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Migrant Networks and Trade: The Vietnamese Boat People as a Natural Experiment

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May 2014

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Key words: Migrant Networks, US Exports, Natural Experiment

JEL classification: F14; F22

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1 Introduction

David Tran, once a Major in the South Vietnamese army, fled from Vietnam in 1979 following the Sino-Vietnamese war. After time in a United Nations refugee camp, he arrived in the United States in January 1980 along with thousands of refugees, collectively known as the Vietnamese Boat People. After settling in Los Angeles, he established Huy Fong Foods, naming his company after the Taiwanese freighter on which he left Vietnam. Chief among Huy Fong Foods' products is Sriracha sauce, a global brand which totalled sales of $60 million in 2012. Strikingly, 80% of these sales were exports to Asia. Hundreds of thousands of entrepreneurial Vietnamese settled in the US from 1975 onwards that subsequently fostered US exports to Vietnam, of which Tran is just one example. In this paper we use the exodus of the Vietnamese Boat People as a natural experiment to provide causal evidence of a long-run developmental impact of immigration, i.e. migrant networks promoting trade.

Immigrants potentially foster international trade by reducing trade costs. Such frictions are quantitatively large, especially for poor countries (Anderson and van Wincoop, 2004), and are so substantial that they have been advocated as a plausible explanation for the *Six Major Puzzles in International Economics* (Obstfeld and Rogoff, 2001). Recent theoretical and empirical research has singled out information costs in particular as inhibiting trade flows (Chaney, 2011; Allen, 2012; Steinwender, 2013). Immigrants may lower such frictions through their knowledge of their home country's language, regulations, market opportunities and informal institutions. So too are immigrants argued to decrease the costs of negotiating and enforcing contracts by drawing upon their trusted networks, thereby deterring opportunistic behavior in weak institutional environments (Greif, 1993; Gould, 1994; Rauch, 2001; Rauch and Trindade, 2002; Dunlevy, 2006). This is important, since weak institutions have been shown to significantly and adversely affect trade volumes (Anderson and Marcouiller, 2002; Berkowitz et al., 2006). Migrants are thus typically

expected to facilitate bilateral trade mostly with developing countries, where firms typically need to navigate myriad bureaucratic and legal hurdles, Vietnam being a case in point.

While a large literature examines the pro-trade effect of migration, causality from migration to trade has yet to be conclusively established (Felbermayr et al., 2012). Studies almost ubiquitously uncover a positive correlation between migration and trade (Genc et al., 2011), to the extent that these results are often interpreted as evidence of a positive diaspora externality. Doubts persist however, as to whether trading partner's cultural affinity or else bilateral economic policies might be driving the observed positive correlations (Lucas, 2005; Hanson, 2010). These doubts are valid, not least since the estimated impacts of immigration on trade are quantitatively large, therefore representing an important economic channel through which migrants might lead to substantial gains from trade.

To address these endogeneity concerns, we use the exodus of the Vietnamese Boat People to the US as a natural experiment to establish a clear causal effect from Vietnamese immigration to US trade with Vietnam. The exodus started in April 1975, following the Fall of Saigon to the Communist North Vietnamese, when the US military evacuated around 130,000 refugees from South Vietnam. A major part of this evacuation was Operation Frequent Wind, the largest boat and air lift in refugee history. This first wave of refugees was, as we will detail in the next section, exogenously dispersed throughout the US. It constituted the first of many waves, as subsequently hundreds of thousands of Vietnamese refugees fled Vietnam to escape protracted persecution in 're-education camps' and agricultural collectives. Between 1975 and 1994 around 1.4 million Vietnamese refugees were resettled in the US. Concurrently, the US imposed a trade embargo on all Vietnam, under the auspices of the 1917 Trading with the Enemy Act and the 1969 Export Administration Act. Our natural experiment thus combines a large immigration shock of Vietnamese refugees to the US - the first wave of which was exogenously dispersed across

US States - in tandem with a lasting trade embargo. These events constitute an ideal setting to test the causal link from Vietnamese immigration to US exports to Vietnam following the lifting of the trade embargo in 1994.

Figures 1 and 2 pictorially demonstrate our identification strategy. Figure 1 plots the immigration waves of Vietnamese to the US (dotted line), with three spikes corresponding to the Fall of Saigon, the Sino-Vietnamese War and later the introduction of US policies designed to welcome additional waves of Vietnamese refugees. These massive immigration shocks preceded the opening up of trade with Vietnam in 1994, which led to a rise in US exports to Vietnam (bold line) that was particularly pronounced in the late 2000s. Figure 2 shows that the exogenous allocation of the first wave of 130,000 refugees in 1975 is strongly correlated with the location of Vietnamese migrants in the US in 1995, the first year after the lifting of the trade embargo. We thus use the chronology of events and the exogenous allocation of the first wave of refugees (as an instrumental variable) to establish a causal link from migrant networks in 1995 to trade creation between 1995 and 2010.

Our results show that the share of US exports going to Vietnam over the period 1995-2010, i.e. following the lifting of the trade embargo in 1994, was higher and more diversified in those US States with larger Vietnamese populations, themselves the result of larger refugee inflows two decades beforehand. We find that US States with larger Vietnamese populations, measured in either levels or as shares of State populations, total migrant stocks or Asian migrant stocks, are associated with greater exports to Vietnam, whether expressed as shares of State GDP or total exports or as the share of industries with positive exports, i.e. the extensive margin. Our results, robust to controlling for income per capita, remoteness from US customs ports and for export structure, suggest that a 10% increase in the Vietnamese network raises the ratio of exports to Vietnam over GDP by 2% and the share of total exports going to Vietnam

by 1.5%. To further qualify the magnitude of our results, we examine counterfactual scenarios that simulate how large the export flows to Vietnam would have been had migrant inflows into the corresponding US States have been 95% lower. These simulations show that on average, across the ten States with the highest Vietnamese populations, exports to Vietnam would have been 50% lower. Uniquely, we further document how the overseas Vietnamese, known as the *Viet Kieu*, took advantage of Vietnam's preferential policies aimed at leveraging their contributions to national development, an important example of a successful Diaspora-engagement program.

Our paper represents, to the best of our knowledge, the first cogent evidence of a causal link from immigration to exports drawing on a natural experiment. Building upon Gould's seminal insight (Gould, 1994), our results lend further support to the idea that immigrants are fundamentally differentiated from native populations in terms of their ties with their home nations. These ties, maintained by a common language and regular flows of information,[1] bring nations closer together and represent an important channel through which immigrants nurture long-run development, in our specific case through fostering trade.[2]

The following Section provides an historical account of the events that followed the Fall of Saigon and in doing so elucidates our natural experiment. Section 3 presents our data and empirical model. Our results are then presented in Section 4, which in turn allow us to simulate counterfactual scenarios so as to quantify how much trade creation

[1]Despite the circumstances under which the first waves of Vietnamese left the country, Vietnamese refugees kept contact with families and friends in Vietnam. As Zhou (1997) writes, *"Letters frequently moved between the receiving countries and Vietnam"*. Moreover the first companies that established long-distance telephone and flight services to Vietnam after 1994, drastically reducing information barriers between the two countries, were founded by Vietnamese migrants.

[2]While Vietnamese networks may have created both export and import opportunities in the US, we focus upon the export-creating effect of immigrants since this isolates the necessarily-welfare-enhancing information channel from the preference channel of the network's pro-trade effect (Gould, 1994). Nonetheless this immigration shock might also have led to 'nostalgia' imports from Vietnam in addition to the opening of many restaurants and other businesses that rely on Vietnamese-specific skills and imports. These potentially translate into gains from variety for US consumers (Chen and Jacks, 2012) and export-led poverty reduction in Vietnam (McCaig, 2011).

would have occurred in the absence of the Vietnamese Boat People. Finally Section 5 concludes.

2 The Natural Experiment

In this section we describe the chronology of events surrounding the exodus of the Vietnamese Boat People from Vietnam to the US. The Fall of Saigon to the Soviet-backed Communist Vietnamese North in April 1975 proved the catalyst for the first wave of refugees from Vietnam, as the communist North pursued their wartime enemies, forcing over one million people into 're-education camps' and 'New Economic Zones' i.e. agricultural collectives. Following the first wave, hundreds of thousands of Vietnamese fled overland and by sea relying on watercraft, often fishing boats, giving rise to their name 'The Boat People'. Those Vietnamese that were able to leave, fled overland to Cambodia, Laos, and Thailand - or else headed for the open seas, to international waters and busy shipping lanes.[3] The fortunate were rescued by ship crews and taken to refugee camps in Hong Kong, Malaysia, Thailand, Indonesia and the Philippines, the so-called 'first asylum countries', where they typically faced squalid conditions.

In response to the unfolding crisis, The President's Special Interagency Task Force (IATF) for Indochina refugees was established on 18 April 1975 to co-ordinate all relevant agencies involved. The refugee program consisted of three separate phases, i) the evacuation of 140,767 refugees, ii) the refugees' temporary care while they waited to be permanently settled and iii) the resettlement of the refugees either in the US (132,421), in third countries, largely Canada and France (6,632) or else to ensure their successful repatriation to Vietnam (1,546). The vast majority of refugees that ended up residing in the US were processed through one of four camps on US soil, deliberately scattered in dispersed

[3]According to the UNHCR, over 250,000 refugees died on the open sea "as a result of storms, illness, and starvation, as well as kidnappings and killings by pirates" (US House, 2010).

geographical locations, namely Fort Chaffee (Arkansas, 50,135), Camp Pendleton (California, 48,418), Fort Indiantown Gap (Pennsylvania, 21,651) and Elgin Air force Base (Florida, 8,665). There 19 voluntary agencies (VOLAGs), predominantly religious organizations, helped the Vietnamese to settle in the US by matching them with sponsors, for example with US citizens that offered food, clothing and shelter until the refugees were financially independent.[4]

The program of refugee resettlement began under emergency conditions and was carried out hurriedly. Due to the unprecedented scale and urgency of the refugee program, citizens, churches, and employers across the US were urged to sponsor refugees (Sonneborn and Johnston, 2007). Over a 32-week period, from 11 May to 20 December 1975, on average 4,000 Vietnamese refugees were released from the refugee program each week (Figure 3). By 20 December 1975, 130,000 refugees had been resettled in the US. The 1975 resettlement process culminated in an exogenous distribution of Vietnamese across the US, uncorrelated with immigrants' choices and economic opportunities related to trade with Vietnam. There are two main reasons why we argue this distribution is quasi-random.

