Heterogeneous Effect of Ethnic Networks on International Trade of Thailand: The Role of Family Ties and Ethnic Diversity

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ABSTRACT

Ethnic networks have been found to have a pro-trade effect in previous research. However, the heterogeneous effect of different ethnicities is under-studied. Drawing on the literature on social structure, this paper attempts to untangle the heterogeneous effect of ethnic networks on international trade using trade data of Thailand. We found that ethnic networks have a positive impact overall on trade, confirming the results of previous studies. However, the magnitude of the positive effect varies across different ethnicities along two dimensions. First, the strength of family ties in the culture of origin accelerates the pro-trade effect of its ethnic networks, suggesting ethnicities with stronger family ties have a cultural preference for trading within their own ethnic community. In comparison, ethnic diversity weakens the positive effect of ethnic networks on trade, suggesting an informational value of diverse ethnic structure in promoting trade between different ethnicities. Our study contributes new evidence of the enduring influence of social and cultural attributes on economic activities.

Keywords: ethnic networks, ethnic diversity, family ties, international trade, system-GMM.

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1. Introduction

The role of culture and social networks on economic outcomes has been embraced by more and more economists in recent years. The enduring effects of traditions, cultural values, and other informal social institutions have been found to have significant impacts on macroeconomic outcomes, such as international trade, investment, and individual decision making, such as preferences for housing, education, and health care (see Guiso, Sapienza, & Zingales, 2006). Within this new field of research, some scholars have paid particular attention to the role of ethnic networks in facilitating international trade and investment (e.g., Bandyopadhyay, Coughlin & Wall, 2008; Freeman & Lindsay, 2011; Rauch & Trindade, 2002; Tong, 2005). Ethnic networks are found to overcome information barriers and support contractual enforcement, and therefore promote trade and investment across borders.

However, one of the lacunas of prior studies is that they have tended to examine a *single* ethnic network in terms of elasticity of trade and investment flows from one country to a group of countries. This has masked a great deal of heterogeneity of network effects on trade. Recent research has empirically demonstrated this lacuna and called for further investigation to unravel the heterogeneous effect of ethnic networks. Bandyopadhyay et al. (2008) examined how twenty-nine ethnic networks located in the US affect the trade flows between the US and the twenty-nine countries of origin. By removing restrictions that the network effect is the same for all ethnicities, they found significant heterogeneity of ethnic-network elasticity on trade. The magnitude of the effect of ethnic networks is much larger than earlier studies suggested, but it is important only for five out of the twenty-nine countries; Brazil, Colombia, Spain, Thailand, and Turkey.

We carry on this line of investigation, and attempt to disentangle the factors that can explain the heterogeneous effect of ethnic networks on international trade. We advance the extant literature in four ways. First, the pro-trade effect of ethnic networks has mainly been examined in a few large, developed, English-speaking, high-

immigration countries, such as the United States, Canada, and the United Kingdom (e.g., Girma & Yu, 2002; Mundra, 2005; Wagner, Head, & Ries, 2002). In this paper, we use Thailand as the unique context to examine the effect of ethnic networks on trade. Thailand, being a developing, non-English speaking, Asian country, provides an interesting testing ground in the sense that it is not a major immigration country. Foreigners residing in Thailand may be there for reasons that differ from residents in large immigration countries, such as the United States. Therefore, empirical results from Thailand will be able to extend the generalization of previous studies regarding the general effect of ethnic networks on trade. Second, prior research may have a bias in estimating the effect of ethnic networks where the ethnic minorities are of positive value, but did not estimate their effect by comparing between positive ethnic networks and non-existent ethnic networks. We take this into account by using a qualitative dummy variable and a continuous variable in our regression models to assess the relative effect of ethnic networks. Third, we examine how social structural features of the countries of origin, such as their ethnic diversity and family ties, interact with the pro-trade effect of their ethnic networks in Thailand. This will provide insights into *whether* and *how* pro-trade effects of ethnic networks vary across different ethnicities. Finally, we use a panel data set that spans about two decades to examine the trade effects of ethnic networks. The panel data enables us to use a recently developed system-GMM (generalized method of moments; GMM-SYS) method that controls for econometric issues such as unobserved country heterogeneity, simultaneity and endogeneity (see e.g., Blundell & Bond, 1998). The control of these estimation issues is very important in establishing causal links between ethnic networks and trade. Therefore, our data and estimation methods present an important improvement upon earlier studies, such as Rauch and Trindade (2002), which only used maximum likelihood and Tobit estimations with cross-sectional data for 1990 and 2000.

The remainder of the paper is structured as follows. In section 2 we review key literature relating to ethnic networks and trade, and develop our hypotheses. Section 3 provides an overview of ethnic minorities in Thailand. Our empirical strategy is laid out in section 4. Section 5 presents our findings and discussions. Finally, section 6 concludes.

2. Literature review

The core of the pro-trade function of ethnic networks lies in the notion that people tend to associate with others who are similar to themselves in some salient respect, such as ethnic identification, religion, and race. Despite the rapid development of modern market-based and liberal societies, this in-group network effect persists (Bowles & Gintis, 2004; Guiso, Sapienza, & Zingales, 2009). Sociologists argue that in-group affinity supports cooperation by means of positive sentiments, such as ethnic purity and personal loyalty among group members (Loury, 2001), whereas economists believe that persistent network effects can be explained by their problem solving capabilities, such as promoting information flows among members and the enforcement of contracts (Bowles & Gintis, 2004).

Prior research, theoretical as well as empirical, has identified ethnic networks as an important intermediary that can mitigate informal barriers in foreign country markets by providing information about demand, languages, business practices, and laws, as well as instilling confidence to facilitate international trade (Bandyopadhyay et al., 2008). For example, Rauch and Trindade (2002) find that ethnic Chinese networks, proxied by the ethnic Chinese population shares, increased bilateral trade between pairs of countries. The increase rate is higher for differentiated than for homogenous products, suggesting that business and social networks have a considerable quantitative effect on international trade by helping match buyers and sellers in addition to their effect through enforcement of community sanctions that deter opportunistic behaviour. Other studies have focused on trade flows between a single English speaking country, such as the US or the UK, and origin countries of different ethnicities, with most results confirming the positive trade effect of ethnic networks (Bardhan & Guhathakurta, 2004; Dunlevy, 2006). However, one of the lacunas of this literature is that it has either focused on a single ethnic network, such as the ethnic Chinese networks in Rauch and Trindade (2002), or it has assumed that all ethnic networks have an equal effect on trade.

This lacuna has been empirically demonstrated by Bandyopadhyay et al. (2008) who found significant heterogeneity of ethnic-network elasticity on trade with the US: ethnic networks were important for only for five out of twenty-nine countries in their investigation – Brazil, Colombia, Spain, Thailand, and Turkey – but not for others. However, no explanation is provided for why the significant impact only exists for these particular countries. Dunlevy (2006) is by far the only study that has attempted to

disentangle the heterogeneous effect of ethnic networks. Employing export data for fifty US states with eighty-seven foreign countries averaged over the period 1990 to 1992, Dunlevy (2006) found that the trade effect of the various ethnicities is stronger when the origin country's political system is more corrupt, and less important when Spanish or English is the language of the origin country. The interpretation for the varying effect of these ethnic networks is that ethnic networks are more valuable when destination markets are less transparent or more subject to corruption. In addition, sharing a common language between the import and export countries reduces the value of ethnic networks.

We extend this line of investigation by focusing on some salient social aspects of the country of origin that may account for the heterogeneous effect of ethnic networks. The significant effect of social and cultural aspects on economic behaviour has been increasingly studied in different areas. For example, Osili and Paulson (2008) found that immigrants to the US from countries with poorer investment protection are more reluctant to buy shares, consistent with them extrapolating to the new environment that prevailing in their country of origin. Giuliano (2007) shows that living arrangements of US families are affected not only by economic conditions, but also by cultural heritage (for example, the structure of the family in their country of origin). Similarly, Fernandez, Fogli, & Olivetti (2004) and Fernandez & Fogli (2009) show that the work and fertility choices of second-generation American women are influenced by the female labour force participation and fertility rates of their parents' country of origin. The enduring cultural and social forces have yet to be fully considered in international trade research.

