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Immigration Policy, Cultural Pluralism and Trade: Evidence from the White Australia Policy

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IMMIGRATION POLICY, CULTURAL PLURALISM AND TRADE: EVIDENCE FROM THE WHITE AUSTRALIA POLICY

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Abstract. Examining data for Australia and 101 trading partners that span the years 1989–2000, we find immigrants from nations afforded preference under the White Australia policy exert greater proportional influences on Australian imports from their home countries compared to immigrants from nations not privy to such preference. Immigrants from this latter group of countries influence Australian exports to their home countries proportionally more than do immigrants from the former group. We also find immigrant-trade links vary across disaggregated measures of trade. The results suggest that cultural diversity, affected here by immigration policy, is relevant to a nation's trade patterns.

1. INTRODUCTION

Australia's continued integration into the global economy has entailed more intense trade and factor flows. Between 1970 and 2000, Australia's combined exports and imports increased from 26.1% of gross domestic product (GDP) to 45.9%. Similarly, the sum of its foreign direct investment (FDI) inflows and outflows as a share of GDP nearly doubled from 2.4% to 4.4%. Although the proportion of Australia's population that was foreign-born only increased from 19.9% to 21.3% (World Bank, 2006), the ethnic composition of immigrant inflows changed dramatically. Capital flows often increase trade due to parent firm–affiliate interaction. Likewise, immigrants have been found to exert a positive influence on trade between home and host countries. Gould (1994), examining the USA, first reports an immigrant-trade link and subsequent studies document positive links for several countries. This paper contributes to the literature by examining Australia's immigrant-trade link and considering potential variation in the effects of immigrants on trade across immigrant home countries classified by historical access to preferences under Australian immigration policy.

Immigrants are thought to influence trade through two broad channels. First, immigrants may arrive with preferences for home country goods that are unavailable in the host nation. If so, host country imports from the home country may increase. Second, immigrants may increase imports from and/or exports to their home nation if they possess knowledge or skills that reduce trade related transaction costs. For example, immigrants may be connected to

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home country social or business networks that facilitate trade or possess language skills or knowledge of home country customs that enable business to be conducted with the home nation (Globerman, 2001). In both cases, greater cultural distance between the populations of home and host nations may engender a stronger immigrant effect on trade. As a nation's cultural identity is an amalgam of its population's attitudes, customs and beliefs, it follows that immigration policy can influence a host nation's cultural identity and, in doing so, may affect trade. Given the associated policy relevance, an accurate account of the immigrant-trade relationship may prove beneficial with respect to the future formulation of immigration and trade policies.

Until the early 1950s, Australian immigration policy – known informally as the White Australia policy – afforded preferential treatment to British emigrants. As a result, Australia's population at the close of World War II was overwhelmingly of British ethnicity. For example, in 1947, Britain (89.8%), northern and western Europe (5.7%), and southern Europe (1.5%) collectively accounted for 97% of Australia's ethnic composition (Price, 1999).[1] In that same year, seeking labour for post-war reconstruction and national defence, Australia adopted annual immigrant inflow targets equal to 1% of the population with a desired ratio of ten British immigrants to every one non-British immigrant (Castles, 2000). However, like Australia, Britain faced manpower shortages and between 1945 and 1960 only 60% of Australia's 1.6 million immigrant arrivals were British (Bouscaren, 1963). This led Australia, beginning in the 1950s, to relax the White Australia policy by formally agreeing to provide preference to emigrants from 11 other European nations.[2]

The demographics of post-war immigrant inflows altered the ethnic makeup of Australia's population, yet even with formal abandonment of the White Australia policy in 1973 and an increased emphasis placed on the promotion of multiculturalism, as recently as 1999 persons of British descent accounted for 69.9% of Australia's ethnic composition. Adding the influence of continental Europe, results in a collective share of 83.8% (Price, 1999). Thus, while ethnic and cultural diversity have increased, Australia remains very much culturally akin to the UK and other European nations. As a result of the changes in Australian immigration policy, more recent immigrant arrivals have often been from nations that are culturally distinct from Europe and, hence, from Australia. For example, 80.1% of the increase in Australia's foreign-born population during the 1990s was due to immigrant arrivals from Asia and the Pacific. The greater cultural distance between Australia and the home countries of these more recent immigrants may have lead to stronger influences being exerted on trade as compared with that of immigrants from nations afforded preference under the White Australia policy.

[1] Price (1996) notes that birthplace origins are not the same as ethnic origins. We acknowledge this and, due to data constraints, proceed cautiously when employing country of birth as representative of ethnic origin.

[2] The appendix provides a list of nations in the dataset, identified by White Australia policy association.

To discern whether increased cultural pluralism, fostered through abandonment of the White Australia policy, generated variation in immigrant trade links across home countries, we classify the UK, New Zealand and home countries that entered into emigration agreements with Australia as White Australia policy (*WAP*) nations. Other home countries are classified as non-White Australia policy (*NWAP*) nations. Using data for Australia and 101 trading partners that span the years 1989–2000, we find pro-trade immigrant effects; however, the effects vary across *WAP* and *NWAP* classifications. Immigrants from *WAP* nations exert greater proportional influences on Australian imports from their respective home countries than do immigrants from *NWAP* nations, while immigrants from *NWAP* nations exert stronger influences on Australian exports to their home countries. Variation in links is also reported across several disaggregated trade measures. Likewise, estimated per-immigrant effects on trade are consistently greater for immigrants from *NWAP* nations. The findings provide greater insight into the channels via which immigrants affect trade and indicate that cultural diversity, affected by immigration policy in this case, is relevant to a nation's trade patterns. Section 2 introduces the econometric specification and the data. Section 3 presents the empirical analysis, while Section 4 concludes.