The first is that the refugees were purposefully dispersed throughout the US as policymakers, drawing on the lesson from the agglomeration of Cubans in Miami, were keen to avoid the development of a similar Vietnamese refugee agglomeration[5]. Haines (1996) write that *"During House debate on the Indochina Migration and Refugee Act 1975 several speakers...referred repeatedly to the need to distribute refugees evenly about the country, to minimize impact upon specific labor markets and communities... This became the explicit policy of refugee resettlement for the Indochinese"*. This sentiment

[4]Since World War II, refugees in the US have been resettled by voluntary agencies, for example those from Hungary (1956) and Cuba (1960). The Indochinese were no exception as "expertise and experience were needed, since the US had never before experienced the arrival of so many refugees in so short a time" (GAO, 1977).

[5]Card (1990) analyzes the labor market effect of the Mariel Boatlift of 1980, when around 125,000 Cubans settled in Miami and finds little evidence of immigration affecting unemployment or wages.

is corroborated by a statement made by Kenneth Fasick, Director of the International Division of the US General Accounting Office, before The Subcommittee on Immigration, Refugees, and International Law, Committee on The Judiciary of the US House of Representatives on 16 May 1979: *"To avoid the kind of geographic concentration experienced with the Cuban refugees, an effort was made at the time of the initial resettlement wave in 1975-76, to distribute the refugee population throughout the US."* In the words of the Sociologist Ruben G.Rumbaut (1995), the *"goal of resettlement through reception centers was to disperse refugees to 'avoid another Miami'...Consequently the initial resettlement efforts sought a wide geographic dispersal of Vietnamese families."* According to Zhou and Bankston (1998), *"...the US Government and the voluntary agencies working mainly under government contracts oversaw their resettlement and in most cases decided their destinations... The effort to minimize impact [on US Society] led initially to a policy of scattering Southeast Asians around the country...the early attempts at dispersion gave rise to Vietnamese communities in such places as New Orleans, Oklahoma City, Biloxi, Galveston and Kansas City, that had previously received few immigrants from Asia."* It was no coincidence that the camp that received the greatest number of refugees was also located in a State that had historically been the least attractive to migrants, Arkansas (Robinson, 1998). Moreover, as Vo (2006) argues, the goal of the dispersion was also to minimize the cost on host societies: *...the US resettlement program planned to disperse them equally throughout all the States. The goal was not to assimilate the refugees but to limit the cost of social health and educational services incurred by counties with large numbers of refugees."* As shown in the top-left corner of Figure 4, the dispersion policy led to a higher number of refugees in the most populous States (the number of refugees per State on 31 December 1975 is given in Table 7).

The second reason why the resettlement process was quasi-random is because the process of refugee allocation was anarchic and differences in agencies' pro-activeness

resulted in a mal-distribution of caseloads. Refugees would need to register, some by choice and others by assignment, with a voluntary agency committed to finding them (and their families) a sponsor.[6] In *theory*, the matching process "*consisted of reviewing the refugees' occupational background against a Department of Labor's listing of labor markets needing additional workers, comparing refugees' preferences for place of resettlement against the agency's opportunities, and assigning the refugees to a sponsor in the chosen locality*" (Baker et al., 1984). Thompson (2010) provides examples of some adverts for workers published in the camp newspaper from Indiantown Gap: *"Workers for greenhouses in Maryland and North Carolina. Free housing, food, assistance, and wages."* or *"Two fisherman needed for job in Florida. Position pays $2.10 per hour with sponsorship. Housing to be provided in new house trailer plus farm animals and garden. Should be able to sex-sort and count fish."* Importantly however, despite this hypothesized process, the reality on the ground was very different, such that ultimately nearly three-fourths of the sponsors chosen were either families or individuals as opposed to firms offering jobs (Marsh, 1980).

Thompson (2010) writes that Washington put tremendous pressure on the agencies, emphasizing the need for expeditious processing. He quotes the Department of Health, Education and Welfare Director, who noted that *"Everyone worked 12-hour shifts, 7 days a week, and it was not uncommon to work 15 or 16 hours at a time."* Never before had the responsible agencies been required to resettle such unprecedented numbers in such a short space of time. The chaos that ensued in the camps led to confusion among the refugees with regards to which agency to sign-up with. The signing-up in large part was a function of how pro-active agency employees were. In Fort Chaffee for example, two agencies registered about 75% of the refugees and other agencies complained of

[6]In the first months of the program refugees could turn down offers of sponsorship. As noted by Thompson (2010), of the 1,213 offers recorded at Indiantown Gap by the Sponsorship Coordination Center, 759 were eventually accepted. From October 1975 onwards, the US government made it almost impossible for a refugee to refuse an offer of sponsorship.

a mal-distribution of caseloads (Thompson, 2010). Robinson (1998) cites a voluntary agency worker at the time as saying *"Nobody quite knew who was doing what. Most of what we were doing was matchmaking...We felt we were competing with one another to get people out of there"*.

The organizations responsible for dispersing the Vietnamese throughout the country had sponsors in specific geographical locations across the United States. The matching with relocation agencies therefore in part determined the destination of many of the refugees. Since religious organizations resettled the vast majority of the refugees (in particular the Catholic Conference (59,901), the Church World Service (18,126) and the Lutheran Immigration and Refugee Service (17,051)), many of the refugees were assigned a State on the basis of the location of parishes or dioceses. In the words of Thompson (2010), *"The Lutheran church was strongest in the upper Midwest and resettled many refugees in Minnesota and neighboring States - and to this day Minnesota is home to many Indochinese despite its bone-chilling winters"*. Moreover, *"the religious VOLAGs...were less tied to specific job offers in settling refugees. A parish or church often sponsored their clients without a commitment on the part of the refugee to accept a particular job* (Thompson, 2010). This explains why only around 25% of the sponsors chosen were firms offering jobs (Marsh, 1980).

Due to the cluster-avoiding US-government-led dispersion policy as well as the differences in pro-activeness across relocation agencies, in most cases the refugees *"were powerless to decide where and when they would be resettled the resettlement agencies almost entirely decided where the refugees would settle"* (Zhou and Bankston, 1998). This is further revealed by the large flows of secondary migration that took place in the following years, which occurred in the absence of government controls. In large part this process was driven by the desire to reunite extended families separated during the resettlement process (Sonneborn and Johnston, 2007), as well as a preference for warmer climates and more

generous social welfare programs (Vo, 2006). According to Baker et al. (1984), 40.6% of those who did not receive their choice of State had moved by 1978, as well as 33.8% of those who had first resettled to the State of their choice.[7] This suggests that 45% of refugees for whom we know residence lived in a different State in 1980 than in 1975. Similarly, the same study reveals that in a poll conducted on the basis of random telephone calls in 1981, 33% of the respondents had moved across State lines since their arrival in the US. This secondary migration strongly suggests that the initial placement was exogenous to migrants' preferences.

Most importantly, the data show that economic and political variables played no role in the allocation process. As shown in Figure 4, the number of refugees hosted across States is not correlated with income per capita, unemployment, remoteness from US 1978 customs ports (from where goods officially leave the US) or with the immigrant share of State populations. The figure also shows that the allocation of refugees was not driven by differences in attitudes towards the US involvement in Vietnam in 1972, which could have affected sponsorship offers. The bottom-right scatter plot shows that the number of refugees by State is not correlated with the share of votes for the Democrat party in 1972, when George McGovern's 1972 Presidential Campaign called for the immediate withdrawal of US troops from Vietnam and lost 49 of 50 States to Richard Nixon.

This initial distribution of Vietnamese persisted, despite the secondary migration and led to the emergence of Vietnamese communities, as additional waves of refugees arrived in the US and drew on pre-existing Vietnamese networks. As shown in Figure 1, the exodus of the Vietnamese to the US consisted of three distinct waves; the initial wave following the Fall of Saigon, the second that occurred at the time of the December 1978 Sino-Vietnamese war, which precipitated the persecution of the ethnic-Chinese populous

[7] The analysis of Baker et al. (1984), although partial, indicates that overall some 47.3% of the refugees were sent to the State of their choice. When asked at the camp interview about their preferences for a State of resettlement almost half wanted to go to California, but only a fifth were sent there. Less than a quarter wanted to go to the 43 least-favored States, yet more than half were sent to those places.

in Vietnam and the third that coincided with the 1988 Amerasian Home Coming Act and the 1989 Humanitarian Operation Program.[8] From 1980 onwards, hundreds of thousands were accepted that had previously lived in Southeast Asian refugee camps.