There are two aspects of social structure that are of interest to us. One is ethnic diversity. With the wide-reaching process of globalization, ethnic composition has been increasingly diverse across many countries. Scholars and policy makers have paid attention to whether the increasing cultural and ethnic diversity might threaten social cohesion by eroding the social fabric of society. Several empirical studies have documented a negative relation between ethnic diversity and generalized trust. They found people tend to trust each other less when they face diverse surroundings (Alesina & La Ferrara, 2002; Banting, Johnston, & Soroka, 2006). However, recent studies begin to challenge this view, and provide some evidence that such a strong negative association does not necessarily exist (Bahry, Kosolapov, Kozyreva, & Wilson, 2005). For example, Hooge, Reeskens, Stolle, & Trappers (2009) employed data across twenty European countries, and found that at country level ethnic diversity does not have a

negative association with generalized trust, hence calling into question previous interpretations which were based exclusively on US data. The relevance of this debate to trade is that if higher ethnic diversity reduces generalized trust, then ethnic networks will produce a greater effect on trade taking place within a certain ethnicity. However, if ethnic diversity does not have a definite association with generalized trust, as research using data from outside the US. shows, then it would have little to do with the pattern of trading within ethnic networks.

While the question of whether ethnic diversity in a country reduces cross-ethnicity trust seems unsettled, we depart from this discussion and suggest an alternative argument. We suggest that the ethnic diversity of the origin country can increase the contact between different ethnicities. More direct contacts usually help to reduce prejudice and hostility because such contacts reduce ignorance and stereotypes (Allport, 1954). Direct contact and experience are also very important in fostering more positive attitudes across ethnicities and therefore promote more social and economic exchanges (Sigelman & Welch, 1993). Therefore, an ethnically diverse environment, compared with an ethnically homogenous one, is more capable of providing the opportunities for cross-ethnic contact, and exposing consumers to products from different cultures and traditions, thereby reducing information asymmetry between different ethnicities (Mooy & Robben, 1998). In addition, a more open and pluralistic regime is argued to be able to lay the foundation for higher levels of trust among different ethnicities, and therefore lessen the sole reliance on one's own ethnic network (Radnitz, Wheatley, & Zurcher, 2009). Taking these arguments together, an ethnically diverse environment seems to be able to reduce the transaction costs associated with trade across different ethnicities and reduce people's sole reliance on their own ethnicity. As such, we hypothesize that:

H1: Ethnic diversity of the origin country of a certain ethnicity will reduce the trade effect of its ethnic networks.

The second aspect of social structure is family ties. Family ties are humanity's most basic form of institution. Family structure may influence economic disparities or other forms of social or economic outcomes. However, over a long time, researchers have traditionally assumed that the impact of family structures tends to be lower than that of other institutions, such as the state, religion, or the law, if only because of their small size, their limited range, and their heterogeneity. However, recently, some academics

have noted strong patterns of family structure, with clear regional variations and persistence over time, and linked them to significant social and economic outcomes. For instance, Duranton, Rodriguez-Pose, & Sandall (2009) found family types with the feature of weaker personal links and more movement and mixing tend to be associated with service societies, and tend to have richer and more dynamic regions.

Family ties are defined by Alesina & Giuliano (2010) as the extent to which in different cultures family members are closely tied together. The significance of family ties originates from the hypothesis first put forward by Bansfield (1958) in his study of a Southern Italian village. He defines "amoral familism" as a social equilibrium in which people trust exclusively their immediate family, expect everybody else to behave in that way and therefore do not trust non-family members. He argues that "amoral familism" leads to low civic engagement, low political participation and, low generalized trust. Similarly, Putnam (1993) put forward the idea that a national culture of strong family ties generates distrust in government, and these attitudes are extremely persistent. "Amoral familism" displays the extreme in the direction of strong family ties, so strong that they are the "only" social connection which matters.

Empirically, researchers found that strong family ties make people rely less on market provided products, such as long-term insurance, as strong family networks act as an effective substitute (Joan, 2010). Strong family ties also reduce people's political participation (Alesina & Giuliano, 2009). More importantly, Alesina & Giuliano (2009) demonstrate, using data from the World Value Survey (WVS) and European Social Survey (ESS), that such cultural traits *travel with people*; namely, family ties matter when individuals coming from different countries of origin face the same host institutional and economic environment. Similarly, Ermisch & Gambetta (2010) found that strong family ties lower the level of trust in strangers with experimental data on a large sample of the British population. They also identify that strong family ties reduce the level of people's outward social exposure, which directly limits their *experience* and *motivation* to interact with those not perceived as 'their own'. We argue that the two mechanisms identified in how family ties influence social trust can have a direct impact on how people trade with others. If "amoral familism" leads to a low level of social interaction, and low generalized trust in others, as research has demonstrated, people will rely more on their in-group networks, namely, their family, friends and those from same ethnicity. As such, in-ethnicity trade may be higher due to the higher level of trust

which can deflate transaction costs. As a result, this can accelerate the strength of the pro-trade effect of ethnic networks. Therefore, we hypothesize that:

H2: The strength of family ties of the origin country of a certain ethnicity will increase the trade effect of its ethnic networks.

Having stated our key hypotheses, we proceed to sketch the country background of Thailand in section 3, and explain our empirical strategy and data collection in section 4.

3. Research background: Thailand

Thailand is a multi-ethnic and multi-cultural society in Southeast Asia, and an ASEAN member since 1992. More than 85% of the population speaks Thai and shares a common culture. Up to 12% of the population of Thailand has a significant Chinese heritage, but the Sino-Thai community is the best integrated in Southeast Asia. Other groups include the Khmer in border provinces with Cambodia; the Mon, who are substantially assimilated with the Thai; and the Vietnamese. Among the immigrant groups, the earliest arrivals were the Chinese traders and labourers. Other nationals such as Indians, Westerners, Japanese and people from neighbouring countries also came to Thailand for various reasons. The Indian merchants arrived to trade and to spread Buddhist teachings. The Westerners came to trade and to teach Christianity. Thailand's neighbours, i.e., the Khmer, Lao, Vietnamese, Cham, Mon, Burmese, Karen, Shan and other small ethnic groups, immigrated to Thailand because of trade, fighting, escaping from either natural or manmade disasters, and the sharing of some religious traditions and culture.

Thailand is known for its tourist attractions. However, apart from large inflow of tourists, the number of foreigners coming to Thailand for long stays has always been low, not exceeding 5,000 persons per year during 1979–1984. Most of these immigrants were professional transients who came to work under the Investment Promotion Act of 1977. Most of them were from Japan, China and the US. However, since 1985, the number of contract workers in Thailand has increased, from 6,229 persons in 1985 to 9,577 persons in 1990 and 22,101 in 1993. Apart from its neighbours and a few other major Asia countries providing the main sources of immigrants in Thailand, recent years have seen incremental increase of Westerners living in Thailand, as shown in data drawn

from the Thailand National Statistics Offices. There are no official statistics recording the attributes, such as age, education and profession, of these foreign residents but some sources suggest that the majority of Westerners stay for the long term as professionals (Brownlee & Mitchell, 1997). To sum up, Thailand is not a major immigration country. Rather it is a small, developing, Asian country with very different cultural and religious attributes from those Western countries that have received academic attention in this research area. Findings in this new setting will help extend the generalization of previous studies.

4. Empirical model and data

4.1. Gravity model specification

We examine the effects of ethnic networks using a standard gravity model of bilateral trade. We examine it in two forms. First, we measure ethnic networks as a dummy variable to estimate the overall effect of ethnic networks. This is to examine whether the presence of ethnic networks generates positive impacts on trade, regardless of their origins. Secondly, we measure it as the natural logarithm of number of residents of a foreign origin plus 1, so that it is a continuous variable which will allow us to assess the heterogeneous effect of the scale of ethnic networks by incorporating into the model their two salient social features, namely, family ties and ethnic diversity. This will enable us to test our hypotheses and establish whether or not these social features magnify or deflate the effect of ethnic networks on international trade.

