europe group. That support, however, is found, when the model is estimated on a by-year basis. Here, for exports, we find that the Linder hypothesis receives support in 1880 and especially from 1900 through 1910. This pattern differs somewhat from what was found for imports where the Linder hypothesis was supported in the estimations for 1880 through 1900, but not for the latter two years of our study. When estimation is done on a commodity group basis, the impact of *Relative Income* on American exports is negative and significant for every group but crude materials. Although there is no reason to expect that crude foodstuffs would be subject to Linder-like forces, there is considerable reason to expect those forces to have been operative in the case of semi-manufactures and manufactures for consumption. In this case the export results are suggestive of greater trade in differentiated goods between the U.S. and its higher income trading partners.

Conclusion

In this paper we complete our investigation of the impact of immigration on American international merchandise trade from 1870 to 1910 by considering the impact of immigrants on American export trade. Here we find further evidence in support of the pro-trade externalities generated by immigration.

We have used the gravity model framework to investigate the effect of the stock of immigrants from 17 countries on a sample of United States exports to their respective home countries. Migrant stock effects were found to be positive and significant for trade as a whole, but proportionately greater for particular regional groupings of countries that reflect the historical pattern of immigration to the United States. Moreover, the impact of the stock of immigrants on exports is found to have diminished over the 1870 to 1910 period. Further, Semi-manufactured goods was the only commodity group for which the presence of immigrants had a significant pro-trade effect. Arguably, these are those goods that benefit more from a greater degree of information and trust between the exporter and the importer.

After 1900 to 1910, the U.S. tended to export more to countries with similar per capita incomes, as suggested by the Linder hypothesis. We find, however, for this same 1900- 1910 period that, *ceteris paribus*, the United States also exported relatively more to the lower per capita income countries. Since in 1900 the U.S. was a high income country, this result is consistent with Heckscher-Ohlin predictions that countries export more to other countries with factor proportions different from their own. That is, the

United States would export more to lower per capita income countries which would tend to have higher labor to capital or labor to land ratios than itself.[27]

The effect of immigrants on exports was positive, as it was on imports. Similar to Gould and to Head and Ries, we find that the impact of immigrants on exports dissipated earlier than it did for imports. We also conclude that the immigrant effect worked more through the information and trust links for exports, whereas for imports the taste link was more important.

[27] This is consistent with Bergstrand (1990).

Appendix: Data Descriptions and Sources

Export Volume — Measured in real 1913 U.S. dollars. Current dollar values obtained from U.S. Commerce and Navigation Reports are divided by U.S. export price indices (1913 = 100) available from Williamson *American Growth*.

Migrant Stock — Measured in persons. Available in Wilcox, *International Migrations*, for decennial years; mid-periods years, e.g., 1875, are obtained by linear interpolation. For Brazil the number of all South American immigrants is used.

U.S. Population — Measured in millions of persons. Available for all years in Maddison, *Monitoring the World Economy*.

Foreign Population — Measured in millions of persons. For most nationalities the data come from Maddison, *Monitoring the World Economy*. Spanish and Portuguese populations are from Mitchell, *International Historical Statistics: Europe* and have been interpolated to the years 1870, etc. Mexican and Brazilian populations are from Mitchell, *International Historical Statistics: The Americas* for selected years.

Real Per Capita GDP — Measured in thousands of U.S. dollars per person. Indices (1913 = 100) of real GDP are available for various years and countries in Maddison, *Dynamic Forces* and *Monitoring the World Economy*. These indices were adjusted using Maddison's values for 1913 GDP measured in 1985 U.S. dollars. Income data for Spain, Portugal, Russia, Brazil, China and Mexico are from Mitchell *International Historical Statistics: Europe, International Historical Statistics: Africa,* and *International Historical Statistics: The Americas.*

Distance — Measured in statute miles between major port or population center of U.S. trading partner and the closest major U.S. port: New York, New Orleans, or San Francisco. The distances to Mexico and to Canada were arbitrarily set at 150 miles.

Terms of Trade — Measured as the ratio of export unit values to import unit values. Data for 1870 and 1875 are from Simon, "The United States Balance of Payments," and were converted to the 1913 base year. Data after 1879 are from Lipsey, *Price and Quantity Trends*.