Whereas the US Government facilitated inward movements of Vietnamese Boat People to the US, their stance with regards to the movement of goods between the two nations was quite the reverse. Under the auspices of the 1917 Trading with the Enemy Act and the 1969 Export Administration Act and following the military conquest of Saigon in 1975 by the Communist North, the US widened trade sanctions, ostensibly a complete trade embargo, from its previous focus on the North of Vietnam, which had been in place since 1964, to the entire country. On 3 February 1994, President Clinton lifted the trade embargo at a time of increased lobbying by private domestic firms who were reported by the Los Angeles Times to be *'champing at the bit'* to do business in Vietnam.[9] The quasi-randomly allocated first-wave of Vietnamese refugees, in tandem with the lasting trade embargo constitute an ideal natural experiment with which to establish a causal effect of Vietnamese migrant networks on US exports to Vietnam.

[8]The US Government passed several important pieces of legislation to facilitate the arrival of the Vietnamese. The 1979 Orderly Departure Program allowed Vietnamese to legally emigrate on the basis of family reunion and on humanitarian grounds and estimates suggest that by the mid-1990s over two hundred thousand Vietnamese had entered the US under the Program. In 1980, the US Congress passed the Refugee Act - the most comprehensive piece of refugee legislation in US history - into law, which revised the provision of the 1965 Hart-Celler Act that previously admitted refugees into the US in limited proportions relative to the overall number of immigrants. The Amerasian Homecoming Act was passed in the US in 1988 to bring as many Amerasians to the US as possible. The final important piece of legislation passed by the US Congress to aid the Vietnamese was the 1989 Humanitarian Operation Program. In that year, the US and Vietnamese Governments agreed for former and current detainees in 're-education camps' to be allowed to depart for the US, the ultimate consequence of which was the arrival of a further 70,000 Vietnamese.

[9]Relations between the two nations improved following a sustained effort by the Hanoi Government to assist US forensic teams locate and identify over 2,000 US service personnel that were still listed as Missing In Action at that time. A normalization of diplomatic relations ensued in 1995, with the upgrading of the liaison offices to full embassy status

3 Data and Empirical Strategy

As detailed in the previous section, the 1975 distribution of Vietnamese refugees was quasi-random and constitutes an ideal instrumental variable with which to establish a causal effect of Vietnamese migrant networks on US exports to Vietnam. The enduring trade embargo compliments our instrument by conclusively insulating our results from concerns of reverse causality i.e. the endogenous location decision of migrants, whereby refugees could potentially have located in areas with more favorable trading opportunities.

Random allocations of refugees have been used for identification purposes in previous studies. For example: in Sweden by Edin et al. (2003) who estimate the causal effect of immigration on labor market outcomes, by Dahlberg et al. (2012) to estimate the effect of ethnic diversity on redistribution preferences and, in a slightly different approach, by Damm and Dustmann (2013) who investigate the effect of exposure to crime on criminal behavior across Danish neighborhoods. Our study is the first to use such an allocation to establish a trade-creation effect of migrants.[10]

We use the exogenous allocation of Vietnamese refugees in 1975 as an instrument for the stock of Vietnamese migrants across US States in 1995, the first (full) year in which the US exported to Vietnam. The 1975 refugee location data are obtained from a US General Accounting Office Report to Congress (GAO, 1977). It provides the number of refugees resettled by State as of 31 December 1975, importantly just eleven days after the last camp closure. Migration data for the year 1995 are taken from the 2000 US Census, by relying on the question that asks respondents their place of residence five years hence. In other words, we only include in estimation those migrants in 1995 that remained in the US up until the year 2000 and importantly only those that migrated to the US prior to 1994; to ensure that their decision to migrate could not have been based on any locations'

[10] A recent paper by Cohen et al. (2012) uses the formation of World War II Japanese Internment Camps as an instrument to identify the impact of Japanese migrants on US exports to Japan. A particular advantage of the current study is the concurrent trade embargo.

trading advantages. These anonymous micro data were obtained from the The Integrated Public Use Microdata Series (Ruggles et al., 2010).[11] To demonstrate that the intensity of our instrument is not capturing differences in migrant characteristics, Figure 5 plots the number of refugees against the average age, female share, college-educated share and share of English-speaking Vietnamese. None of these characteristics are correlated with the numbers of refugees, giving us confidence that our instrument captures the numbers of refugees, as opposed to any selection process that may have inadvertently occurred in the observables.

Figure 6 shows the concentrations of Vietnamese across US States in 1995.[12] The top ten metropolitan areas are listed below Figure 6. Although agglomeration occurred, most notably in California and Texas, the Figure shows the wide dispersion of Vietnamese across the country. It is important to emphasize that many populous cities do not feature prominently in 6, for example, San Antonio, Jacksonville, Indianapolis and Columbus. Importantly, as shown in Figure 2, the distribution of Vietnamese in 1995 was in large part determined by the initial allocation of refugees in 1975. The correlation between the two data series is 0.98, such that our instrument is strong.

Our regression thus takes the following form:

$$X_i = \beta_0 V_i + \beta_1 C_i + \epsilon_i \tag{1}$$

Where V_i is the stock of Vietnamese migrants in 1995 and X_i is the average share of exports of State i to Vietnam from 1995 to 2010 (to militate against State size effects, we divide exports to Vietnam by total exports or State GDP. C_i is a set of control variables.

[11] Our analysis can only be conducted at the State level since more disaggregated data for our instrument are unavailable.

[12] The Figure is constructed by applying the data for Vietnamese immigrants in 1995 from the US Census of 2000 available at the Metropolitan Statistical Area (MSA) to the corresponding map defined at the county level, such that all counties that constitute the same MSA will be defined as being host to the same number of immigrants.

We include three: income per capita, as rich States may be more likely to export more differentiated products to Vietnam, a measure of export-structure similarity of Vietnam's import basket with that of US States, to control for differences in export structures that could explain export performance and a measure of trade costs, i.e. remoteness from US customs ports. All three are 1995-2010 yearly averages. The βs are parameters to be estimated and ϵ_i is the error term. We instrument V_i with the stock of refugees in 1975.

To construct the export-structure similarity index, we take the inverse of the Euclidean distance between the State's export vector, defined as its export share by industry and Vietnam's import vector. For each State the index is defined as:

$$\frac{1}{\sqrt{\sum (X_k - M_k)^2}} \tag{2}$$

where X_k is the State's export share in industry k (28 industries of the NAICS classification) and M_k is Vietnam's share of imports from the US in industry k.

To construct the remoteness measure we take a weighted distance from each State centroid to every Customs Port, where the weights are US total exports from the ports between 1995 and 2010. The logic here is that the further States are from customs ports that export internationally, the higher the trade costs. The remoteness of each State is defined as:

$$\frac{1}{\sum \frac{X_i}{D_i}} \tag{3}$$

where X_i are the custom port i exports and D_i is the distance in kilometers from the State's centroid to custom port i.

Unless otherwise indicated, variables are taken in logs. Trade data are from the Foreign Trade Division of the US Census Bureau. Exports are disaggregated into 28 product categories, according to the 3-digit NAICS (North American Industry Classification

System) from 2002 to 2010 and the 2-digit SIC (Standard Industrial Classification) from 1995 to 2001 (see Table 8 for concordance). The main US exports to Vietnam over the period (in absolute terms) were transportation equipment and food and kindred products, while leather and forest products are important in relative terms (see Table 1). The data for our control variables, i.e. State GDP and population are taken from the US Bureau of Economic Analysis. Summary statistics are provided in Table 2.

4 Results

The baseline results are given in Table 3. Column (1) confirms the validity of our instrument; i.e. the distribution of Vietnamese refugees in 1975 is strongly correlated with the corresponding distribution in 1995 (this is also confirmed by the p-value of the Kleibergen-Paap test and the Cragg-Donald F statistic). Columns (2) and (3) of Table 3, confirm the causal effect of Vietnamese immigrants on US exports to Vietnam, whether measured as a share of total exports or as share of GDP. Our results suggest that a Vietnamese network twice as large, raises the ratio of exports to Vietnam over GDP by 19.8% (the average share of GDP is 0.0008%) and the share of total exports going to Vietnam by 14.5% (the average share of exports is 0.15%). The latter result is also illustrated in Figure 7. Column (4) reports results pertaining to the extensive margin, defined here as the share of industries (3-digit NAICS) exporting to Vietnam (among industries in which the State exports). We find that a comparable rise in the Vietnamese network increases the extensive margin by 27%, which is not inconsiderable when the breadth of our product categories is taken into consideration (the average share of exported industries is 43%).

To confirm the validity of our results, we perform a number of robustness exercises. Column (5) in Table 3 suggests that the Vietnamese immigrants increase US exports

to Vietnam as a share of exports to all Asian countries. This confirms that our results are driven by a Vietnam bias in exports as opposed to by a broader Asian bias. Table 4 further details robustness checks using alternative migrant-network variables: Vietnamese migrants as a share of total migrants, migrants from Asia or State populations. The results confirm that Vietnamese networks, however defined, are associated with a greater share of exports to Vietnam. So too are the results robust to specifications where we exclude potential outliers, i.e. California, Texas, Pennsylvania or Washington.[13] When we instead estimate a reduced-from OLS specification, with our measure of the 1975 Vietnamese State refugee stocks entering directly on the right-hand side, the results confirm that those States that hosted most refugees in 1975 are also those with the highest share of exports to Vietnam in the later period (Column (1) of Table 4). A 10% larger refugee shock is associated with a 1.9% rise in the share of total exports to Vietnam.

To further corroborate our results, we run placebo regressions to ensure that our results capturing network effects are specific to Vietnamese exports. We re-estimate our baseline model substituting exports to Vietnam with exports to ten other countries in South-East and East Asia, in ten separate specifications. Results in Table 5 show that for eight out of ten countries we find no significant relationship with Vietnamese migrants. We do find positive relationships with exports to Cambodia and China however. The latter case may be explained by the fact that many of the Vietnamese in the US are ethnic-Chinese and maintain links with China. The link with exports to Cambodia may be explained by the fact that Vietnam occupied Cambodia from 1978 to 1989 and hundreds of thousands of ethnic Vietnamese constitute the largest ethnic minority in Cambodia.