The gravity model takes its name from the prediction that the volume of trade between two countries will be directly related to the product of their economic masses (Rauch & Trindade, 2002). For the purposes of comparison (with the literature) and robustness regarding the sign and magnitude of estimated coefficients, we employ the OLS, fixed effects, random effects and GMM estimation methods. The common gravity model that we are going to use is specified as follows:

$$\text{Ln}\, Exports_{jt} \text{ or } \text{Ln}\, Imports_{jt} = \beta + \beta_j + \beta_t + \delta_1 Ethnic\ Networks_{jt} + \delta_2 GDP_t + \delta_3 GDP_{jt} + \delta_4 Population_t + \delta_5 Population_{jt} + \delta_6 Distance_j + \sum_{n=1}^{k} \gamma_n Z_{jtn} + \varepsilon_{jt} \quad (1)$$

where j denotes a country and t denotes time. β is the constant term common to all countries; β_j measures time-invariant unobservable country-specific effects; β_t measures time-variant effects; ε_{jt} is the general disturbance term for the model, which is time-

varying and serially uncorrelated with mean zero and variance μ^2. The coefficients δ's and γ's are estimable parameters. As emphasized in Bandyopadhyay et al. (2008), the fixed effects and GMM specifications consider the fixed effects term β_j in the estimations. The dependent variable is either Ln Exports or Ln Imports.

Ln Exports$_{jt}$ (Ln Imports)$_{jt}$ denotes (the logarithm of) the dollar value of exports (imports) of manufactures from (to) Thailand to (from) country *j* in year *t*. Ethnic Networks$_{jt}$ denotes whether a certain ethnicity *j* has a positive presence in Thailand in year *t*. Positive presence is proxied by value 1 and otherwise value 0. Or, it denotes natural logarithm of (1 + the total number of residents of a foreign origin *j* in Thailand in year *t*). GDP$_t$ denotes GDP of Thailand in year *t*. GDP$_{jt}$ denotes GDP of a foreign origin *j* in year *t*. Population$_t$ denotes population of Thailand in year *t*. Population$_{jt}$ denotes population of a foreign origin *j* in year *t*. Distance$_{jt}$ denotes the distance from Thailand to the capital of foreign origin country *j*. Z_{ij} denotes other (k) variables used to augment this standard form that allows us to test the hypotheses in the previous section.

Following the previous section, Z_{ij} includes family ties and ethnic diversity. A common border has been found to affect bilateral trade in previous studies (McCallum, 1995). However, we exclude this factor as no country in our final sample borders Thailand. In addition, we also control for the effect of *institutional environment*. This is in line with Dunlevy (2006), in which corruption is examined as the only institutional factor affecting bilateral trade. Apart from corruption, we also include additional institutional factors such as origin of legal system, extent of marketing and English language as control variables. In addition, we include religious commonality (measured as percentage of Buddhist population) and ASEAN dummy, as they may have an important influence on the trading pattern of Thailand.

4.2. Data and measurement

Research data for our empirical analysis are gathered from various sources. Firstly, data on exports to and imports from Thailand is obtained from the UN Comtrade database. We use exports as our primary dependent variable. Imports are used as an alternative to check the robustness of our results. The time period for these dependent variables is between 1988 and 2006 to allow for one-period lagged effect of explanatory factors in the regression model, which helps mitigate the endogeneity issue (see e.g., Girma & Yu, 2002). With regard to our explanatory variables, data on ethnic networks in Thailand between 1987 and 2005 are drawn from the Thailand National Statistics Offices.

Twenty-seven foreign ethnicities having a positive number of residents in Thailand were recorded throughout this period of time, these are listed in Appendix B.[1] The data were reported in a consistent format, with the total number of foreign aliens classified by nationality and gender provided by Thailand National Statistics Bureau. We measure ethnic networks in two forms. First we measure it as a dummy variable, and secondly, we measure it with the natural logarithm of the total number of foreign aliens in Thailand plus one as a continuous variable to assess the relative trade effect of ethnic networks. Data on GDP, population for Thailand, and its trading partners is drawn from the World Bank. Distance, which is measured by the natural logarithm of kilometres between Bangkok and the capital city of the origin country of the immigrant ethnic network, is compiled by using city distance calculator.

Ethnic diversity can be measured in two ways. First, it is measured by the percentage of the second largest ethnic group of population residing in a country using CIA country profiles data; therefore, high values indicate higher ethnic diversity. While this measurement has been used in many earlier studies (e.g., Alesina & La Ferrara, 2002; Collier, 2001; Hero & Tolbert, 1996), it is acknowledged that it only uses limited data to portray ethnic diversity. Therefore, we adopt a second measure, following Fearon (2003), defined by the probability that two individuals selected at random from a country will be from different ethnic groups. If the population shares of the ethnic groups in a country are denoted by p_1, p_2, p_3…., p_n, then ethnic diversity is

$$\mathrm{F} = 1 - \sum_{i=1}^{n} \left(P_i^2 \right)$$

In this definition, all ethnic groups with at least one percentage point of the population are considered. Ethnic groups are classified based on some important social and ethnic features, such as having a common homeland, and sharing distinguishing cultural features, such as common language, religion and customs (Fearon, 2003: p. 201). This measurement has an advantage over the first measurement in the sense that all major recognizable ethnic minorities are considered so that it improves the accuracy of the measurement. We create an interaction variable of ethnic diversity and ethnic networks to test the first hypothesis. The strength of family ties is measured, following Alesina &

[1] In addition to the twenty-three countries shown in Appendix B, we also had ethnic networks data on Laos, Malaysia, Myanmar and Nepal. However, these countries were removed from our sample as we did not have all the data regarding the factors listed in Table 1.

Giuliano (2009), by looking at the World Value Survey (WVS) variables capturing beliefs on the importance of the family in an individual's life, the duties and responsibilities of parents and children, and the love and respect for one's own parents. The WVS is a compilation of national surveys on values and norms on a wide variety of topics, carried out four times (1981–1984, 1990–1993, 1995–1997, and 1999–2004). The coverage varies depending on the wave. The 1981–84 survey covered 22 countries, the 1990–93 wave 42 countries, the 1995–97 wave 54 countries and, finally the last wave covered 81 countries. To avoid awkwardness in interpreting its results, we use the reciprocal value of the average score drawn from the original data so that it is measured in a way that higher values indicate stronger family ties. Likewise, we create another interaction variable of ethnic diversity and ethnic networks to test the second hypothesis.

Data on the control of corruption is from the PRS group, a consultant company specializing in producing macro-economic and political related data. We use this source due to its offering the widest coverage of country and period. The index is based on seven points, with higher scores indicating better control of corruption. Most scholars identify two main secular legal traditions (e.g., La Porta, Lopez-de-Silanes, & Shleifer, 2008), which we follow to code countries with two dummy variables: one is civil law origin and the other is common law origin. Countries with civil law origin are coded as 1 and otherwise 0 for the first dummy; countries with common law origin are coded as 1 and 0 otherwise for the second dummy. The data is derived from JuriGloba Research Group, specializing in world legal systems, hosted by the University of Ottawa. The extent of marketing is included in the model to control for the effect of marketing expertise on trade. The data is derived from the Global Competitiveness Reports, published by the World Economic Forum. It is based on seven points, with higher points indicating that companies employ the world's most sophisticated tools and techniques. We expect that countries in which companies employ sophisticated and extensive tools for their marketing activity would rely less on ethnic networks as an informal channel to promote trade. This variable has never been considered in earlier studies, but controlling it is important as it will account for the advance of marketing in reducing informational barriers in business activities. In addition, we include religious commonality and ASEAN dummy in the model to control for the potential effect of these two factors. Descriptive statistics of all variables and their definition are presented in Table 1.