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Table 1: Fixed Effects Estimation Results—Overall and by Geographic Region

Variable	Exports to All Regions	Exports to Old Europe	Exports to New Europe	Exports to Non Europe
Migrant Stock	0.08**	0.93***	1.21***	0.30***
abs. t-value:	(2.11)	(7.11)	(6.72)	(2.81)
English Language	2.70***	-1.80**	...	-0.14
	(12.50)	(2.57)		(0.15)
Distance	-0.99***	-49.82***	-12.60***	-0.58***
	(14.64)	(10.01)	(3.04)	(4.43)
Relative Income	-0.56***	-0.33**	-0.64	-1.35
	(5.36)	(2.32)	(0.32)	(1.00)
Foreign Per Capita Income	0.94***	-2.87***	2.72	-2.92
	(3.14)	(3.25)	(0.84)	(1.09)
Foreign Population	0.76***	0.23*	-0.16	-0.42***
	(11.67)	(1.78)	(0.55)	(2.64)
American Per Capita Income	1.17	0.46	6.81	6.62
	(0.57)	(0.19)	(1.47)	(1.08)
American Population	19.75***	37.85***	11.90	-3.18
	(4.36)	(6.37)	(1.62)	(0.40)
Terms of Trade	-3.20***	-3.12***	-3.20**	-3.40*
	(3.59)	(2.92)	(1.98)	(2.24)
Recession	-0.71***	-0.70***	-0.82**	0.27
	(3.96)	(3.27)	(2.80)	(0.80)
Year	-1.70***	-3.31***	-1.91**	0.35
	(0.53)	(4.71)	(2.21)	(0.31)
deg. freedom.	5548	2570	1577	1292
R^2	0.46	0.62	0.53	0.54

Estimation of fixed (commodities) effects model. t-values are based on the robust standard errors correction procedure for heteroskedasticy using the Stata 7 software package. Statistical significance of a coefficient at the 10 %, 5 %, or 1 % level is indicated, respectively, by *, **, and ***. All variables except the English language and Recession dummy variables and the variable Year are in logarithms. The dependent variable is the logarithm of (1 + the real value of exports of a given commodity.

Appendix to Table 1:
Countries in the Data Set, by Year and Geographic Classification

Income Data are Available for the Following Countries as Indicated

All Years
Austria, Belgium, Canada, Denmark, France, Germany, Italy, Spain, Sweden, United Kingdom

Some Years

Brazil	1870, 1890, 1895, 1900, 1905, 1910
China	1870, 1890, 1900, 1905, 1910
Japan	1870, 1885, 1890, 1900, 1905, 1910
Mexico	1870, 1885, 1900, 1905, 1910
Netherlands	1870, 1880, 1890, 1900, 1910
Portugal	1870, 1890, 1895, 1900, 1905, 1910
Russia	1870, 1890, 1895, 1900, 1905, 1910

Population Data are Available for the Following Countries by Geographic Group, as Indicated

Old Europe:
All Years: Belgium, Denmark, France, Germany, Netherlands, Sweden, United Kingdom

New Europe:
All Years: Austria, Italy, Portugal, Spain, Russia

Non Europe:
All Years: Brazil, Canada, Japan, Mexico, China

Table 2: Fixed Effects Estimation Results, All Countries and Commodities—by Year

Variable	1870	1875	1880	1885	1890	1895	1900	1905	1910
Migrant Stock	0.25**	0.54***	0.29**	0.20*	-0.01	0.03	0.22**	-0.04	-0.16
abs. t-value:	(2.54)	(4.26)	(2.24)	(1.72)	(0.05)	(0.26)	(2.06)	(0.32)	(1.41)
English	2.67**	3.74***	-0.85	2.02**	2.11***	4.37***	-0.40	-0.09	0.34
Language	(3.58)	(4.55)	(0.94)	(2.38)	(3.58)	(5.46)	(0.68)	(0.13)	(0.43)
Distance	-0.64***	-1.05***	-2.44***	-0.87**	-1.12***	0.04	-1.35***	-1.42***	-1.43***
	(3.14)	(3.60)	(6.64)	(2.60)	(6.77)	(0.12)	(8.60)	(8.71)	(8.03)
Relative	1.94***	1.22***	-1.08***	-0.19	-0.33	-0.54	-2.41***	-3.35***	-3.26***
Income	(3.56)	(2.99)	(3.81)	(0.55)	(1.62)	(1.11)	(5.98)	(5.33)	(3.76)
Foreign Per	4.25***	8.10***	2.36**	3.17***	2.21***	1.29	-3.09***	-4.49**	-3.82**
Capita Income	(3.11)	(6.62)	(2.54)	(2.85)	(2.79)	(0.95)	(3.05)	(3.34)	(2.31)
Foreign	0.11	1.80***	2.25***	1.23***	0.62***	0.27	0.44*	0.80***	0.87**
Population	(0.58)	(8.16)	(9.46)	(6.30)	(3.52)	(1.29)	(2.69)	(4.63)	(4.96)
deg. freedom	618	394	387	456	650	568	698	698	698
R^2	0.40	0.66	0.66	0.56	0.46	0.48	0.54	0.52	0.53