To check whether our results also provide evidence of the network/search view of trade

[13]These results are not included for the sake of brevity but are available on request from the authors.

(Rauch, 1996, 2001), we follow Rauch and Trindade (2002) and run our baseline regression dividing exports into differentiated goods, reference-price goods and homogenous goods (see Table 8 for the matching of NAICS code to Rauch categories). According to the network/search view, prices of differentiated goods fail to transmit full information in terms of their quality and characteristics to international buyers and sellers. Ethnic networks are therefore perfectly placed to be able to exploit international informational asymmetries and foster trade, particularly for differentiated products. In line with the theory and existing literature, we only find a robust pro-trade effect for differentiated products (Table 6).

To further quantify the pro-trade effect of the Vietnamese migrants we simulate the counterfactual export paths of the top ten US States (in terms of Vietnamese refugees), should those States have hosted at least 50% fewer Vietnamese in 1995. We construct a synthetic version of each State's share of exports to Vietnam, which is a weighted average of the variable for other States that were home to at least 50% fewer Vietnamese (the synthetic controls end up having 95% fewer Vietnamese on average). The weights are generated so that the differences in export shares by industry and income per capita across States, from 1995 to 2010, are minimized. Each State is thus compared to a synthetic version of itself, similar in terms of income per capita and export structure, but with far fewer Vietnamese (see Abadie et al. (2010) for a detailed review of the technique). Figure 9 displays the cases of California, Texas, Massachusetts, Washington, Pennsylvania, Virginia, New York, and Illinois, eight among the top ten State hosts of Vietnamese migrants in 1995. The export performances of six of these States are much higher as when compared to their synthetic image, especially post 2005. On average, the synthetics suggest, had Vietnamese migrant stocks been around 95% lower, that the export share going to Vietnam would have been about 50% smaller. Using our IV specification (Column (2) of Table 3), we estimate the share of exports to Vietnam in

each year from 1995 to 2010 resulting from a drop in 1995 Vietnamese equivalent to the synthetic controls'. These estimates are also plotted in Figure 9 to facilitate comparisons of the different magnitudes of the measured effects. On average, the synthetics suggest effects of lower magnitudes than our IV estimate.

A recurrent pattern in the States' export share to Vietnam is that the boom and the network effect appear mostly after 2005. A seemingly plausible explanation is Vietnam's accession to the WTO on 11 January 2007. The WTO rules should not amplify the role of networks however. On the contrary, they should simplify rules with the aim of minimizing discrimination and informal practices.[14] An alternative mechanism must therefore be responsible. One possibility is the 2008 Vietnamese Government Action Plan, which introduced new policies to leverage overseas Vietnamese contributions to national development, so as to encourage overseas Vietnamese to invest and do business in Vietnam. The plan, once enacted, provided reduced land rents, cheap loans, lower interest rates, investment credit guarantees, corporate and personal income tax breaks and lowered tariffs on machinery imports.[15] To analyze to what extent these policies increased the pro-trade effect of migrant networks, we run panel regressions that include a policy dummy equal to one after 2008 that is interacted with our measure of migrant networks. We can therefore examine whether the trade creation effects of the 2008 policy change are higher in those States that host greater numbers of Vietnamese migrants. Specifically, we run the following regression:

$$X_{it} = \alpha_i + \beta_1 POLICY_t + \beta_2 POLICY_t \times V_i + \epsilon_{it} \tag{4}$$

where α_i are State fixed effects, $POLICY_t$ is a dummy variable that switches from

[14]The same logic applies to the 2001 US-Vietnam Free Trade Agreement, which in any case didn't result in a significant increase of US exports to Vietnam.

[15]Pham (2011) reviews recent government policy toward the Vietnamese Diaspora and the latter's contribution to Vietnams economic growth.

zero to one in years after 2008. We focus upon the four-year period around the policy change. We instrument $POLICY_t \times V_i$ with $POLICY_t \times$ 1975 refugees. An advantage of this approach is that it allows us to include State fixed effects, while examining export growth as opposed to export levels. We find a positive β_2, which suggests that the trade-creation effect of the policy change are significantly higher in States with larger Vietnamese networks in 1995. The corresponding result is presented in Figure 8. In the States with the largest migrant networks, exports increased by around 200% from 2006 to 2010. In the States with few Vietnamese, the growth of exports was around 50%.

5 Conclusion

Using the exodus of the Vietnamese Boat People as a natural experiment, we establish a clear causal impact from migrant networks to trade. We exploit the exogenous allocation of 1975 refugees across US States as an instrument for immigrant stocks in 1995 and examine the effect of the latter on exports in the 15 years following the lifting of the trade embargo in 1994. We find a strong pro-trade effect across many alternative specifications, measuring migrant networks in levels or else as shares of State populations or State migrant stocks. In our benchmark regression a 10% increase in the Vietnamese network is associated with a rise in the share of exports to Vietnam of 1.4%.

Our paper is the first to provide evidence from a natural experiment of the causal relationship between migrant networks and international trade, thereby addressing an issue that has lingered for over two decades of empirical research. Taking a broader perspective, our results provide evidence of the positive long-term economic benefits of immigration, namely export creation, thus emphasizing a strong channel through which networks may foster development.

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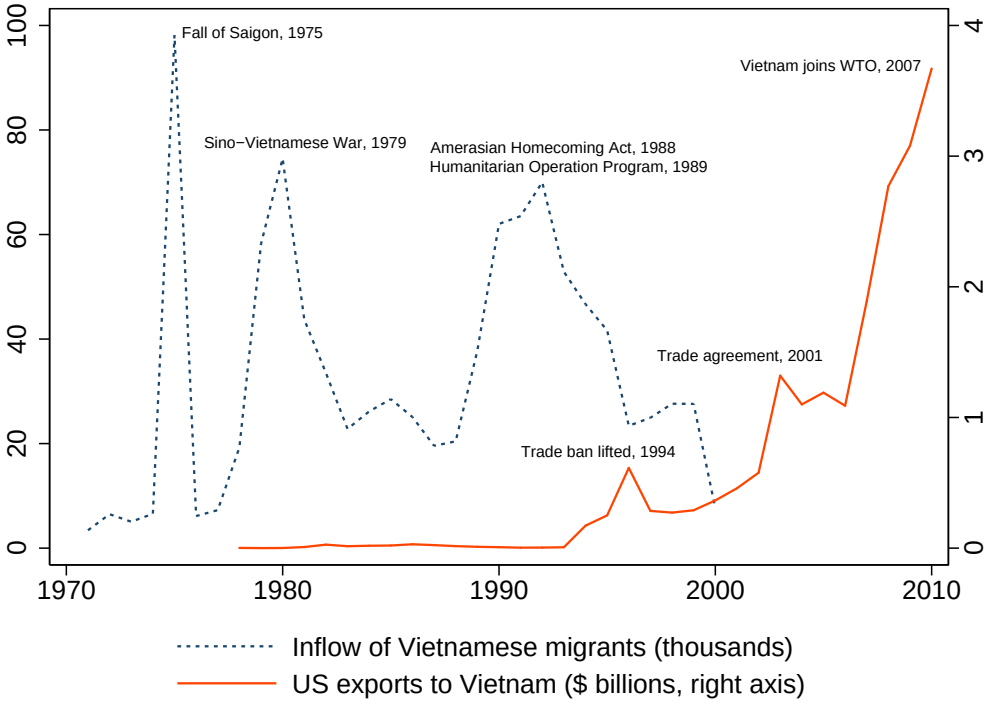
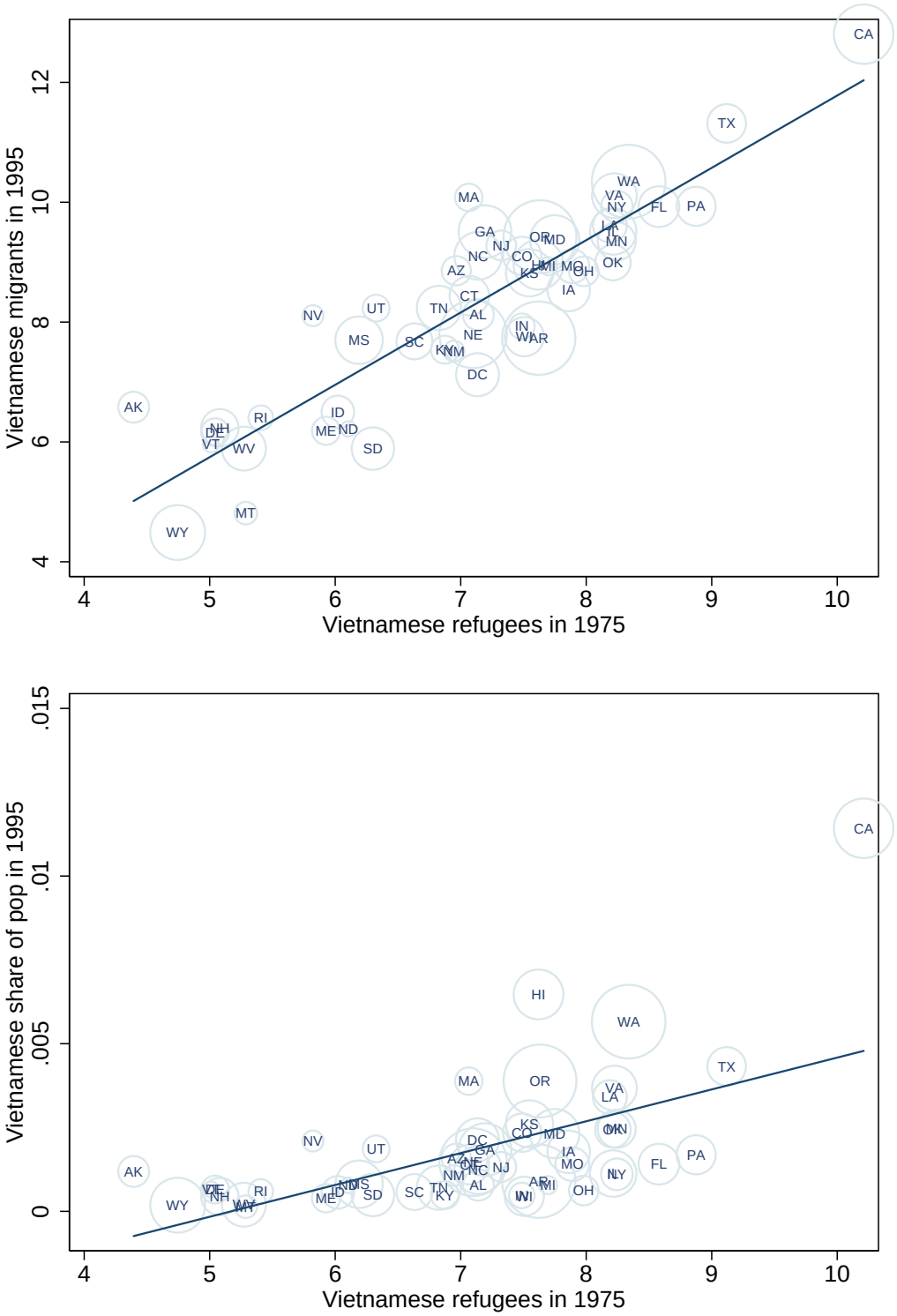
Figure 1: Vietnamese inflows to the US and US Exports to Vietnam