The sample size was originally 4,976 country-year observations for 197 countries when excluding the data related to ethnic networks, family ties, ethnic

diversity and marketing factors. With the inclusion of these factors, our final sample covers 80 countries with 1,547 observations. The explanatory variables are lagged one period. The time period for the dependent variables is between 1988 and 2006. Except Family Ties and the related factors, the time period for all the explanatory variables, including control variables, is between 1987 and 2005. For the variable Family Ties and its interaction terms, the time period is between 1987 and 2004. See Appendix B for further details.

[INSERT TABLE 1 HERE]

5. Empirical analysis and results

Our investigation takes two steps. First, we estimate the overall effect of ethnic networks by assigning ethnic networks as a dummy variable. This step of the analysis is deemed necessary because skipping this step may under-estimate the overall effect of ethnic networks. This analysis requires us to incorporate ethnicities that do not have presence in Thailand. Apart from the 27 ethnicities represented in Thailand, we include in the model all the major nations that do not have residence in Thailand to execute this estimation. The second step treats ethnic networking as a continuous variable and assesses its effect on trade with OLS, random and fixed effect panel estimation. It is noted that although the causation between social and cultural aspects and economic outcomes is likely to work both ways, this problem is lessened in our estimation for two reasons. First, we focus on the social dimensions that are intrinsically *inherited* rather than voluntarily adopted by individuals (e.g., Alesina, Devleeschauwer, Easterly, Kurlat, & Wacziarg, 2003).[2] When aggregated at country level, such features are very difficult to change in a short span of time. That is, family ties and ethnic diversity of a certain ethnicity are largely a given for the ethnic group. Therefore, their effect on bilateral trade is understood as causal forces affecting trade. Second, we provide robustness checks with the recently developed system-GMM method to control for specific estimation difficulties, thereby strengthening the reliability and validity of our results. To find out whether this potential endogeneity issue is resolved by the GMM, we can check the relevance of moment conditions in conjunction with the tests of overidentifying restrictions. If the regression specifications satisfy the tests, we can then

[2] As a socio-cultural variable, trust has several limitations. Trust is not just an inherited cultural variable. People can develop trust because of the quality of the legal system or as the result of strategic interactions (Axelrod, 1984). Trust can even be the result of optimal investment in social capital. In addition, measuring macro-level trust across countries is difficult.

infer that one cannot reject the economic and statistical significance of the estimated coefficients on trade determinants (e.g., ethnic networks, ethnic diversity, family ties and marketing), which implies that the effect is running from these factors to exports or imports. Before discussing the multiple regression analysis, Table 2 provides the correlation matrix among the dependent and explanatory variables.[3]

[INSERT TABLE 2 HERE]

We report our regression results as follows. Table 3 reports our main results where Thailand's exports is the dependent variable. In model 1, Ethnic Networks 1 is a dummy variable indicating the presence or absence of ethnic networks. It has attained a positive and statistically significant coefficient. Gravity related variables, such as GDP of Thailand, GDP of the country of origin of the ethnic networks, population of Thailand, and distance, all attain statistically significant and expected results. An exception is the population of the country of origin of the ethnic networks, which receives a statistically significant and negative result. Adjusted R^2 is 56.3%, indicating a satisfactory model fit. In model 2, we replace the dummy variable of ethnic networks with its continuous variable, Ethnic Networks 2. It has also attained a statistically significant and positive result, with a lower coefficient compared to its dummy. The rest of the variables attain qualitatively unchanged results. In model 3 and model 4, with random effects estimation, the results of ethnic networks, whether measured as a dummy in Model 3, or as a continuous variable in Model 4, remain statistically positive and significant. Finally, in model 5 and model 6, with the fixed effects estimation, the results remain qualitatively unchanged. The results in Table 3 establish that ethnic networks have a pro-trade effect. In addition, the impact is larger when it is measured as a dummy than when it is measured as a continuous variable. This indicates that measuring it only as a continuous variable may have slightly underestimated its influence on trade. The fact that the dummy variable generated higher coefficient than the continuous variable may also indicate that there is a threshold level that determines whether there will be a positive presence of a certain ethnicity in Thailand. Overcoming that threshold has a higher impact on the trading relations between Thailand and the country of origin than that the impact generated by quantitative increase of the size of the ethnic networks in Thailand.

[3] The (unreported) variance inflation factor (VIF) values among the explanatory variables are far below 10, suggesting the absence of multicollinearity problem.

In this regard, our result provides stronger support in asserting the pro-trade effect of ethnic networks.

[INSERT TABLE 3 HERE]

Table 4 reports results with interaction terms that are designed to test our first hypothesis. In model 1, Ethnic Networks is a statistically significant estimator, with an expected positive coefficient. Other gravity related variables attain qualitatively unchanged results from those in Table 3. We now look at the variables that are essential to test our hypotheses. First, the interaction term of ethnic diversity and ethnic networks attains a statistically significant and negative result, confirming our hypothesis regarding the diluting effect on ethnic diversity. The interaction term of family ties and ethnic networks achieved expected result as well. It is a statistically significant and positive estimator, suggesting that the pro-trade effect of ethnic networks is stronger in ethnicities with stronger family ties. Therefore, both hypotheses were confirmed by the results in this model.

With regard to our control variables, control of corruption is shown to have a significant and positive effect on trade. The interaction variable of corruption and ethnic networks attains a significant result with a negative sign. This suggests that the impact of the pro-trade effect of ethnic networks on trade is weakened when the country of origin has less corruption. This result is consistent with the previous studies (e.g., Dunlevy, 2006) that show that the value of ethnic networks is lessened in countries with low levels of corruption. Civil law origin is found to have a statistically significant and negative impact on trade across all three estimates. In contrast, common law origin attains statistically significant and positive result in three estimates. This suggests that a common law system is more conducive to international trade whereas a civil law system is detrimental. This finding corroborates conventional wisdom that common law is the foundation to commercial economics due to its lighter regulatory burden (Djankov, La Porta, Lopez de-Silanes, & Shleifer, 2002), higher contractual flexibility (Pistor, 2006), and higher protection of private property (Hayek, 1960), which greatly reduces transaction uncertainty and improves economic efficiency (Mahoney, 2001). Marketing is a positive and significant estimator, and its interaction term with ethnic networks is statistically significant and negative. This is also consistent with our conjecture that the pro-trade effect of ethnic networks will be attenuated when extensive marketing techniques are adopted to promote trade. English language is a positive and significant

estimator, suggesting it has a positive effect on bilateral trade if the pair of countries shares English as their official language. In addition, its interaction variable with ethnic networks appears to be negative and significant, suggesting that the pro-trade impact of ethnic networks is attenuated if the pair of countries share the English language. These results also confirm Dunlevy's (2006) findings. Religious commonality is not a statistically significant estimator, but membership of ASEAN is, with a very high coefficient of 1.34, making it one of the most important factors explaining bilateral trade flows in model 1.

In model 2 of Table 4, we use random effects estimates. We find that the overall results remain qualitatively identical to and remarkably consistent with those in model 1. In model 3, we adopt fixed effect estimates and thus exclude time-invariant variables. Most remaining variables gave qualitatively identical results, especially with respect to the interaction term of family ties and ethnic networks. This lends more support for our second hypothesis.