2. ECONOMETRIC SPECIFICATION

Prior studies of the immigrant-trade relationship have employed variations of the gravity model.[3] In its basic form, the model posits that trade between two nations (T_{ijt}) increases with the nations' combined economic mass ($Y_{it}Y_{jt}$) and decreases with distance (D_{ij}) between nations. The subscripts i, j and t represent Australia, home nations and time (in years), respectively. Higher home country GDP (Y_{jt}) implies greater export markets for Australia and an increased probability of Australian imports. Similarly, higher Australian GDP (Y_{it}) signals an increased capacity to both export and to import. Distance between Sydney and the capital city of nation j, measured in kilometres using the great circle method, is a proxy for transport costs. Λ is the constant of proportionality, as equation (1) illustrates,

$$T_{ijt} = \Lambda\left(\frac{Y_{it}Y_{jt}}{D_{ij}}\right). \tag{1}$$

Researchers have, over time, extended the basic gravity specification to include a number of factors that potentially facilitate or inhibit trade. We draw upon the existing literature in formulating an augmented gravity specification. To control for additional factors that may enhance or diminish trade flows, we append to equation (1) several variables that, potentially, facilitate or inhibit trade. Taking natural logarithms of the continuous variables on both sides of

[3] Tinbergen (1962) first applies the gravity equation to trade. Recent research (Bergstrand, 1985; Helpman and Krugman, 1985; Davis, 1995; Deardorff, 1998; Feenstra *et al*., 2001; Eaton and Kortum, 2002; Anderson and van Wincoop, 2003; Anderson, 1979) has established theoretical foundations for the model.

the resulting equation and adding an assumed independently and identically distributed error term, ε_{ijt}, yields equation (2),

$$\begin{aligned}\ln T_{ijt} = {} & \alpha_0 + \beta_1(\ln IMM_{ijt} \times WAP_j) + \beta_2(\ln IMM_{ijt} \times NWAP_j) \\ & + \beta_3 \ln \Delta T_{ijt-1} + \beta_4 D_{ij} + \beta_5 \ln XRATE_{ijt-1} + \beta_6 Y_{it} + \beta_7 Y_{jt} \\ & + \beta_8 \ln\left(\frac{Y\ deflator_j}{Y\ deflator_i}\right)_t + \beta_9 \ln OPEN_{jt} + \beta_{10} \ln POP_{it} \\ & + \beta_{11} \ln POP_{jt} + \beta_{12} \ln REM_{jt} + \beta_{13} ENGLISH_j + \varepsilon_{ijt}.\end{aligned} \tag{2}$$

The series of dependent variables, T_{ijt}, includes values for aggregate imports and exports, along with trade values for manufacturing and non-manufacturing sectors, goods at one-digit Standard Industrial Trade Classification (SITC), and differentiated and homogenous (reference-priced and organized exchange) products.[4] These latter values are constructed using four-digit SITC-level trade data and Rauch (1999) product classifications. Goods traded on public exchanges are classified as organized exchange products, while reference-priced goods are those with prices regularly listed in industry trade publications. All other goods are considered differentiated. Trade data are from Feenstra *et al*. (2005), except for the one-digit SITC level data which are from the SourceOECD database. Estimating equation (2) using each of the various measures of trade increases the depth and breadth of our analysis. While aggregate trade values permit examination of a general immigrant-trade link, use of disaggregated trade values as dependent variables enables us to consider variation across sectors and types of goods. This, in turn, provides for a more detailed understanding of the relationship between immigrants and trade.

The stock of immigrants from nation *j* residing in Australia, IMM_{ijt}, is interacted with two dummy variables, WAP_j and $NWAP_j$, respectively, to produce a pair of variables that identify immigrants from home countries that received preferential treatment under the White Australia policy and those that were not privy to such preference. The interaction of the dummy variables with the immigrant stock variable permits us to test whether or not the abandonment of the White Australia policy has contributed to any variation in immigrant-trade links. We acknowledge that an immigrant's influence on trade may depend on the immigrant's skill level and/or visa status. For example, 'business' or 'skilled' migrants may increase Australian trade more, on average, than would the typical 'family' migrant; however, given available data, we are unable to address this question.

The immigrant stock variable is constructed as follows. Census data from the Australian Bureau of Statistics (ABS) provide country level immigrant stocks at three points in time: 1991, 1996 and 2001. We employ these values as benchmarks. ABS data on immigrant inflows during the years 1992–2000

[4] A listing of one-digit SITC sectors is provided in the appendix.

are used to estimate immigrant stock values for intra-census years. For example, immigrant stocks for the years 1992–1996 are estimated as follows,

$$IMM_{ijt} = IMM_{ij1991} + \sum_{1991}^{t} INFLOW_{ijt} + \delta_j. \quad (3)$$

δ_j is an adjustment factor accounting for return migration and death of immigrants during intra-census years. It is the immigrant stock from nation j in Australia given by the 1996 census less the sum of immigrants from nation j in Australia in 1991 and the inflow from nation j during the years 1991–1996 divided by six,

$$\delta_j = \frac{IMM_{ij1996} - \left[IMM_{ij1991} + \sum_{t=1991}^{1996} INFLOW_{ijt} \right]}{6}. \quad (4)$$

For the years 1997–2000 the immigrant stock variable is constructed similarly, using 2001 census values and 1997–2001 immigrant inflow data. The combination of the 1992–1995 and 1997–2000 estimated immigrant stock values and the 1991 and 1996 benchmark values results in a set of immigrant values for each nation over the years 1991–2000.

The remaining explanatory variables include the lagged first-difference of the dependent variable. Gould (1994) employs the one-period lagged value of the dependent variable as an explanatory variable and interprets the resulting regression specification as a partial adjustment model. This is akin to controlling for the effects of what might be called trade inertia. Eichengreen and Irwin (1996) also include the one-year lag of the dependent variable to capture such effects. Following Wooldridge (2002), we test for autocorrelation in our panel data and fail to rule out the presence of first-order autocorrelation for each of the dependent variables used in our estimations. In the presence of AR(1) in the data, inclusion of the lagged dependent variable in the empirical specification would bias estimated coefficients downward and potentially obscure any meaningful effects of changes in explanatory variables, including those of immigrants, on trade. As a result, we include the lagged first-difference of the dependent variable (given as $\Delta \ln T_{ijt-1} = \Delta \ln T_{ijt-1} - \ln T_{ijt-2}$), rather than the lagged value of the dependent variable, to control for inertia effects. As changes in the dependent variable are related to trends in bilateral trade flows, rather than size or distance, inclusion of this variable does not violate the theoretical foundations of the gravity specification, nor does it lead to downward biasing of coefficients.