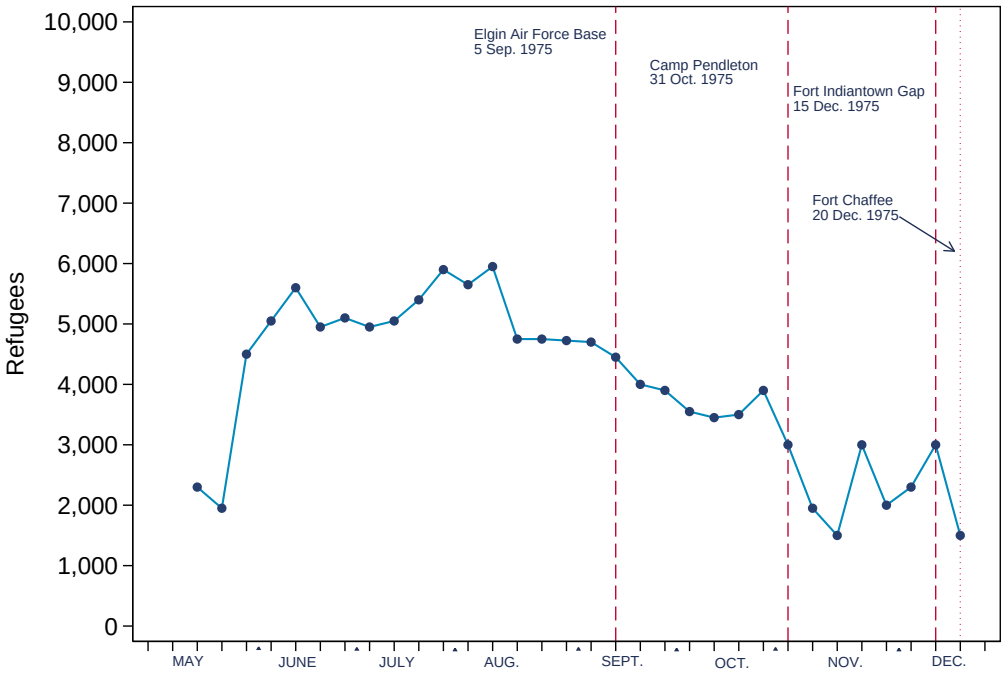
Sources: US Census 2000 and USITC.

Figure 2: 1995 Vietnamese Migrant Stock vs. 1975 Refugees



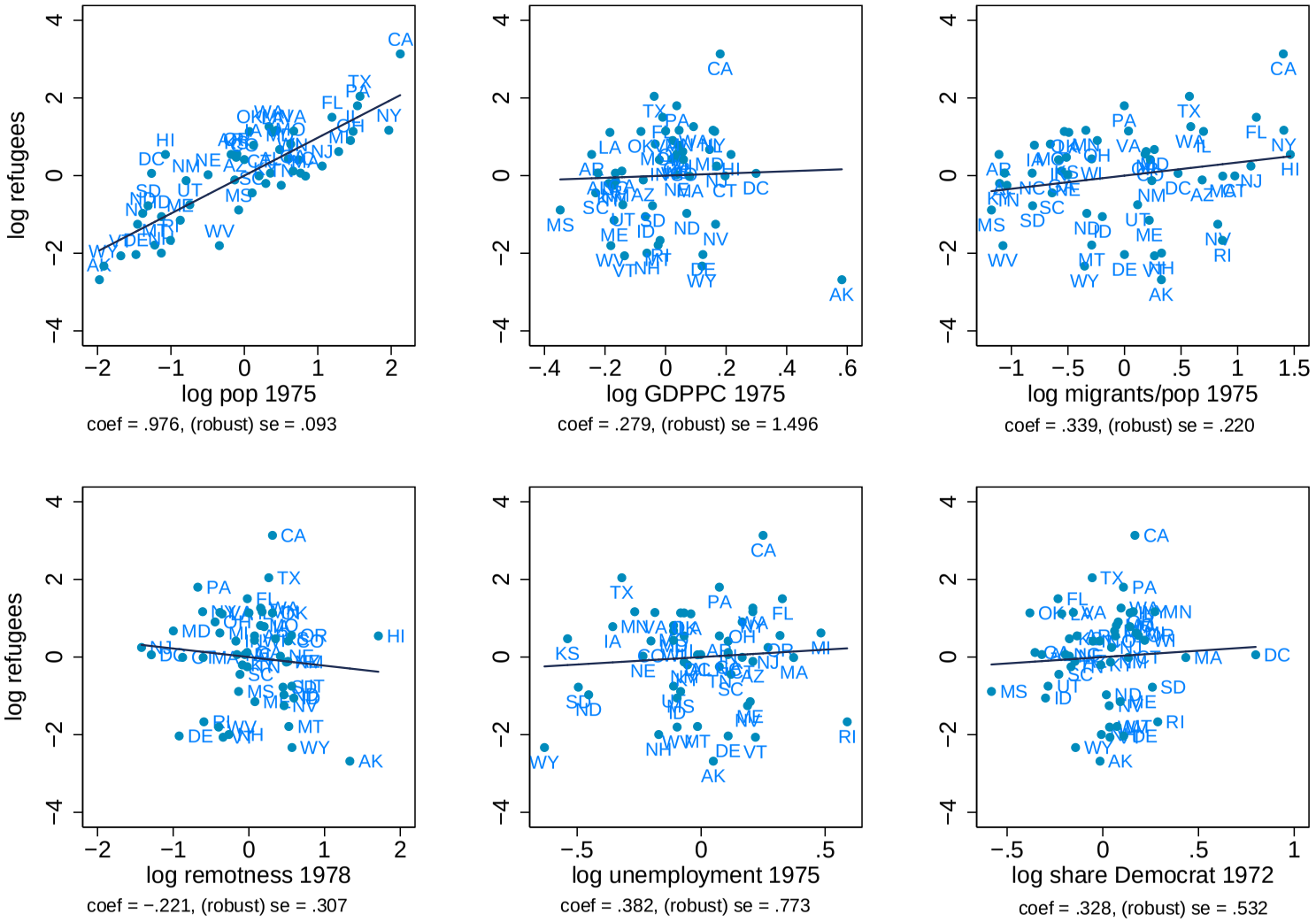
Note: The circles are proportional to the State's average exports to Vietnam as a share of total exports during 1995-2010. Sources: See Section 4