Now we look at the remaining three models in which we replace exports with imports as the dependent variable. First, we turn to model 4. We found that all control variables, with the sole exception of $Population_{t,}$ received qualitatively identical results as those in model 1. The only exception, which is the population of Thailand, appears to be statistically insignificant, even though it is statistically significant in earlier models with the same positive sign. This is probably because imports to Thailand are much less affected by Thailand's own population than are exports. Import is probably more affected by the standard of living and foreign firms' activities in Thailand, whereas export is more likely to be attributed to Thailand's population increasing its general product outcome. In fact this particular result persists in models 5 and 6 as well. The interaction terms of ethnic diversity lose statistical significance, but the negative coefficient remains. In contrast, the interaction term of ethnic diversity and family ties gave statistically significant and positive results, confirming our second hypothesis. The results of model 5 are almost identical to those in model 4, which means that our first hypothesis did not receive support, but our second one does. The results in model 6 are largely identical to those of model 3, lending more support to our second hypothesis. To sum up the results in Table 4, it provides substantial support to our second hypothesis regarding the accelerating effect of ethnic networks on trade for ethnicities with stronger family ties. However, the first hypothesis, that ethnic diversity may reduce the pro-trade

effect of ethnic networks, did not give a statistically significant result when we used import as the dependent variable.

[INSERT TABLE 4 HERE]

Next, we look at Table 5 which aims to subject our analysis to system-GMM checking. In model 1 we use exports as the dependent variable. We found all variables attain satisfactory results with statistical significance and expected signs, much similar to those in Table 3. However, the coefficient of ethnic networks is only 0.02, a very marginal result in this regard. The overall model fitness is satisfactory, but with a lower R^2 probably because it excludes a large number of important control variables. Turning to model 2, we first notice that the coefficient of ethnic networks improves drastically from 0.02 to 2.59. This seems to indicate the importance of including relevant control variables in the specification. We now focus our discussion on the variables for our hypotheses. First of all, the interaction term of ethnic diversity and ethnic networks received a statistically significant and negative result, confirming our first hypothesis that the pro-trade effect of ethnic networks is diluted by higher ethnic diversity. In fact, the coefficient is much larger, -0.75 in this model, than those in Table 4. This result is largely consistently with the result in Table 4 when exports is the dependent variable (models 1 and 2). The GMM estimates strengthen the support for our first hypothesis because the system-GMM model is econometrically more robust as this method accounts for unobserved country-specific effects and potential endogeneity, i.e., the correlation between the error term and regressors (see also Appendix A).[4] Second, the interaction term of ethnic networks and family ties continues to be a statistically significant and positive estimator, confirming our second hypothesis. It is worth noting that the coefficient of this interaction term is extraordinarily high (3.04), nearly as high as that of the ASEAN variable, which has a coefficient of 3.15. In addition, to test whether such strengthening effect of stronger family ties is indeed due to higher trust among close ethnic networks, we include a triple interaction term, namely, the interaction term of ethnic networks, family ties, and corruption. Our rationale is that if the accelerating reliance on family ties in promoting bilateral trade is due to high levels

[4] For the GMM results to be reliable and consistent, it is crucial that two diagnostics should be fulfilled. First, as expected, the test results in Table 5 show the presence of first-order autocorrelation and absence of second-order autocorrelation. Second, Sargan p-values confirm the validity of the instrument set. See, for instance, Blundell & Bond (1998), Cheng & Kwan (2000), Levine, Loayza, & Beck (2000) for further details. The specification tests we employ for the regressions suggest that we can safely confirm the absence of simultaneity bias, causality and endogeneity considerations in the GMM context (Hansen, 1982; Newey & West, 1987).

of trust, then countries with lower corruption will rely less on such informal social networks. We indeed find some supporting evidence judged by the sign and coefficient of this interaction term. It is statistically insignificant, but a positive estimator. Compared with the interaction term of family ties and ethnic networks, 3.04, the coefficient of this triple interaction term is only 0.29 and it becomes an insignificant estimator. This means that in countries with less corruption, the strengthening effect of strong family ties on ethnic networks is somewhat lessened. The rest of the control variables all gave expected and satisfactory results.

Turning to model 3, where we present our basic model in import as the dependent variable, the results are satisfactory and qualitatively unchanged from those in model 1. Model 4 presents another set of robustness checks with import as the dependent variable. We focus on the interaction term of ethnic networks and ethnic diversity first. This, again, gave a statistically significant and negative result, supporting our argument that ethnic diversity reduces the reliance on ethnic networks in promoting bilateral trade flows. Note, however, that the coefficient (-0.36) is just under half of that for exports, meaning the impact is lower for imports compared to export. Another interaction term between ethnic networks and family ties also gave a satisfactory result. It is statistically significant and positive, with a smaller coefficient of 1.26 compared with that in Table 4. In a similar vein, the triple interaction term of ethnic networks, family ties and corruption, also received a qualitatively unchanged result. To sum up the results of our system-GMM models in Table 5, we confirm that both of our hypotheses are strongly supported. In addition, the impact of ethnic networks, and the two interaction terms, all have a quantitatively larger effect on trade than models without the system-GMM specification, which indicates the importance of using this method to control for and address econometrical issues in making any inference.

[INSERT TABLE 5 HERE]

6. Conclusion

This paper has developed two hypotheses regarding how social structures, such as family ties and ethnic diversity, can moderate the effect of ethnic networks on trade between their countries of origin and Thailand. This advances our understanding on what constitutes the heterogeneous effects of ethnic networks on international trade. At a more general level, it also helps advance our knowledge on how social and cultural

factors can affect economic outcomes. The panel dataset we compiled and the adoption of an advanced estimation method have strengthened our confidence in affirming the causation between ethnic network, its interaction with family ties and ethnic diversity, and international trade. We view this as an initial step towards developing more research to fill the surprising gap in the economic literature on the heterogeneous effect of ethnic networks on international commerce.

We reflect on some potential endogeneity among the key concepts in the study. Conceptually speaking, family ties are internally a key inherent component of culture, which differentiates cultures with strong family ties from those with weak family ties, such as Singapore versus Sweden (Ermisch & Gambetta, 2010). However, the potential endogeneity may arise between family ties and ethnic diversity of a society in the sense that societies hosting ethnicities with strong family ties tend to reject other ethnicities, thereby reducing ethnic diversity. On the other hand, there are extensive and significant factors that make ethnic diversity exogenous, such as wars, famine, and ethnic cleansing (Alesina et al., 2003). In addition, historically, some societies have multiple ethnicities because of complex geographical, historical and religious reasons, as in the case of India, which has over 2,000 ethnic groups. Modern institutional developments, such as rule of law, also ease potential reverse relationship between family ties and ethnic diversity (see e.g., Easterly, 2001). Policy makers all recognize the importance of integrating diverse ethnicities to fully reap the benefits of diversity (Dustmann, 1996). This further dilutes the potential linkage between family ties and ethnic diversity within the society. The absence of endogeneity between ethnic diversity and family ties can be seen in many countries where both are low, such as Sweden, or both are high, such as Thailand and India, meaning the endogeneity between the two is significantly alleviated by a host of social, historical and geographic factors. However, in the view that there is a dearth of theoretical work in explaining ethnic diversity (Hardwick, 2003), a systematic examination of the relationship between ethnic diversity and family ties certainly is merited in future studies.

Future research can also investigate whether there is a similar effect of ethnic networks on international financial flows, such as foreign direct investment and foreign portfolio investment. It will be interesting to observe how economic forces, in the era of globalization, integrate with cultural and social factors in shaping economic outcomes.

Our findings also suggest that, contrary to the concern that ethnic diversity can erode social coherence, ethnic diversity in a country encourages its people to trade with other ethnicities and therefore may promote ethnic integration within the country. In contrast, family ties seem capable of promoting cross-country trade linkage, thereby accelerating the globalization process.

Appendix A

Discussion of estimation procedures

To provide a general comparison of different estimation procedures, consider the following dynamic model (*t* represents time and *i* represents individual panel unit such as a country).[5]

$$Y_{i,t} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k \, X^{a}_{k,i,t} + \sum_{k=1} \delta_k \, X^{b}_{k,i,t-1} + \Psi_i + \Psi_t + \varepsilon_{i,t} \qquad (A.1)$$

$Y_{i,t}$ is the dependent variable. X^a and X^b are vectors of current and lagged explanatory variables respectively. Ψ_i represents time-invariant effects, and Ψ_t represents time-specific effects. α_0, α_1, γ_s and δ_s are estimable unknown parameters. The time-varying disturbance term $\varepsilon_{i,t}$ is serially uncorrelated with mean zero and variance σ^2.