To capture potential effects of price variation, we include lagged one-year nominal exchange rates ($XRATE_{ijt}$) (IMF, 2006). Given as annual average values of Australian dollars per foreign currency unit, an increase in the value indicates a depreciation of the Australian dollar and thus is expected to yield increases in Australian exports and decreases in Australian imports. Also controlling for the influences of relative prices, we include the ratio of GDP deflators $(Y\ deflator_j / Y\ deflator_i)_t$ (World Bank, 2006). While Gould (1994) employs US

and home country GDP deflators separately, we follow the methodology of Head and Ries (1998) as we believe this measure of relative prices is better suited, as compared with including Australian and home country GDP deflators separately, to capture the expected positive influences of relatively higher (lower) home country prices on Australian imports (exports).

Since trade with Australia may depend on outside (i.e. non-Australian) trading opportunities available to potential trading parties in each home country, we include a measure of the economic remoteness of each home country. Given as $REM_{jt} = 1/\ \Sigma_{k=1}^{K}\ [(Y_{kt}/Y_{wt})/D_{jk}]$, the remoteness variable is a measure of quasi-distance (Wagner *et al.*, 2002). D_{jk} is the distance between home country j and each nation k other than Australia, Y_{kt} is the total output of country k and Y_{wt} represents gross global product (World Bank, 2006).[5] A country may be economically remote if it is geographically isolated (e.g. New Zealand) or located near relatively small economies (e.g. South Africa). Such nations face a relative lack of trading opportunities and may find Australia to be a preferred partner.

It could be argued that the pro-trade influence of immigrants is the result of recent trade liberalization in *NWAP* nations. Similarly, relative openness to trade may stem from greater trading infrastructure; for example, airports, seaports, rail lines and highway systems. To control for such possibilities, we include a trade openness variable ($OPEN_{jt}$) which is given as the sum of imports and exports divided by GDP (Head and Ries, 1998). Hutchinson (2002) and Girma and Yu (2002), examining US and UK trade, respectively, find common language to be an important determinant of trade flows. Shared languages may permit contracts to be more easily written and interpreted or reduce search costs associated with finding suitable trading partners. Accordingly, we include a dummy variable equal to one if English is a common language in the home country (US CIA, 2006). Finally, following Gould (1994), we include Australian and home country populations (POP_{it} and POP_{jt}, respectively) to represent market size (World Bank, 2006). All values, trade flows and otherwise, have been normalized to 2000 US dollars where applicable.

Immigrants from the nations included in this dataset comprise 18.4% of the Australian population. Descriptive statistics are provided in Table 1. The average immigrant stock is significantly greater for the 13 nations that were afforded preference under the White Australia policy. The collective immigrant population from these nations (11.3% of the total population) is sizeably larger than the total immigrant population (7.1%) from the 88 nations not afforded preference under the White Australia policy. Australia tends to import relatively more from and export more to *WAP* nations, and *WAP* nations have, on average, higher average GDP values; so much so that, in comparison with the typical *NWAP* nation, *WAP* nations are relatively closed to trade. *WAP* nations are also significantly less economically remote than *NWAP* nations; however, they are located, on average, a greater distance from Australia.

[5] If $j = k$, internal distance is the square root of the country's mass times 0.4 (Head and Mayer, 2000).

Table 1. Descriptive statistics for all home countries and for WAP/NWAP subsamples

Variable	*Description*	*All home countries N = 1010*	*NWAP countries N = 880*	*WAP countries N = 130*
T_{ijt}	Real exports, total	461,788.90	437,314.70	627,460.5***
		(1,544,632)	(1,621 423)	(846,162.80)
	Real imports, total	486,334.50	400,345.40	1,068,414.00*
		(1,554,189)	(1,589,043)	(1,138,347)
IMM_{ijt}	Immigrant stock	33,130.80	14,727.79*	157,705.00*
		(116,504.3)	(27,016.52)	(288,518.80)
D_{ij}	Distance (in miles)	13,369.57	13,201.90	14,504.62*
		(3,514.9)	(3,402.5690)	(4,031.974)
$XRATE_{ijt\text{-}1}$	Exchange rate (one-year lag)	1,032.80	1,169.5460	107.0323*
		(10,848)	(11,615.77)	(293.6987)
Y_{jt}	Real GDP (home country)	275,987.96	234,637.47	555,898.95*
		(964,929.09)	(995,998.75)	(657,678.96)
$Y\ deflator_{jt}$	GDP deflator (home country)	105.6778	104.8121	111.5379*
		(16.87136)	(17.2191)	(12.8974)
$Y\ deflator_{jt}/Y\ deflator_{it}$	GDP deflator ratio	1.0523	1.0439	1.109*
		(0.1807)	(0.1854)	(0.1314)
$OPEN_{jt}$	Trade openness	0.7083	0.7156	0.6586*
		(0.388)	(0.4091)	(0.1851)
POP_{jt}	Population	49,111,783.90	52,907,343.91	23,442,069.92*
		(15,377,902)	(163,697,640.97)	(25,468,345.39)
REM_{jt}	Economic remoteness	6,737.85	7,159.151**	3,885.94*
		(4,125.54)	(4,093.3390)	(3,089.96)
$ENGLISH_{j}$	Common language	0.3762	0.3864	0.3077
		(0.4847)	(0.4872)	(0.4633)
Y_{it}	Real GDP (Australia)	383,263.85	----	----
		(44,411.21)	----	----
$Y\ deflator_{it}$	GDP deflator (Australia)	100.7173	----	----
		(4.6335)	----	----
POP_{it}	Population (Australia)	18,209,220	----	----
		(612,790.70)	----	----

Standard deviations in parentheses. '*', '**' and '***' denote statistical significance from the overall mean at the 1%, 5% and 10% levels, respectively. Trade values are in thousands of 2000 US dollars. GDP values are in millions of 2000 US dollars. NWAP = non-White Australia policy, WAP = White Australia policy.