Figure 3: Weekly releases of refugees from camps



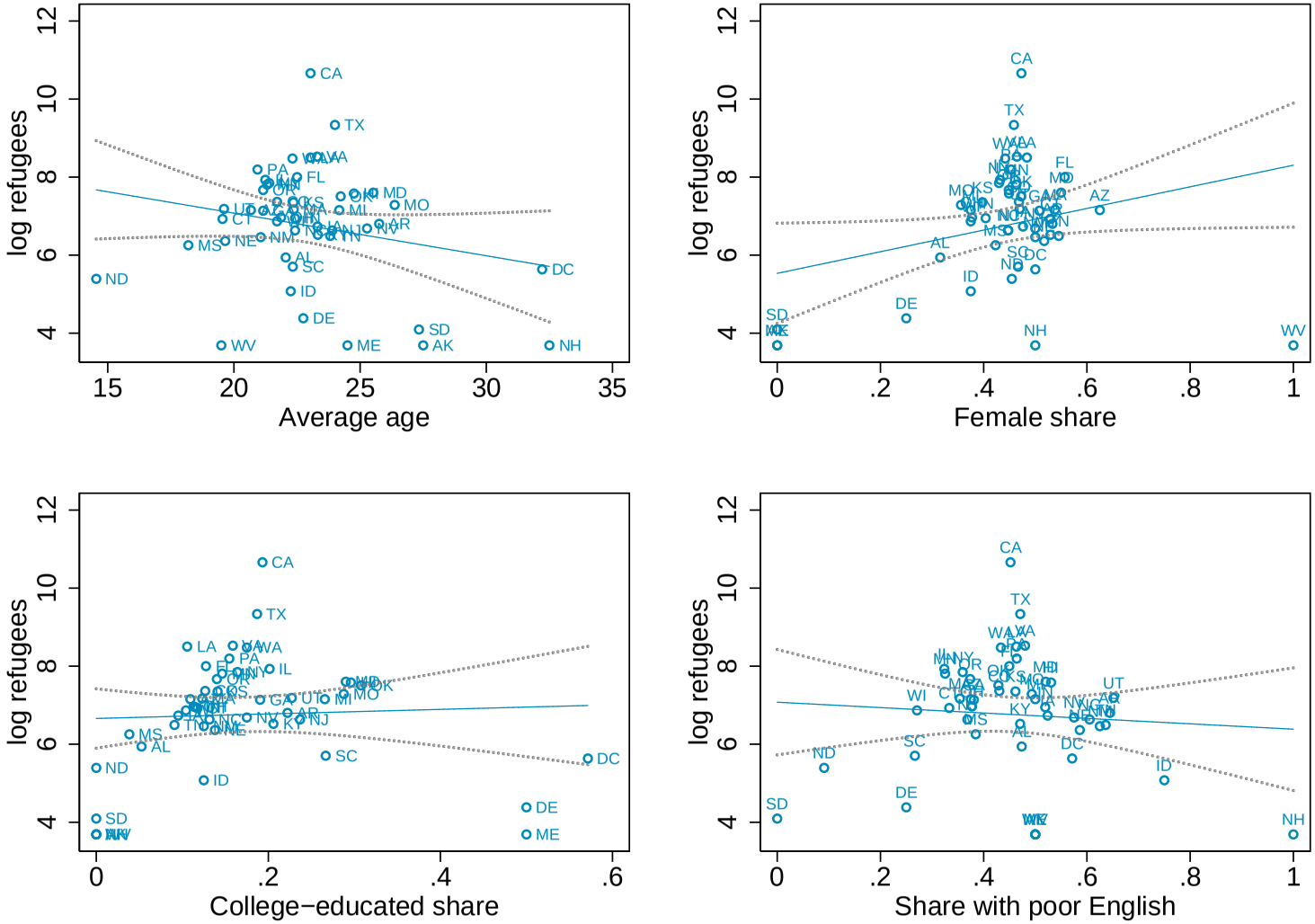
Note: Camp closure dates are in parenthesis. Source: GAO (1976).

Figure 4: Economic conditions did not account for the Refugee dispersal



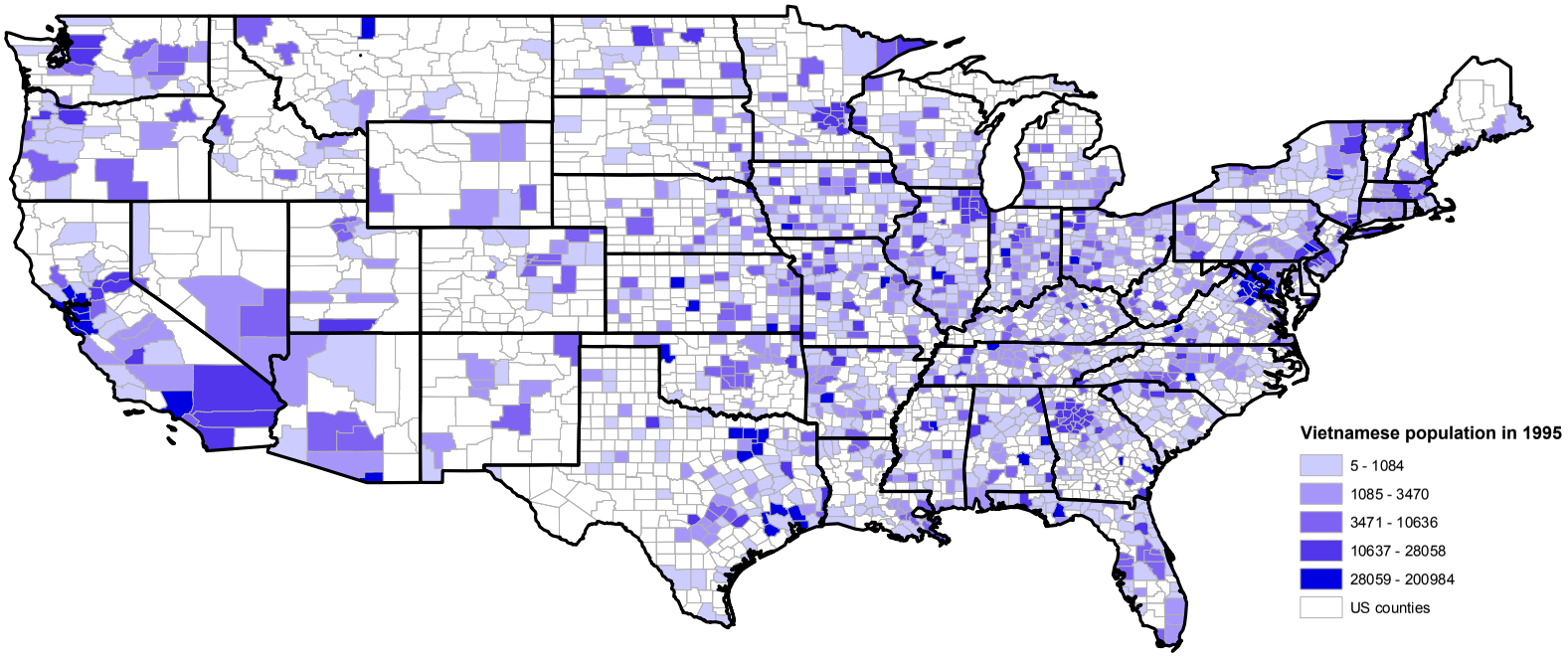
Sources: US Bureau of Economic Analysis, Wikipedia, and GAO (1977).

Figure 5: Refugee characteristics across treatment intensity



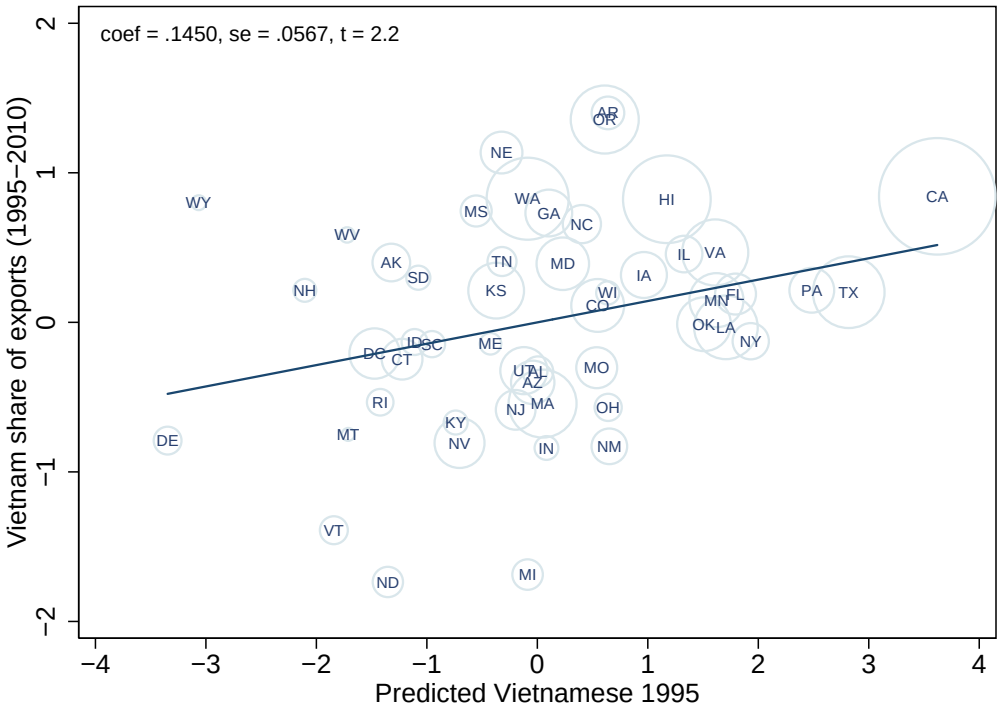
Note: Source: US 1980 Census.