Estimating equation (A.1) using the OLS method would produce biased coefficients because Ψ_i is unobservable and correlated with other regressors in the model (Hsiao, 1985). As some lagged dependent variables may be correlated with country-specific effects, the estimated coefficients may be inconsistent. Although it is possible to eliminate Ψ_i by first-differencing, the OLS estimators would still be inefficient, since $\Delta\varepsilon_{i,t}$ and $\Delta Y_{i,t-1}$ are correlated as a consequence of the correlation between $\varepsilon_{i,t-1}$ and $Y_{i,t-1}$. Furthermore, the OLS specification assumes that all explanatory variables are strictly exogenous, which is very unlikely to be the case in our study which models international trade.

Anderson & Hsiao (1982) suggest an instrumental variables (IV) method to overcome these problems. They contend that $\Delta Y_{i,t-2}$, or $Y_{i,t-2}$, can be used as instrument for $\Delta Y_{i,t-1}$. This instrument selection is relevant and valid because $\Delta Y_{i,t-2}$, or $Y_{i,t-2}$, is correlated with $\Delta Y_{i,t-1}$, but not with $\Delta\varepsilon_{i,t}$. If $\varepsilon_{i,t}$ is not serially correlated then the IV estimates will be consistent. However, since the IV technique neither uses all the related moment conditions, nor accounts for the differenced structure of the error term, the estimates are likely to be inefficient.

[5] For further details the readers are suggested to see Antoniou, Guney, & Paudyal (2006), Arellano & Bover (1995) and Blundell & Bond (1998).

As a remedy, Arellano & Bond (1991) suggest that GMM controls for these problems. GMM employs additional instruments obtained by utilizing the orthogonal conditions that exist between the error term ($\varepsilon_{i,t}$) and the lagged dependent variable. Hence, GMM optimally exploits all the linear moment restrictions specified by the model, this being the main advantage of the GMM method. It is argued that $E(\varepsilon_{it},\varepsilon_{it-1})$ in equation (A.1) is not necessarily zero, but $E(\varepsilon_{i,t},\varepsilon_{i,t-2})$ should be zero as the consistency of GMM estimators is based on the absence of second-order correlation in differences and of first-order correlation in levels. If we assume that the error terms are not correlated, it is expected that $\Delta\varepsilon_{i,t}$ is orthogonal to the history of the variables X and Y so that ($X_{i,t-2,}$ $X_{i,t-3,\ldots}$ $Y_{i,t-2,}$ $Y_{i,t-3,\ldots}$) can be used as valid instruments for $\Delta\varepsilon_{i,t}$. If $\varepsilon_{i,t}$ follows an MA(1) process, then the instrument set will include the following $X_{i,t-3,}$ $X_{i,t-4,}$ …, $Y_{i,t-3,}$ $Y_{i,t-4,}$…. Namely, the first valid instruments start from the third lag, *not* from the second lag, because the differenced-disturbances follow an MA(2) process. Thus, it is critical that there is no higher-order serial correlation to have a valid set of instruments independent from the residuals. We can examine this by referring to the Sargan test of over identifying restrictions and the autocorrelation statistics.

This study adopts the two-step GMM estimators that use one-step residuals to construct the asymptotically optimal weighting matrix. These estimators are more efficient than their one-step counterparts when the disturbance terms are expected to show heteroscedasticity in the large sample data with long-term time spans. This specification can control for the correlation of errors over time, heteroscedasticity across firms, simultaneity, and measurement errors thanks to the utilization of the orthogonality conditions on the variance-covariance matrix.

Consequently, it is implied that the GMM specification of the first differences (GMM-DIF) is superior to its many alternatives. However, the GMM-DIF estimator has been shown to have a problem of weak instruments. It is known that first-differencing causes information loss across cross-section units (countries, in our case) and exacerbates measurement error biases. Arellano & Bover (1995) contend that the absence of information with respect to the parameters in the level variables causes substantial efficiency loss in models estimated in first differences using instruments in levels.

Hence, they suggest the use of instruments in first differences for equations in levels and instruments in levels for equations in first differences. Blundell & Bond (1998) reveal that this GMM-SYS estimator of Arellano & Bover (1995) has dramatic efficiency gains in cases where the GMM-DIF estimator performs poorly especially for short sample period and persistent data. Under the extended GMM-SYS method, the model is estimated in both levels and first differences; i.e., in stacked regressions level equations are simultaneously estimated using differenced lagged regressors as instruments. The poor performance by GMM-DIF is particularly apparent when the coefficient estimate on $Y_{i,t-1}$ gets closer to one and the ratio of [variance(Ψ_i)/variance($\varepsilon_{i,t}$)] increases (see equation (A.1)). In such cases, the coefficient on $Y_{i,t-1}$ is downward-biased. In addition, Blundell & Bond (1998) report that when lagged first-differenced and lagged-levels instruments are incorporated into the instrument set, the finite sample bias can be alleviated considerably by using the additional moment conditions arising from level equations. The authors show that the instruments used by the GMM-DIF estimator contain little information about the endogenous variables in first differences, and lagged first differences are informative instruments for the endogenous variables in levels. In this way, other than controlling for individual heterogeneity, we can partially account for variations among firm-specific factors.

In the OLS setting, the observations are pooled and hence no unobserved country-specific effects are taken into consideration. The fixed effects method, on the other hand, does control for this problem. However, neither fixed effects nor random effects specifications address the issue of endogeneity or simultaneity. Therefore, GMM-SYS appears to be the most appropriate method to estimate dynamic equations or models including endogenous explanatory variables.

Appendix B

Panel data structure

Table A1
Panel data structure and data availability.

Country	Ethnic Networks	Time period
Albania	No	1987-2006
Algeria	No	1987-2006
Argentina	No	1987-2006
Armenia	No	1987-2006
Australia	Yes	1987-2006
Austria	No	1987-2006
Azerbaijan	No	1987-2006
Bangladesh	No	1987-2006
Belarus	No	1987-2006
Belgium	No	1987-2006
Bosnia	No	1987-2006
Brazil	No	1987-2006
Bulgaria	No	1987-2006
Canada	Yes	1987-2006
Chile	No	1987-2006
China	Yes	1987-2006
Colombia	No	1987-2006
Croatia	No	1990-2006
Czech Republic	No	1993-2006
Denmark	Yes	1987-2006
Dominica	No	1987-2006
Egypt	No	1987-2006
El Salvador	No	1987-2006
Estonia	No	1990-2006
Finland	No	1987-2006
France	Yes	1987-2006
Georgia	No	1990-2006
Germany	Yes	1987-2006
Greece	No	1987-2006
Hungary	No	1987-2006
Iceland	No	1987-2006
India	Yes	1987-2006
Indonesia	Yes	1987-2006
Iran	No	1987-2006
Iraq	No	1987-2006
Ireland	No	1987-2006
Italy	Yes	1987-2006

Japan	Yes	1987-2006
Country	**Ethnic Networks**	**Time period**
Jordan	No	1987-2006
Kyrgyzstan	No	1990-2006
Latvia	No	1990-2006
Lithuania	No	1990-2006
Luxembourg	No	1990-2006
Macedonia	No	1990-2006
Malta	No	1987-2006
Mexico	No	1987-2006
Moldova	No	1990-2006
Morocco	No	1987-2006
Netherlands	Yes	1987-2006
New Zealand	Yes	1987-2006
Nigeria	No	1987-2006
Norway	Yes	1987-2006
Pakistan	Yes	1987-2006
Peru	No	1987-2006
Philippines	Yes	1987-2006
Poland	No	1987-2006
Portugal	Yes	1987-2006
Romania	No	1987-2006
Russia	No	1990-2006
Saudi Arabia	No	1987-2006
Serbia	No	1990-2006
Singapore	Yes	1987-2006
Slovakia	No	1993-2006
Slovenia	No	1990-2006
South Africa	No	1987-2006
South Korea	Yes	1987-2006
Spain	No	1987-2006
Sweden	Yes	1987-2006
Switzerland	Yes	1987-2006
Taiwan	No	1989-2006
Tanzania	No	1987-2006
Turkey	No	1987-2006
Uganda	No	1987-2006
Ukraine	No	1990-2006
United Kingdom	Yes	1987-2006
Uruguay	No	1987-2006
USA	Yes	1987-2006
Venezuela	No	1987-2006
Viet Nam	Yes	1987-2006
Zimbabwe	No	1987-2006

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Table 1
Descriptive statistics for the main variables and their definition.