3. ECONOMETRIC RESULTS

As mentioned, we examine whether increased cultural pluralism, fostered through abandonment of the White Australia policy, has produced variation in immigrant-trade links across home countries. Doing so provides a more accurate account of the immigrant-trade relationship and may prove beneficial to the formulation of future immigration and trade policies. Using US data, Gould (1994) first documents an immigrant-trade link. Subsequent research has reported positive relationships between immigrants and trade for several nations. For example, Wagner *et al*. (2002), Head and Ries (1998) and Helliwell (1997) examine immigrant-trade links for Canada. Similarly, Ching and Chen (2000) report a positive relationship between immigration and Canada-Taiwan trade. Blanes (2003), Piperakis *et al*. (2003) and Bryant *et al*. (2004) report links for Spain, Greece and New Zealand, respectively, and, at the sub-national level, Combes *et al*. (2005) finds evidence of an intra-France migrant-trade relationship. Several studies also identify a link between immigrants and US state exports.[6] Few studies have explored variation in immigrant effects across home countries and none have considered a potential Australian immigrant-trade link. White (2007), employing average income as a proxy for relative economic development, finds immigrants from low income countries drive the US immigrant-trade link.

The study most similar to our examination of the Australian immigrant-trade link may be Girma and Yu (2002). Examining UK trade with 48 nations over the 1981–1993 period, the authors stratify their sample into two groups: 'Commonwealth' and 'non-Commonwealth' nations. A positive immigrant-trade link is reported only for the latter group. The authors contend that personal contacts and network connections apply to all immigrants, regardless of home country. Thus, associated influences on trade would be relatively uniform across home countries. Similarly, commonality of legal norms and judicial systems, formal and informal contracting structures, and communications systems between the UK and Commonwealth-affiliated home countries diminish immigrants' abilities to affect trade. This suggests that institutional dissimilarity between the UK and non-Commonwealth home countries permits immigrants from such nations to enhance trade flows. Classifying nations by *WAP*/*NWAP* status permits the isolation of the respective influences of immigrants on trade. Unlike Commonwealth affiliation, which entails much stronger host country influences on the home country in terms of governmental and, hence, institutional structures, *WAP*/*NWAP* status involves much weaker host country influence (and, perhaps, only a negligible influence) on the internal structures of the home countries. As a result, classification of home countries according to *WAP*/*NWAP* status permits consideration that cultural pluralism, in this instance resulting from a host country shifting away from a restrictive immigration policy, affects trade flows.

[6] See Bandyopadhyay *et al*. (2006) for a review of related research.

Table 2. Immigrant-trade links, with and without White Australia policy distinction

Dependent variables	*ln exports*$_{ijt}$	*ln imports*$_{ijt}$	*ln exports*$_{ijt}$	*ln imports*$_{ijt}$
ln immigrants$_{ijt}$	0.4646*	0.1758*	----	----
	(0.0356)	(0.0325)	----	----
ln immigrants$_{ijt}$ *x White Australia*$_j$	----	----	0.3882*	0.2416*
	----	----	(0.0295)	(0.0319)
ln immigrants$_{ijt}$ *x non-White Australia*$_j$	----	----	0.4721*	0.1882*
	----	----	(0.0326)	(0.0308)
Lagged first-difference of dep. variable	–0.0277	0.0056	–0.0253	0.0061
	(0.0188)	(0.0148)	(0.019)	(0.0147)
ln distance$_{ij}$	–1.4659*	–2.0129*	–1.667*	–2.1753*
	(0.1147)	(0.2056)	(0.1281)	(0.2369)
ln exchange rate$_{ijt-1}$	0.0221	–0.0614**	0.0137	–0.0845*
	(0.0154)	(0.0246)	(0.0141)	(0.0241)
ln GDP$_{jt}$ *(home country)*	1.108*	1.5136*	1.1057*	1.3858*
	(0.0412)	(0.0464)	(0.0377)	(0.0373)
ln GDP$_{it}$ *(Australia)*	–3.1932*	–0.0219	–3.3529*	0.4735
	(0.8944)	(0.7978)	(0.8862)	(0.7153)
ln (GDP deflator$_{jt}$*/GDP deflator*$_{it}$*)*	–2.086*	–0.8011**	–2.1421*	–1.2216*
	(0.345)	(0.3416)	(0.3342)	(0.2998)
ln open$_{jt}$	0.9849*	0.1235***	0.9254*	0.1219***
	(0.0756)	(0.0658)	(0.0717)	(0.0648)
ln population$_{jt}$ (home country)	0.0565***	–0.2172*	–0.0682***	–0.1669*
	(0.0311)	(0.0595)	(0.0407)	(0.0594)
ln population$_{it}$ (Australia)	3.9849	–2.0477	4.0371	–2.7123
	(3.1065)	(2.7336)	(3.0817)	(2.4654)
ln remote$_{jt}$	0.3706*	–0.1847	0.1097	–0.1742
	(0.0774)	(0.1194)	(0.0732)	(0.1099)
ENGLISH$_j$	0.2007**	1.4985*	0.1307	1.4413*
	(0.1022)	(0.1572)	(0.0912)	(0.1582)
Constant	9.5552	30.2588	19.3732	32.2236
	(28.8499)	(25.4529)	(28.4008)	(22.8131)
N	1010	1010	1010	1010
Wald χ^2	6503*	3200*	7397*	6948*
Log likelihood	–1003	–664	–1029	–652

All dependent variables have been converted to 2000 US dollars. Standard deviations are in parentheses. '*', '**' and '***' indicate significance from zero at the 1%, 5% and 10% levels, respectively.