Figure 6: Vietnamese migrants in the US, 1995



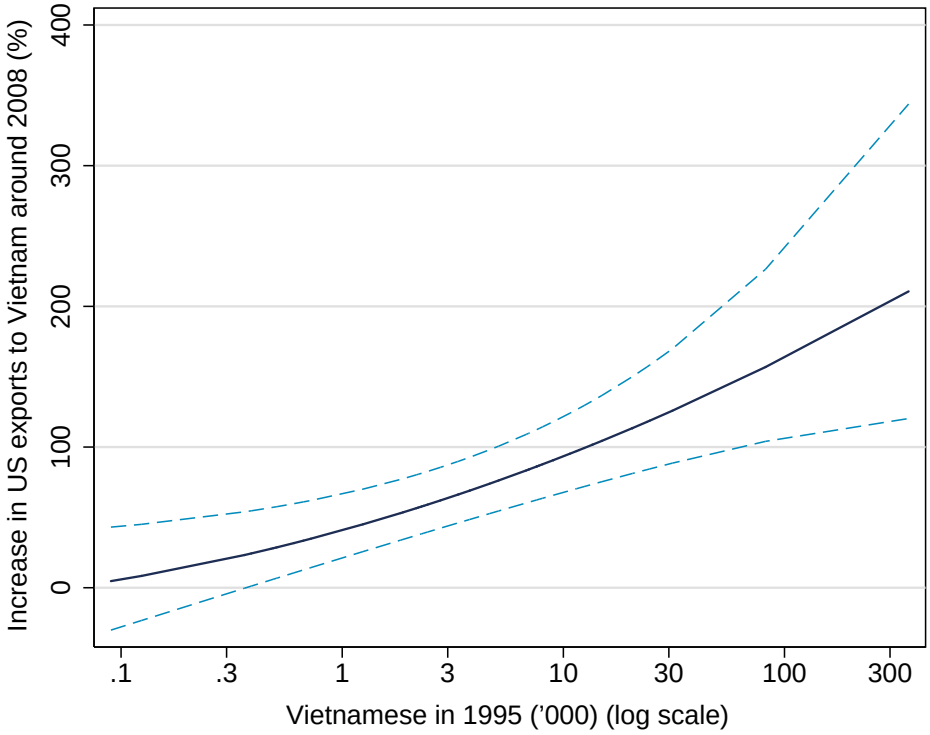
Top-10 metropolitan areas (number of Vietnamese): Los Angeles-Long Beach, CA (200,984); San Jose, CA (79,961); Houston-Brazoria, TX (46,839); San Francisco-Oakland-Vallejo, CA (46,489); Washington, DC/MD/VA (33,845); Dallas-Fort Worth, TX (30,279); San Diego, CA (28,058); Seattle-Everett, WA (24,796); New York-Northeastern NJ (21,579); Boston, MA-NH (20,155).

Figure 7: The Pro-Export effect of the Vietnamese



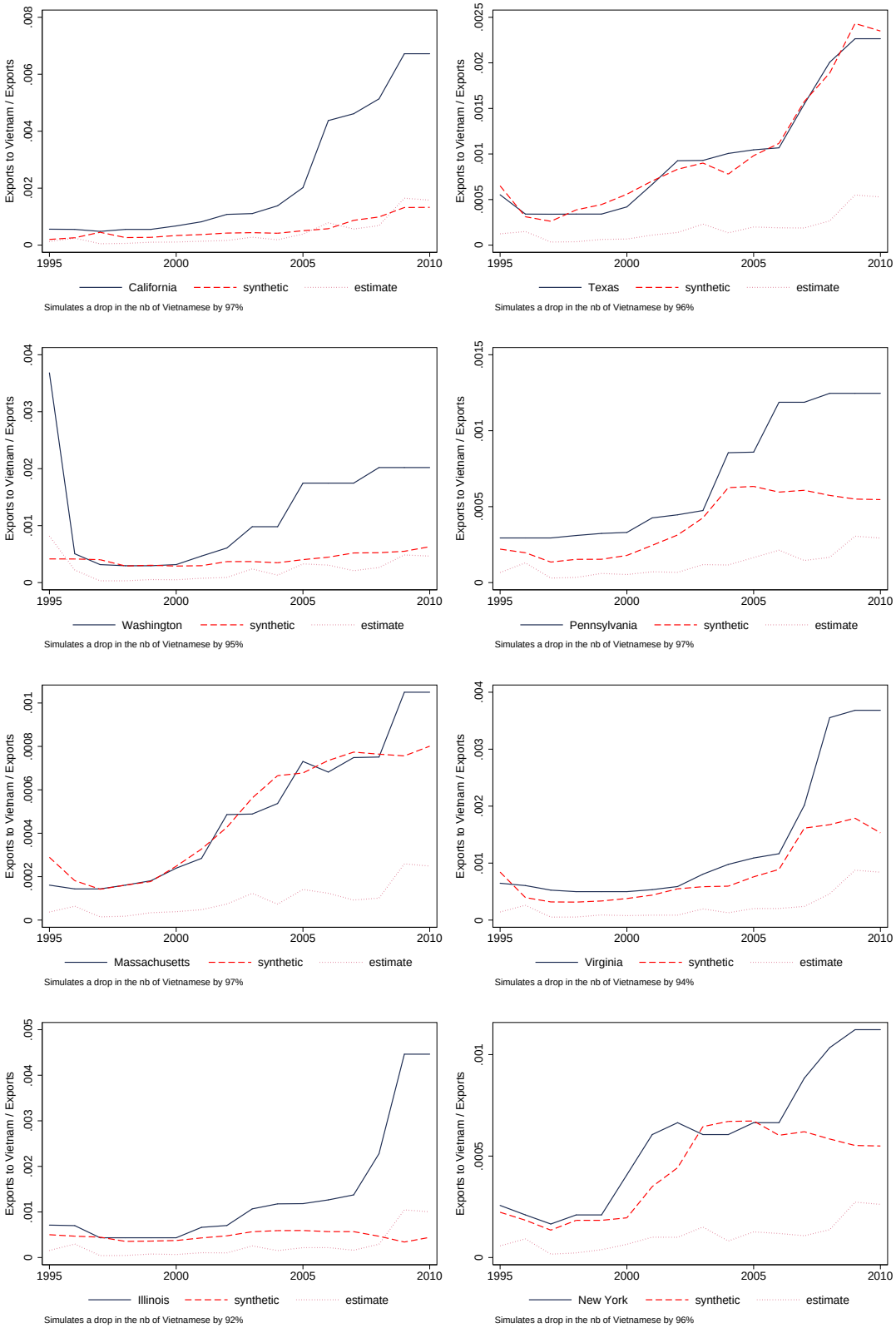
Note: This Figure is based on regression results of Table 3. The circles are proportional to the State's Vietnamese population share in 1995. Sources: See Section 4

Figure 8: US export growth across States



Note: This figure is based on estimates of regression 4.

Figure 9: Case studies



Note: The solid lines plot the data. The dashed lines the synthetic counterfactuals, and the dotted lines the IV estimates, as expalined in Section 4.

Table 1: Export Products - 1995-2010

NAICS	Exports to Vietnam ('000$)	Share of US exports	Description
316	380000	1.34%	Leather & Allied Products
113	210000	1.28%	Forestry Products, Nesoi
321	470000	1.05%	Wood Products
311	2600000	0.76%	Food & Kindred Products
312	220000	0.57%	Beverages & Tobacco Products
910	790000	0.52%	Waste And Scrap
111	1600000	0.40%	Agricultural Products
114	92000	0.26%	Fish, Fresh/chilled/frozen & Other
336	3200000	0.20%	Transportation Equipment
322	350000	0.20%	Paper
325	1900000	0.17%	Chemicals
333	1700000	0.16%	Machinery, Except Electrical
327	110000	0.14%	Nonmetallic Mineral Products
313	97000	0.12%	Textiles & Fabrics
112	13000	0.11%	Livestock & Livestock Products
331	370000	0.11%	Primary Metal Mfg
334	1700000	0.10%	Computer & Electronic Products
990	120000	0.10%	Special Classification Provisions
335	260000	0.09%	Electrical Equipment, Appliances
315	38000	0.08%	Apparel & Accessories
314	18000	0.08%	Textile Mill Products
326	150000	0.08%	Plastics & Rubber Products
332	190000	0.07%	Fabricated Metal Products, Nesoi
339	270000	0.07%	Miscellaneous Manufactured Commodities
920	36000	0.06%	Used Or Second-hand Merchandise
337	16000	0.05%	Furniture & Fixtures
511	3300	0.05%	Newspapers, Books & Other Published
323	26000	0.05%	Printed Matter And Related Products
212	39000	0.04%	Minerals & Ores
324	36000	0.01%	Petroleum & Coal Products
211	722	0.00%	Oil & Gas

Table 2: Summary Statistics

	Obs	Mean	Std. Dev.	Min	Max
GDP (Million $)	51	246748	297667	22518	1672301
Income per capita	51	35383	5877	27108	58523
Pop	51	5532596	6183150	494300	34000000
Export structure	51	0	1	-3.19	2.02
Remoteness	51	-13.64	0.39	-14.62	-12.45
Exports to Vietnam ('000$)	51	33400	70700	306	444000
Share of total exports	51	0.15%	0.12%	0.02%	0.57%
Share of GDP	51	0.0008%	0.0009%	0.0001%	0.0051%
Nb of NAICS exported to Vietnam	51	12.58	6.35	2.00	27.31
Share of NAICS exported	51	0.43	0.21	0.10	0.92
Total migrants	51	679535	1494611	16058	9261300
Vietnamese migrants	51	15782	50747	85	358205
Vietnamese refugees 1975	51	2369	3987	81	27199

Table 3: Results - IV

	(1)	(2)	(3)	(4)	(5)
	First Stage	Exports to Vietnam share of			
	Vietnamese 1995	Exports	GDP	Extensive margin	Exports to Asia
Vietnamese 1995		0.145**	0.198***	0.271***	0.134**
		-0.0567	(0.0605)	(0.0256)	(0.0573)
Income per capita	1.214	0.667	-0.901	-0.560*	0.0192
	(0.747)	(0.720)	(0.856)	(0.328)	(0.802)
Remoteness	-6.03e-05	0.408**	0.163	-0.412***	0.140
	(0.202)	(0.196)	(0.338)	(0.0868)	(0.183)
Export structure	-0.353***	0.214**	0.232*	0.0214	0.365***
	(0.108)	(0.100)	(0.135)	(0.0296)	(0.0910)
Refugees 1975	1.296***				
	(0.0781)				
Constant	-13.49	-6.831	14.94**	-5.800	-4.291
	(8.885)	(5.989)	(7.010)	(4.099)	(7.188)
Observations	51	51	51	51	51
R-squared	0.852	0.219	0.282	0.795	0.332
Cragg-Donald F	275.2				
Kleibergen-Paap p-val	0.000182				