		Mean	SD	Min.	Max.
Ln Exports	The natural logarithm of the dollar value of exports	31.403	2.814	21.708	37.517
Ln Imports	The natural logarithm of the dollar value of imports	31.116	3.012	20.052	37.799
Ethnic Networks 1	1, if positive ethnic networks exist; 0, otherwise	0.587	0.493	0.000	1.000
Ethnic Networks 2	The natural logarithm of (1+ the total number of foreign aliens)	1.974	3.258	0.000	12.484
GDP_t	The natural logarithm of GDP of Thailand, $ US (current prices, billion)	25.526	0.359	24.646	28.319
GDP_{jt}	The natural logarithm of GDP of the trading partner ,$ US (current prices)	24.838	2.035	18.498	30.587
$Population_t$	The natural logarithm of Thailand's population	17.921	0.057	17.810	18.013

$Population_{jt}$	The natural logarithm of the trading country's population	16.569	1.711	11.166	20.997
Distance	The natural logarithm of the distance between Bangkok and the capital city of the country (kilometres)	8.940	0.575	6.896	9.889
Family Ties	The reciprocal value of average score of three questions shown in the notes below	1.216	0.101	1.026	1.503
Ethnic Diversity	The probability that two individuals selected at random from a country will be from different ethnic groups	0.377	0.232	0.004	0.953
Control of Corruption	Score 1-7. Higher values indicate lower corruption	3.381	1.453	0.000	6.000
Civil Law	1, if civil law; zero, otherwise	0.617	0.486	0.000	1.000
Common Law	1, if common law; zero, otherwise	0.090	0.286	0.000	1.000
Extent of marketing	Score 1-7. Higher values indicate companies use extensive and employs the world's most sophisticated tools and techniques	4.471	0.938	1.000	6.700
English Language	1, if English is the official language; 0, otherwise	0.205	0.404	0.000	1.000
Religion	Religious commonality with Thailand (percentage of Buddhist population)	0.062	2.416	0.000	95.500
ASEAN	1, if the country is the ASEAN member; 0, otherwise	0.046	0.210	0.000	1.000

We measured three family-ties factors out of 267,870 responses. Family Ties Question 1: How important it is family in your life? 1= very important; 2 = rather important; 3= not very important; 4 = not at all important. Family Ties Question 2: Do you always respect and love your parents? 1 =always; 2= earned; 3= neither. Family Ties Question 3: Parents' responsibility to their children? 1= do their best for their children; 2= parents have a life; 3 = neither. Family Ties is the inverse of average score of these three questions. For marketing and family-ties variables, if data were available for one of the waves, the other waves' missing data were replaced by the mean values to mitigate data loss. The sample covers 80 countries with 1,547 observations.

Table 2
Correlation matrix for the main variables.

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
1.Ln Exports									
2.Ln Imports	0.83**								
3.Ethnic Networks 1	0.18**	0.15**							
4.Ethnic Networks 2	0.58**	0.59**	0.51**						
5. GDP_t	0.19**	0.11**	0.05*	-0.08**					
6.GDP_{jt}	0.80**	0.79**	0.14**	0.53**	0.05*				
7. $Population_t$	0.22**	0.10**	0.03	-0.07**	0.77**	0.09**			
8. $Population_{jt}$	0.52**	0.54**	-0.04*	0.41**	0.00	0.66**	0.00		
9.Distance	-0.25**	-0.17**	-0.28**	-0.35**	-0.01	0.00	-0.01	-0.27**	
10.Family Ties	0.19**	0.21**	0.35**	0.24**	0.02	0.28**	0.02	-0.16**	0.08**

11.Ethnic Diversity	-0.17**	-0.19**	-0.18**	-0.26**	0.01	-0.23**	0.02	0.05*	0.10**
12. Control of Corruption	0.31**	0.35**	0.14**	0.31**	-0.11**	0.34**	-0.23**	-0.20**	0.23**
13.Civil Law	-0.34**	-0.24**	0.13**	-0.25**	0.04*	-0.10**	0.03	-0.29**	0.34**
14.Common Law	0.21**	0.19**	0.17**	0.25**	-0.02	0.15**	-0.01	-0.09**	0.21**
15.Marketing	0.60**	0.59**	0.22**	0.42**	-0.03	0.64**	-0.02	0.07**	0.22**
16.English Language	0.15**	0.15**	-0.03	0.20**	-0.03	0.00	-0.02	-0.07**	-0.01
17. Religion	0.02	-0.01	0.02	-0.02	-0.04	0.01	-0.04*	0.00	-0.05*
18. ASEAN	0.25**	0.23**	0.18**	0.30**	0.01	0.02	0.02	0.13**	-0.57**
	(10)	***(11)***	***(12)***	***(13)***	***(14)***	***(15)***	***(16)***	***(17)***	
11.Ethnic Diversity	-0.37**								
12.Control of Corruption	0.54**	-0.30**							
13.Civil Law	0.37**	-0.26**	0.10**						
14.Common Law	0.06**	-0.01	0.29**	-0.40**					
15.Marketing	0.40**	-0.20**	0.65**	-0.05*	0.38**				
16.English Language	-0.19**	0.25**	0.18**	-0.58**	0.62**	0.26**			
17. Religion	0.00	-0.01	0.01	-0.03	-0.01	0.02	-0.01		
18. ASEAN	-0.25**	0.03	-0.11**	-0.20**	-0.07**	-0.01	0.19**	-0.01	

* (**) indicates correlation is significant at the 0.05(0.01) level (two-tailed, Pearson).

Table 3
The effect of ethnic networks on Thai exports (parsimonious model).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	OLS	OLS	RE	RE	FE	FE
Ethnic Networks 1	0.28 (0.07)***	-	0.29 (0.03)**	-	0.25 (0.07)**	-
Ethnic Networks 2	-	0.13 (0.02)***	-	0.16 (0.06)**	-	0.22 (0.10)**
GDP_t	0.61 (0.15)***	0.57 (0.16)***	0.59 (0.06)***	0.54 (0.17)***	0.68 (0.16)***	0.59 (0.14)***
GDP_{jt}	0.85 (0.04)***	0.84 (0.05)***	0.79 (0.12)***	0.79 (0.07)***	0.73 (0.15)***	0.61 (0.13)***
$Population_t$	6.51 (2.43)***	6.53 (2.44)***	7.14 (2.76)***	6.79 (2.30)***	6.88 (1.05)***	7.58 (1.13)***
$Population_{jt}$	-0.30 (0.06)***	-0.35 (0.05)***	-0.38 (0.06)***	-0.41 (0.08)***	-0.22 (0.13)*	-0.16 (0.07)**
Distance	-0.87 (0.08)***	-0.86 (0.06)***	-0.73 (0.19)***	-0.73 (0.17)***	-	-

Model summary						
F-statistic	821.34***	834.77***	1005.34***	1010.71***	88.51***	87.56***
Adjusted R^2	0.5628	0.5672	0.6217	0.6251	0.3693	0.3606
Observations	1547	1547	1547	1547	1547	1547
Year effects?	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is Ln Exports. The standard errors robust to heteroscedasticity are reported in the parentheses. (*), (**) and (***) indicates that the coefficients are significant or the relevant null is rejected at the 10, 5 and 1 percent level, respectively. RE is random effects; FE is fixed effects. Distance is dropped from FE estimations.