We select iterative feasible generalized least squares (FGLS) as the appropriate econometric estimation method. Our selection of FGLS is dictated by the presence of first-order autocorrelation and panel-level heteroskedasticity in the original data.[7] FGLS allows the estimation of efficient coefficients when AR(1) autocorrelation within panels and cross-sectional correlation and/or heteroskedasticity across panels are present. Thus, the estimated coefficients we provide in Tables 2 and 3 are based on iterative FGLS estimations where

[7] We follow Wooldridge (2002) and test for autocorrelation and heteroskedasticity in the panel data. Both Wooldridge and Breusch-Pagan tests, respectively, reject (at $P > 0.001$) the null hypotheses of no autocorrelation and the homoskedastic panels assumption. Since we have time invariant country characteristics, the use of fixed effects regression is ruled out. Thus, we select FGLS as our estimation strategy. We also use the panel corrected standard errors (PCSE) technique for estimating variances as an alternative estimation strategy to check the robustness of our findings (see Subsection 3.3 for details).

Table 3. Summary of proportional immigrant effects on exports and imports

	Exports		*Imports*	
Trade measure	*NWAP home countries*	*WAP home countries*	*NWAP home countries*	*WAP home countries*
Conservative product classification				
Differentiated products	0.440*	0.426*	0.322*	0.416*
	(0.045)	(0.047)	(0.041)	(0.062)
Reference-priced products	0.461*	0.238*	–0.003	–0.049
	(0.067)	(0.075)	(0.031)	(0.037)
Organized exchange products	0.622*	0.370*	0.091***	0.441*
	(0.064)	(0.079)	(0.047)	(0.053)
Liberal product classification				
Differentiated products	0.408*	0.403*	0.307*	0.399*
	(0.049)	(0.051)	(0.041)	(0.064)
Reference-priced products	0.451*	0.291*	0.011	–0.044
	(0.073)	(0.091)	(0.024)	(0.032)
Organized exchange products	0.645*	0.378*	0.19*	0.398*
	(0.059)	(0.071)	(0.037)	(0.039)
One-digit SITC industry sector				
Non-manufacturing	0.257***	0.03	0.464***	0.345***
	(0.051)	(0.057)	(0.050)	(0.063)
SITC-0: Food and live animals	0.231*	0.091	0.482*	0.416*
	(0.078)	(0.100)	(0.044)	(0.048)
SITC-1: Beverages and tobacco	–0.009	–0.007	0.029**	0.119*
	(0.019)	(0.045)	(0.014)	(0.031)
SITC-2: Crude materials, inedible, except fuels	0.164*	–0.086	0.003	0.148**
	(0.051)	(0.070)	(0.055)	(0.064)
SITC-3: Mineral fuels, lubricants and related materials	0.072	0.001	0.007	0.214*
	(0.044)	(0.061)	(0.031)	(0.053)
SITC-4: Animal and vegetable oils, fats and waxes	0.043	0.143*	–0.001	–0.04
	(0.042)	(0.050)	(0.018)	(0.032)

Table 3. Continued.

Trade measure	*Exports*		*Imports*	
	NWAP home countries	*WAP home countries*	*NWAP home countries*	*WAP home countries*
Manufacturing	0.187*	0.103***	0.083*	–0.198*
	(0.044)	(0.058)	(0.043)	(0.050)
SITC-5: Chemicals and related products, n.e.s.	0.141**	0.041	0.087*	0.022
	(0.063)	(0.077)	(0.048)	(0.066)
SITC-6: Manufactured goods classified chiefly by material	0.129**	0.001	0.101***	–0.102
	(0.057)	(0.069)	(0.055)	(0.065)
SITC-7: Machinery and transport equipment	0.238*	0.358*	–0.047	–0.463*
	(0.041)	(0.051)	(0.036)	(0.058)
SITC-8: Miscellaneous manufactured articles	0.158*	0.021	0.289*	0.154*
	(0.038)	(0.052)	(0.045)	(0.055)
SITC-9: Commodities and transactions n.e.c.	0.297*	0.216**	–0.007	–0.168*
	(0.067)	(0.088)	(0.021)	(0.052)

Standard deviations are in parentheses. '*', '**' and '***' indicate significance from zero at the 1%, 5% and 10% levels, respectively. NWAP = non-White Australia policy, WAP = White Australia policy.

the panel-level autocorrelation of order 1 and cross-sectional correlation and/or panel-level heteroskedasticity are corrected for. The results are, thus, asymptotically efficient and maximum likelihood estimates of the true parameters underlying the effect of the variables theoretically hypothesized to influence Australian trade flows.

Accordingly, columns (a) and (b) of Table 2 present results obtained when aggregate exports and imports, respectively, are employed as dependent variables and no distinction is made regarding *WAP* or *NWAP* classification. Columns (c) and (d) present results obtained when allowing for variation in immigrant effects across classifications. In all estimations, coefficients on immigrant stock variables are positive and significant. Focusing first on results presented in columns (a) and (b), in response to an assumed 1% increase in the immigrant stock, Australian exports to and imports from the typical home country are estimated to rise by 0.46% and 0.18%, respectively. We consider this as a confirmation of the pro-trade effect of immigrants and support for immigrant-trade links reported in earlier studies. That the proportional influences of immigrants on host country exports are greater than the corresponding influence on imports is consistent with results reported by Gould (1994), Girma and Yu (2000) and Combes *et al.* (2005). However, it is not necessary to observe such a pattern. For example, White (2007) and both Wagner *et al.* (2002) and Head and Ries (1998) find pro-import effects of immigrants that exceed their pro-export effects.

In columns (c) and (d), we report results where we differentiate the effects of immigrants by their home countries' status under Australian immigration policy. The results indicate that, in response to an assumed 1% increase in the number of immigrants from *WAP* nations, Australian exports to such nations increase by 0.39% while Australian imports increase by 0.24%. In comparison, assuming a like-immigrant stock increase, Australian exports to *NWAP* nations rise by 0.47% while imports from such nations increase by 0.19%. Tests of the null hypothesis of equality of coefficients on the terms interacting the immigrant stock variable with the *WAP* and *NWAP* dummy variables also consistently reject the hypothesis at $P > 0.001$. Thus, there appears to be support for the notion of variation in immigrant-trade links across *WAP* and *NWAP* nations. Specifically, compared with immigrants from *WAP* home nations, immigrants from *NWAP* nations exert a stronger proportional influence on exports to their home countries and a weaker, yet positive, proportional influence on Australian imports from their home countries.