Estimation of fixed (commodities) effects model. t-values are based on the robust standard errors correction procedure for heteroskedasticity using the Stata 7 software package. Statistical significance of a coefficient at the 10 %, 5 %, or 1 % level is indicated, respectively, by *, **, and ***. All variables except the English language dummy are in logarithms. The dependent variable is the logarithm of (1 + the real value of exports of a given commodity). Since the American-specific variables, *Terms of Trade*, *Recession*, and *Year* are constants within any given by-year regression, they do not appear in these results.

Table 3: Fixed Effects Estimation Results—By Commodity Groupings

Variable	Crude Foodstuffs	Processed Foodstuffs	Crude Materials	Semi Manufactures	Manufactures for Consumption
Migrant Stock	-0.12	0.11	0.10	0.31***	-0.02
abs. t-value:	(1.01)	(1.36)	(0.90)	(3.63)	(0.35)
English Language	4.68***	3.55***	-0.37	2.49***	2.75***
	(6.99)	(8.61)	(0.55)	(5.96)	(8.28)
Distance	-1.32***	-0.64***	-1.66***	-0.83***	-0.95***
	(5.94)	(4.78)	(7.97)	(6.32)	(8.72)
Relative Income	-1.13***	-0.77***	0.60**	-0.86***	-0.47***
	(3.54)	(3.84)	(2.07)	(4.12)	(3.01)
Foreign Per Capita Income	1.14	0.68	5.67***	-0.26	-0.51
	(1.24)	(1.18)	(6.98)	(0.42)	(1.15)
Foreign Population	0.86***	0.49***	1.43***	0.82***	0.58***
	(4.12)	(3.72)	(7.78)	(5.73)	(6.19)
American Per Capita Income	7.01	4.21	-1.32	2.28	-4.47
	(1.04)	(1.03)	(0.25)	(0.50)	(1.46)
American Population	44.16**	30.54***	35.04***	-2.41	-1.18
	(3.11)	(3.35)	(2.74)	(0.22)	(0.18)
Terms of Trade	-2.20	-4.48**	-1.84	-2.59	-3.77***
	(0.79)	(2.51)	(0.72)	(1.38)	(2.93)
Recession	-0.34	-0.98***	-0.55	-0.37	-0.98***
	(0.62)	(2.75)	(1.12)	(0.92)	(3.61)
Year	-4.95**	-3.16***	-3.66**	-0.31	1.27
	(2.97)	(2.94)	(2.44)	(0.26)	(1.64)
deg. freedom.	654	1512	787	1064	1487
R^2	0.47	0.42	0.54	0.41	0.61

Estimation of fixed (commodities) effects model. t-values are based on the robust standard errors correction procedure for heteroskedasticity using the STATA software package. Statistical significance of a coefficient at the 10 %, 5 %, or 1 % level is indicated, respectively, by *, **, and ***. All variables except the English language and Recession dummy variables and the variable Year are in logarithms. The dependent variable is the logarithm of (1 + the real value of exports of a given commodity.

Appendix to Table 3:
Commodities in the Data Set, by Commodity Grouping

Crude Foodstuffs:

Live Cattle	Corn	Green Apples
Hops	Wheat	

Processed Foodstuffs:

Butter	Canned Salmon	Cheese
Cornmeal	Cotton Oil	Dried Apples
Lard	Meat	Oil Cake
Tallow	Refined Sugar	Vegetable Oil
Wheat Flour		

Crude Materials:

Coal	Raw Cotton	Copper Ore
Crude Petroleum	Timber	Tobacco Leaf

Semi-Manufactures:

Brass Manufactures	Cotton Cloth (uncolored)	Cotton Cloth (colored)
Copper Ingots	Furskins	Leather
Lumber	Tobacco Manufactures	Wood Pulp

Manufactures for Consumption:

Agricultural Implements	Clocks and Watches
Cotton Apparel	Firearms
India Rubber Boots and Shoes	Iron and Steel Rails
Leather Boots and Shoes	Misc. Iron and Steel Products
Leather Bridles and Saddles	Tinplate
Refined Petroleum	Sewing Machines

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