Table 4
The effect of ethnic networks on Thai exports and imports.

	Dependent variable: Ln Exports			Dependent variable: Ln Imports		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	OLS	RE	FE	OLS	RE	FE
Ethnic Networks	0.51 (0.12)***	0.52 (0.18)***	0.50 (0.24)**	0.35 (0.11)**	0.31 (0.15)**	0.54 (0.23)**
GDP_t	0.65 (0.18)***	0.53 (0.12)***	0.76 (0.14)***	0.86 (0.16)***	0.84 (0.23)***	0.99 (0.20)***
GDP_{jt}	0.70 (0.06)***	0.74 (0.12)***	0.69 (0.12)***	0.55 (0.08)***	0.28 (0.13)**	0.57 (0.09)***
$Population_t$	6.36 (1.23)***	7.22 (1.13)***	7.06 (1.15)***	1.48 (1.25)	2.91 (1.98)	1.23 (1.27)
$Population_{jt}$	0.13 (0.06)**	0.23 (0.10)**	-0.19 (0.45)	0.44 (0.06)***	0.83 (0.21)***	-0.29 (0.17)*
Distance	-0.97 (0.09)***	-0.46 (0.20)**	-	-0.27 (0.10)**	-0.35 (0.15)**	-
Ethnic Diversity	0.39 (0.17)**	0.64 (0.29)**	-	0.63 (0.20)***	1.73 (0.68)**	-
Ethnic Diversity*Ethnic Networks	-0.24 (0.05)***	-0.12 (0.05)**	-	-0.07 (0.08)	-0.32 (0.48)	-
Family Ties	1.13 (0.50)**	4.81 (1.30)***	0.07 (0.09)	1.71 (0.64)***	6.33 (1.87)***	0.19 (0.26)
Family Ties*Ethnic Networks	0.38 (0.10)***	0.46 (0.15)***	0.53 (0.13)***	0.20 (0.11)*	0.23 (0.10)**	0.45 (0.20)**
Control of Corruption	0.16 (0.04)***	0.07 (0.04)*	1.49 (0.71)**	0.36 (0.04)***	0.15 (0.06)**	0.47 (0.73)
Control of Corruption*Ethnic Networks	-0.06 (0.03)**	-0.02 (0.01)**	-0.26 (0.08)***	-0.09 (0.03)***	-0.02 (0.01)**	-0.36 (0.17)**
Civil Law	-1.57 (0.09)***	-1.74 (0.35)***	-	-0.55 (0.10)***	-0.50 (0.13)***	-
Common Law	0.42 (0.14)***	0.45 (0.20)**	-	0.35 (0.14)**	0.44 (0.19)**	-
Marketing	0.70 (0.08)***	0.34 (0.10)***	0.22 (0.05)***	0.51 (0.10)***	0.37 (0.10)***	0.24 (0.06)***
Marketing* Ethnic Networks	-0.06 (0.03)**	-0.06 (0.02)***	-0.07 (0.01)***	-0.06 (0.03)**	-0.02 (0.01)**	-0.15 (0.03)***
English Language	0.77 (0.14)***	0.49 (0.27)*	-	0.19 (0.10)*	0.75 (0.41)*	-
English Language*Ethnic Networks	-0.07 (0.02)***	-0.12 (0.05)**	-	-0.11 (0.02)***	-0.03 (0.01)***	-
Religion	0.05 (0.09)	0.09 (0.11)	-	0.19 (0.22)	0.07 (0.06)	-
ASEAN	1.34 (0.14)***	2.34 (0.31)***	2.58 (0.16)***	2.33 (0.24)***	2.24 (0.43)***	3.07 (0.39)***
Model summary						
F-statistic	485.45***	2781.62***	73.71***	350.72***	3718.57***	72.89***
Adjusted R^2	0.7874	0.8097	0.5843	0.6816	0.7318	0.5821
Observations	1467	1467	1467	1467	1467	1467
Year effects?	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is Ln Exports or Ln Imports. Ethnic Networks is measured by the continuous variable Ethnic Networks 2. The standard errors robust to heteroscedasticity are reported in the parentheses. (*), (**) and (***) indicates that the coefficients are significant or the relevant null is rejected at the 10, 5 and 1 percent level, respectively. The number of observations reduces from 1547 to 1467 because the data on family ties end in 2004, rather than in 2005.

Table 5
The effect of ethnic networks on Thai exports and imports: system-GMM estimates.

	Model 1	Model 2	Model 3	Model 4
	Ln Exports	Ln Exports	Ln Imports	Ln Imports
Ethnic Networks	0.02 (0.01)**	2.59 (1.16)**	0.02 (0.01)**	2.45 (1.04)**
GDP_t	0.17 (0.06)**	0.19 (0.08)**	0.38 (0.13)***	0.76 (0.21)***
GDP_{jt}	1.25 (0.09)***	1.04 (0.17)***	1.47 (0.08)***	0.55 (0.18)***
$Population_t$	5.12 (1.53)***	6.74 (1.63)***	1.19 (1.54)	2.20 (1.71)
$Population_{jt}$	-0.48 (0.08)***	0.25 (0.48)	-0.57 (0.12)***	0.49 (0.51)
Distance	-1.85 (0.20)***	-0.71 (0.43)*	-1.68 (0.27)***	-0.80 (0.39)**
Ethnic Diversity	-	0.39 (2.80)	-	4.50 (2.04)**
Ethnic Diversity*Ethnic Networks	-	-0.75 (0.32)**	-	-0.36 (0.17)**
Family Ties	-	4.51 (2.63)*	-	4.75 (2.15)**
Family Ties*Ethnic Networks	-	3.04 (1.36)**	-	1.26 (0.59)**
Control of Corruption	-	0.74 (0.33)**	-	0.25 (0.19)
Control of Corruption*Ethnic Networks	-	-0.33 (0.14)**	-	-0.41 (0.18)**
Control of Corruption*Family Ties* Ethnic Networks	-	0.29 (0.36)	-	0.37 (0.38)
Civil Law	-	-1.26 (0.60)**	-	-1.80 (0.55)***
Common Law	-	1.63 (0.68)**	-	0.43 (0.20)**
Marketing	-	0.17 (0.08)**	-	0.19 (0.05)***
Marketing* Ethnic Networks	-	-0.02 (0.01)**	-	-0.06 (0.03)**
English Language	-	0.84 (1.28)	-	1.50 (2.53)
English Language*Ethnic Networks	-	-0.16 (0.07)**	-	-0.20 (0.08)**
Religion	-	0.54 (1.29)	-	1.09 (1.14)
ASEAN	-	3.15 (0.97)***	-	3.61 (1.10)***
Model summary				
Wald-statistic	1122.43***	728.37***	933.82***	743.28***
Adjusted R^2	0.5447	0.5987	0.4326	0.5247
Correlation 1	-6.902***	-4.048***	-7.254***	-3.406***
Correlation 2	-1.002	-0.6003	-1.014	-1.323
Sargan Test (*p-value*)	26.40(*0.84*)	74.63(*0.71*)	26.79(*0.83*)	71.12(*0.75*)
Observations	1547	1467	1547	1467
Year effects	Yes	Yes	Yes	Yes

The dependent variable is Ln Exports or Ln Imports. Ethnic Networks is Ethnic Networks 2. The standard errors robust to heteroscedasticity are reported in the parentheses. Wald statistic tests the joint significance of estimated coefficients; asymptotically distributed as χ^2(df) under the null of no relationship. Correlation 1 and Correlation 2 are the first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is the test of over-identifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. We tested for the potential endogeneity of the variables using the 'Difference-in-Sargan-Hansen" statistic, for which the null hypothesis states that the variable is exogenous. The results show that Ethnic Networks, Ethnic Diversity, Family Ties, Marketing and the corresponding interaction terms should be treated as endogenous. (*), (**) and (***) indicates that the coefficients are significant or the relevant null is rejected at the 10, 5 and 1 percent level, respectively.