The remaining coefficients in Table 2 conform generally to a priori expectations. Coefficients on the lagged first-difference of the dependent variables are not significant. Greater distance from Australia, implying higher transport costs, reduces trade between the home country and Australia. As expected, higher home country GDP corresponds to greater Australian exports. Coefficients on lagged exchange rate variables are significant and negative with respect to Australian imports. This implies that depreciation of the Australian dollar against the home countries' currencies substantially decreases Australia's imports. Australia's exports, on the other hand, appear not to be sensitive to depreciation of the currency. The coefficients on the ratios of GDP deflators are negative and significant in

all estimations. Assuming alternative sources for goods exist, higher relative prices and currency values may be expected to decrease trade.

Coefficients on the home country population variables are positive and negative in columns (a) and (b), respectively. Intuitively, this would mean that larger populations imply larger markets for Australian exports to serve. That larger home country populations correspond with lower Australian imports also makes sense when one considers that Australia imports more from *WAP* nations, which have significantly lower populations compared with *NWAP* nations (see Table 1). Inclusion of *WAP* and *NWAP* dummy variables absorbs much of the variation across home country classifications and, as a result, coefficients in columns (c) and (d) on home country population variables become negative for both exports and imports. Home country economic remoteness increases Australian exports, yet appears to decrease Australian imports. The increase in exports may indicate a lack of alternative source markets available to home countries. Similarly, the negative relationship between home country remoteness and imports may reflect that Australia imports significantly more from *WAP* nations, which are less remote than the typical *NWAP* nation. Coefficients on the English dummy variables are positive and generally significant; suggesting that commonality of language facilitates trade. Similarly, coefficients on the trade openness variables are positive and significant in all estimations.

3.1. *Disaggregated trade measures and immigrant-trade links*

To further explore the Australian immigrant-trade relationship, we first consider variation in links across products by degree of differentiation. The product classification system developed by Rauch (1999) categorizes four-digit SITC industry trade values as differentiated, reference-priced or organized exchange products. The latter two classifications can be considered homogenous goods. Both liberal and conservative classifications are applied, with the conservative classification more apt to identify industries as producing organized exchange products.[8] We also consider variation in immigrant-trade links across non-manufactured (SITC-0 through SITC-4) and manufactured (SITC-5 through SITC-9) goods producing sectors. Finally, we examine the immigrant-trade relationship using trade data at the one-digit SITC level. Since data at the one-digit SITC are aggregations of four-digit SITC industries, examination of immigrant-trade links generated when estimating equation (2) using disaggregated trade values as dependent variables can be undertaken with knowledge of the corresponding sector's degree of product differentiation. Table 3 presents estimated proportional immigrant effects.[9]

Across *WAP* and *NWAP* classifications, we find that immigrants exert comparable proportional influences on Australian exports and imports of

[8] The liberal classification lists 12.28% of industries as producing organized exchange goods, while the conservative classification identifies 17.83%. A test of difference in means yields a *t*-statistic of 3.79. No significant differences are found across classifications for differentiated or referenced priced products.

[9] The full set of estimation results is available upon request.

differentiated products. When considering the effects of immigrants on trade of reference-priced and organized exchange products, immigrants from *NWAP* nations exert larger proportional effects on exports than do immigrants from *WAP* nations. Conversely, immigrants from *WAP* nations tend to increase imports of organized exchange products proportionally more so than do immigrants from *NWAP* nations. It is interesting to note that the proportional influences of immigrants from *NWAP* nations on Australian exports are consistently of greater magnitude, across the Rauch product classifications, compared with the pro-export effects of immigrants from *WAP* nations. However, when considering pro-import effects, the influences of immigrants from *WAP* nations are greater than the corresponding influences of immigrants from *NWAP* nations.

Examining the influences of immigrants on non-manufactured (SITC-0 through SITC-4 sectors) and manufactured (SITC-5 through SITC-9 sectors) goods trade, we find immigrants from *NWAP* nations increase Australian exports and imports of both non-manufactured and manufactured products. The influence of immigrants from *WAP* nations is less pronounced, with significant increases reported only for imports of non-manufactured products and exports of manufactured products. Comparing relative immigrant-trade links across sectors and home country classifications reveals an interesting regularity. As mentioned, many studies have reported proportional pro-import influences of immigrants that are greater than observed pro-export effects. Consistent with these studies, we report proportional immigrant influences on imports of non-manufactured products that are consistently of greater magnitude than the influences of immigrants on exports of such products. However, when we consider the extent to which immigrants affect trade in manufactured products, the proportional influence on exports is greater than the corresponding influence on imports in almost all cases.

The manufacturing sector is comprised of one-digit SITC sectors that have above-average shares of differentiated products. Conversely, summation of reference-priced and organized exchange product shares provide a measure of the homogeneity of each sector's product mix. The one-digit SITC sectors that comprise the non-manufacturing sector have above-average shares of homogenous products. This helps to explain the observed variation in immigrant-trade links. If immigrants, as hypothesized, influence trade through preferences and their abilities to exploit information asymmetries and/or business or social network connections, it follows that preference effects will be more pronounced for trade in differentiated products and that positive influences on trade in relatively homogenous products would stem from an ability to acquire and/or provide lower-cost substitutes.

The proportional immigrant effects, taken collectively, suggest that the abilities of immigrants in promoting trade are not necessarily the same for both imports and exports. Thus, immigrants from *WAP* and *NWAP* nations exert influences that, at the aggregate level, result in similar outcomes (i.e. increased trade) even though the means by which trade is increased and the sectors, product types and products affected vary considerably across *WAP* and *NWAP* classifications. That immigrants from *NWAP* nations exert greater proportional influences on trade in non-manufactured products (i.e. in relatively homogenous products) may be the result of immigrants from these nations, generally

speaking, having greater opportunities, or being better-able (i.e. more adept), to exploit associated information asymmetries and network connections, compared with immigrants from *WAP* nations. An alternative explanation for the observed variation is that, since *WAP* and *NWAP* status is based on Australian immigration policy rather than Australia-home country institutional similarities, greater cultural distance between Australia and *NWAP* immigrants' home countries may underlie the Australian immigrant-trade relationship. Either scenario may be linked to the abandonment of the White Australia policy and the subsequent increase in cultural pluralism.

3.2. *Estimated per-immigrant effects*

Using the significant coefficients presented in Tables 2 and 3 and observed changes in immigrant stock and trade variables, we construct annual per-immigrant effects and present them in Table 4. These estimates are derived using values from 95% confidence intervals that correspond to proportional effects. The results indicate that a typical immigrant from a *WAP* nation increases Australian exports to her home country by $138 per year (lower bound: $117; upper bound: $158), and Australian imports from her home country by $134 (lower bound: $99; upper bound: $168). A typical immigrant from an *NWAP* nation exerts a more pronounced effect on Australian trade with her home country. Australian exports to and imports from an *NWAP* home country are estimated to increase by $1756 (lower bound: $1519; upper bound: $1993) and $569 (lower bound: $387; upper bound: $752), respectively.

That the estimated per-immigrant effects for immigrants from *WAP* nations are quite small is taken to imply that corresponding proportional immigrant effects, while statistically significant, are of minor practical significance. However, estimated per-immigrant effects for *NWAP* nation immigrants are not only of considerably greater magnitude, they are consistent with findings from earlier studies. For example, Head and Ries (1998) report per-immigrant effects on Canadian exports and imports equal to approximately $3000 and $8000, respectively. Also examining Canada, Wagner *et al.* (2002) report an import effect of $944 and an export effect of $312. Gould (1994) estimates the marginal immigrant increases US imports and exports by $456 and $327, respectively. White (2007), considering the effects of immigrants from low income home countries on US trade, reports per-immigrant effects of $2967 for imports and $910 for exports. Use of disaggregated trade values and corresponding significant coefficients further reveals the stark cleavage in estimated per-immigrant effects between *NWAP* and *WAP* nations. Across product classifications, effects attributable to immigrants from *NWAP* nations are, in the majority of cases, greater than the corresponding effects of immigrants from *WAP* nations.

3.3. *Robustness checks and sensitivity analysis*

To analyse the sensitivity of our results, we estimate several alternative regression specifications and also examine sample composition. First, we estimate

Table 4. Estimated per-immigrant effects on exports and imports

	NWAP home countries			*WAP home countries*			*All home countries*		
Trade Measure	*Lower bound*	*Estimate*	*Upper bound*	*Lower bound*	*Estimate*	*Upper bound*	*Lower bound*	*Estimate*	*Upper bound*
Exports, total	1519	1756	1993	117	138	158	1512	1748	1984
Conservative product classification									
Differentiated exports	307	385	462	48	61	74	306	383	460
Reference-priced exports	722	1012	1302	0	15	24	718	1007	1296
Organized exchange exports	323	405	486	32	56	79	322	403	484
Liberal product classification									
Differentiated exports	250	327	403	38	50	63	249	325	401
Reference-priced exports	185	272	359	0	20	33	184	271	357
Organized exchange exports	1226	1494	1762	38	61	83	1220	1487	1754
Non-manufactured goods exports	169	275	381	0	0	11	168	274	379
SITC-0: Food and live animals	0	59	98	0	0	4	0	58	97
SITC-1: Beverages and tobacco	0	0	0	0	0	0	0	0	0
SITC-2: Crude materials, inedible, except fuels	0	24	39	–6	0	0	0	24	39
SITC-3: Mineral fuels, lubricants and related materials	0	0	101	–3	0	3	0		101
SITC-4: Animal and vegetable oils, fats and waxes	0	0	3	0	0	0	0	0	3
Manufactured goods exports	63	118	172	0	16	34	63	117	171
SITC-5: Chemicals and related products, n.e.s.	0	8	14	0	0	3	0	8	14
SITC-6: Manufactured goods classified chiefly by material	0	17	32	–3	0	3	0	17	32
SITC-7: Machinery and transport equipment	24	36	48	10	14	18	24	36	48
SITC-8: Miscellaneous manufactured articles	2	4	6	0	0	2	2	4	6
SITC-9: Commodities and transactions n.e.c.	44	79	114	0	13	23	44	79	114

Table 4. Continued.

Trade Measure	NWAP home countries			WAP home countries			All home countries		
	Lower bound	*Estimate*	*Upper bound*	*Lower bound*	*Estimate*	*Upper bound*	*Lower bound*	*Estimate*	*Upper bound*
Imports, total	387	569	752	99	134	168	385	567	749
Conservative product classification									
Differentiated imports	465	619	774	42	59	76	463	617	771
Reference-priced imports	–51	0	47	–10	0	0	–50	0	46
Organized exchange imports	0	27	54	109	143	177	1	27	54
Liberal product classification									
Differentiated imports	419	565	713	38	56	73	417	563	710
Reference-priced imports	–45	0	0	–8	0	0	–45	0	0
Organized exchange imports	47	77	106	108	134	160	47	77	107
Non-manufactured goods imports	130	166	201	10	15	21	130	165	200
SITC-0: Food and live animals	70	86	101	6	8	10	70	85	100
SITC-1: Beverages and tobacco	0	1	2	0	1	1	0	1	2
SITC-2: Crude materials, inedible, except fuels	–7	0	8	0	2	3	–7	0	8
SITC-3: Mineral fuels, lubricants and related materials	0	0	0	1	2	3	0	0	1
SITC-4: Animal and vegetable oils, fats and waxes	0	0	0	0	0	0	0	0	0
Manufactured goods imports	0	76	153	–59	–39	–20	0	75	152
SITC-5: Chemicals and related products, n.e.s.	0	12	26	0	0	5	0	12	25
SITC-6: Manufactured goods classified chiefly by material	0	48	99	–12	0	0	0	47	98
SITC-7: Machinery and transport equipment	–20	0	0	–43	–34	–26	–20	0	0
SITC-8: Miscellaneous manufactured articles	21	30	39	0	4	7	20	29	38
SITC-9: Commodities and transactions n.e.c.	–1	0	0	–2	–1	0	–1	0	0

Per-immigrant effects are estimated using coefficients presented above and observed changes in immigrant stock values and trade values. Lower bound and upper bound estimates are generated using 95% confidence intervals constructed around each significant immigrant stock coefficients.

equation (2) using Tobit and Pooled Corrected Standard Errors (PCSE) specifications. The Tobit specification is appropriate when dependent variables are censored. Of aggregate export and import values in the dataset, 14.4% and 20.8%, respectively, are equal to zero.[10] Following Eaton and Tamura (1994) and Head and Ries (1998), we modify our estimation equation to obtain a specification that permits the realization of zero trade values. While use of the PCSE estimation strategy is based on variance estimates which require the assumption of many observations per panel, it also allows for panel-level heteroskedasticity and contemporaneous correlation of observations between the panels. In estimating the PCSE, we employ the Prais-Winsten method as it is the only method that allows FGLS assuming an AR(1) process in the disturbances.[11] We find the results from the Tobit and PCSE estimations provide proportional immigrant effects that are comparable to the FGLS results presented in columns (c) and (d) of Table 2. Further, estimated coefficients on the remaining explanatory variables are also generally consistent with estimates from the iterative FGLS method.

As a sample robustness check, we also estimate equation (2) using our full complement of aggregate and disaggregate trade values and removing one nation from our sample at a time, repeating the process for 101 successive rounds. For example, in the first round we exclude Algeria, while the second round includes Algeria but excludes Argentina. Considerable variation in immigrant effects once a nation is removed implies that the excluded nation has a significant impact on the results for the full sample. In total, 3838 estimations were performed, resulting in 7676 estimated proportional immigrant effects.[12] In nearly all cases (94.4%), estimated immigrant effects lay within 95% confidence intervals constructed around estimates obtained for the full sample. When variation is found, it is slightly more likely to involve immigrants from *NWAP* nations; however, even for this cohort, 94% of the estimated effects lay within the confidence intervals. In comparison, robustness checks of immigrant effects for *WAP* nations reveal 94.9% lay within corresponding intervals.

4. CONCLUSION

We have addressed one facet of the immigration issue: the possible influence that relaxation of a restrictive immigration policy has on trade flows. While the White Australia policy is specific to Australian history, the analysis presented here provides general insights into the immigrant-trade relationship. In identifying a positive influence of immigrants on trade, we find that immigrants from *WAP* nations exert greater proportional influences on Australian imports

[10] We chose to forego use of the Tobit specification in the primary estimations as it is possible that a zero level of imports and/or exports is natural for some countries, and especially so for disaggregated trade values.

[11] All estimation results corresponding to our robustness checks are available upon request.

[12] For each excluded country, 38 estimations (utilizing aggregate and disaggregated trade measures) are undertaken, each producing a *WAP* immigrant effect and an *NWAP* immigrant effect.

from their respective home countries than do immigrants from *NWAP* nations, while immigrants from *NWAP* nations exert stronger influences on Australian exports to their home countries. The finding of pro-trade influences supports the notion that immigrants increase trade between home and host nations via preference effects and through social/business network connections and/or the exploitation of information asymmetries.

We also report significant variation in the immigrant-trade relationship across product classifications, non-manufacturing and manufacturing sectors, and one-digit SITC goods. The observed variation underscores that an immigrant's ability to influence exports and/or imports is a function of the immigrant's preferences and, given existing host-home country (dis)similarities, the immigrant's ability to take advantage of the opportunities afforded. Taken collectively, our findings suggest that immigration which leads to increased cultural pluralism and a corresponding change in a host nation's cultural identity may have positive repercussions on the nation's trade. We posit that abandonment of the White Australian policy led to increased cultural pluralism and, thus, contributed to the conditions (i.e. the information asymmetries and potential for exploitation of network connections) under which immigrants from *NWAP* nations are found to influence trade.

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APPENDIX

Country Listing: White Australia policy nations[13]: Austria (1952), Denmark (1954), Finland (1954), Germany (1952), Greece (1952), Italy (1951), Netherlands (1951), New Zealand, Norway (1954), Spain (1958), Sweden (1954), Switzerland (1954), United Kingdom. Non-White Australia policy nations: Algeria, Argentina, Bangladesh, Barbados, Belgium, Belize, Benin, Bolivia, Brazil, Bulgaria, Burkina

[13] Immigrants from New Zealand and the UK have traditionally received preferential treatment under Australian immigration policy. The years in which agreements between Australia and other nations whose emigrants received preference under the White Australia policy are listed parenthetically (Money, 1999).

Faso, Burundi, Cameroon, Canada, Chad, Chile, China, Colombia, Congo (Dem. Rep.), Congo (Rep.), Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, France, Gabon, Gambia, Ghana, Guatemala, Guinea-Bissau, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Jamaica, Japan, Jordan, Kenya, South Korea, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Morocco, Mozambique, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sri Lanka, St. Kitts and Nevis, Syria, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, USA, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

SITC one-digit Industry Sector and Description: Non-manufacturing sectors: 0 – Food and live animals; 1 – Beverages and tobacco; 2 – Crude materials, inedible, except fuels; 3 – Mineral fuels, lubricants and related materials; 4 – Animal and vegetable oils, fats and waxes. Manufacturing sectors: 5 – Chemicals and related products, not elsewhere classified; 6 – Manufactured goods classified chiefly by material; 7 – Machinery and transport equipment; 8 – Miscellaneous manufactured articles; 9 – Commodities and transactions not elsewhere classified.