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Results - Robustness

	(1)	(2)	(3)	(4)
	Exports to Vietnam share of exports			
Refugees 1975	0.188**			
	(0.0754)			
Vietnamese share of pop		180.6**		
		(78.72)		
Vietnamese share of migrants			22.77**	
			(10.84)	
Vietnamese share of Asians				0.720*
				(0.371)
Income per capita	0.843	0.0418	1.565**	1.785*
	(0.727)	(0.786)	(0.735)	(0.921)
Remoteness	0.408*	0.126	0.250	0.392
	(0.204)	(0.248)	(0.232)	(0.247)
Export structure	0.163	0.203**	0.114	0.141
	(0.111)	(0.0981)	(0.113)	(0.115)
Constant	-8.787	-5.233	-18.81***	-15.84**
	(5.775)	(5.464)	(7.128)	(7.577)
Observations	51	51	51	51
R-squared	0.220	0.219	0.141	0.074
		(5)	(6)	(7)
		First stages		
		Vietnamese share of		
		pop	migrants	Asians
Refugees 1975		0.00104***	0.00825***	0.261***
		(0.000333)	(0.00229)	(0.0630)
Income per capita		0.00444***	-0.0317	-1.308**
		(0.00124)	(0.0195)	(0.607)
Remoteness		0.00156***	0.00692	0.0228
		(0.000462)	(0.00503)	(0.243)
Export structure		-0.000219	0.00214	0.0311
		(0.000252)	(0.00256)	(0.0902)
Constant		-0.0197*	0.440***	9.786
		(0.0108)	(0.148)	(6.232)
Observations		51	51	51
R-squared		0.535	0.303	0.325
Cragg-Donald F		9.745	13.01	17.14
Kleibergen-Paap p-val		0.0326	0.00313	0.00459

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Results - Placebos

	(1)	(2)	(3)	(4)	(5)
	Cambodia	China	Indonesia	Japan	Korea
Vietnamese 1995	0.499***	0.104**	0.158	0.0286	0.0406
	(0.186)	(0.0483)	(0.126)	(0.0579)	(0.0734)
Income per capita	1.411	-1.803**	-1.309	0.782	0.888
	(1.353)	(0.824)	(0.876)	(0.548)	(0.758)
Remoteness	0.258	-0.0541	0.0956	0.230	-0.0280
	(0.458)	(0.300)	(0.270)	(0.334)	(0.382)
Export structure	0.0549	-0.265***	0.148	-0.122	-0.284*
	(0.190)	(0.100)	(0.0962)	(0.110)	(0.150)
Constant	-25.86*	13.71	7.642	-8.107*	-14.02*
	(14.45)	(9.820)	(9.302)	(4.615)	(7.250)
Observations	49	51	51	51	51
Cragg-Donald F	280.7	271.7	271.7	271.7	271.7
Kleibergen-Paap p-val	0.000128	7.54e-05	7.54e-05	7.54e-05	7.54e-05
	(6)	(7)	(8)	(9)	(10)
	Laos	Malaysia	Philippines	Taiwan	Thailand
Vietnamese 1995	0.106	0.125	0.143	-0.0365	0.0234
	(0.109)	(0.0882)	(0.0915)	(0.0607)	(0.0828)
Income per capita	4.009***	-1.197	-0.483	0.215	0.825
	(1.266)	(1.240)	(1.086)	(0.523)	(0.715)
Remoteness	0.0823	-0.375	-0.220	-0.723***	-0.193
	(0.339)	(0.457)	(0.410)	(0.263)	(0.254)
Export structure	-0.418**	-0.339*	-0.248*	-0.200**	-0.151*
	(0.198)	(0.198)	(0.141)	(0.0986)	(0.0797)
Constant	-53.50***	1.284	-4.527	-15.96***	-16.42**
	(12.72)	(11.19)	(9.930)	(5.404)	(7.937)
Observations	47	51	51	51	51
Cragg-Donald F	226.5	271.7	271.7	271.7	271.7
Kleibergen-Paap p-val	0.000316	7.54e-05	7.54e-05	7.54e-05	7.54e-05

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: The Pro-Trade Effect across Product Categories

	Vietnamese 1995	Vietnamese share of exports					
		Differentiated goods		Reference-priced goods		Organized-exchange goods	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Vietnamese 1995		0.200***	0.362***	0.298**	0.154	0.0866	0.324
		(0.0531)	(0.0782)	(0.121)	(0.132)	(0.136)	(0.221)
Income per capita	0.856	-0.00348	-1.311*	1.982	-3.049**	-3.441***	-4.943**
	(0.858)	(0.616)	(0.769)	(1.481)	(1.499)	(1.224)	(2.413)
Remoteness	91.45*	42.51	95.97*	31.84	68.68	41.42	-21.39
	(48.30)	(45.01)	(57.80)	(115.1)	(96.79)	(100.1)	(143.0)
Export structure	-0.375***	0.248**	0.461***	-0.248	-0.220	-0.381**	-0.140
	(0.104)	(0.111)	(0.122)	(0.198)	(0.208)	(0.163)	(0.290)
Refugees 1975	1.277***						
	(0.0775)						
Constant	-2.938	-5.667	20.89**	-27.46	36.90**	30.70*	46.82
	(9.555)	(7.787)	(9.730)	(18.64)	(17.45)	(16.03)	(30.39)
Observations	51	51	51	51	51	46	46
R-squared	0.864	0.281	0.526	0.173	0.141	0.180	0.116
Cragg-Donald F		271.7	271.7	271.7	271.7	183.1	183.1
Kleibergen-Paap p-val		8.15e-05	8.15e-05	8.15e-05	8.15e-05	0.000538	0.000538

Note: IV-2SLS estimates. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: The Vietnamese in the Unites States - 1995

State	Vietnamese	% of pop	% of migrants	1975 refugees
California	364192	1.15	4.40	30495
Hawaii	7767	0.65	3.48	2411
Washington	31103	0.57	5.72	5205
Texas	82142	0.43	3.26	11136
Oregon	12411	0.39	5.18	2448
Massachusetts	23890	0.39	3.18	1439
Virginia	24566	0.37	4.79	5620
Louisiana	14947	0.34	11.70	3916
Kansas	6794	0.26	5.90	1953
Minnesota	11483	0.25	5.71	4250
Oklahoma	8055	0.24	6.74	3716
Colorado	8995	0.24	3.07	2350
Maryland	11773	0.23	2.57	2828
District of Columbia	1240	0.21	1.80	613
Nevada	3321	0.21	1.50	519
Utah	3763	0.19	3.11	964
Georgia	13501	0.18	7.01	1622
Iowa	5094	0.18	7.11	3352
Pennsylvania	20583	0.17	3.78	8187
Arizona	7027	0.16	1.33	1444
Nebraska	2433	0.15	4.32	1418
Florida	20492	0.14	0.84	5237
Missouri	7575	0.14	5.53	3154
Connecticut	4634	0.14	1.16	1304
New Jersey	10717	0.13	0.76	1918
North Carolina	9022	0.12	2.91	1334
Alaska	721	0.12	1.70	94
Illinois	13543	0.11	0.97	4675
New York	20490	0.11	0.51	4749
New Mexico	1837	0.11	1.27	1047
Arkansas	2280	0.09	3.72	2127
Mississippi	2205	0.08	5.33	493
Alabama	3368	0.08	3.60	1439
Michigan	7578	0.08	1.70	2949
North Dakota	502	0.08	3.19	408
Tennessee	3777	0.07	2.91	1250
Vermont	387	0.07	1.73	106
Delaware	475	0.07	1.07	173
Ohio	6961	0.06	2.07	3496
Rhode Island	604	0.06	0.51	545
South Carolina	2162	0.06	2.06	926
Idaho	666	0.06	1.10	421
South Dakota	361	0.05	2.59	604
Kentucky	1881	0.05	2.70	1174
Indiana	2780	0.05	1.77	2175
Wisconsin	2338	0.05	1.34	2461
New Hampshire	511	0.04	0.98	171
Maine	486	0.04	1.15	376
West Virginia	361	0.02	1.46	268
Wyoming	89	0.02	0.60	143
Montana	123	0.01	0.60	360

Table 8: Matching NAICS to SIC and the Rauch goods classification

NAICS	NAICS description	SIC	Rauch
111	Agricultural Products	1	w
112	Livestock & Livestock Products	2	w
113	Forestry Products, Nesoi	8	r
114	Fish, Fresh/chilled/frozen & Other Marine Products	9	r
211	Oil & Gas	13	w
212	Minerals & Ores	10	w
311	Food & Kindred Products	20	n
312	Beverages & Tobacco Products	21	n
313	Textiles & Fabrics		n
314	Textile Mill Products	22	r
315	Apparel & Accessories	23	n
316	Leather & Allied Products	31	n
321	Wood Products	24	r
322	Paper	26	r
323	Printed Matter & Related Products, Nesoi	27	n
324	Petroleum & Coal Products	29, 12	w
325	Chemicals	28	r
326	Plastics & Rubber Products	30	n
327	Nonmetallic Mineral Products	14, 32	r
331	Primary Metal Mfg	33	r
332	Fabricated Metal Products, Nesoi	34	n
333	Machinery, Except Electrical	35	n
334	Computer & Electronic Products	38	n
335	Electrical Equipment, Appliances & Components	36	n
336	Transportation Equipment	37	n
337	Furniture & Fixtures	25	n
339	Miscellaneous Manufactured Commodities	39, 3X	n
511	Newspapers, Books & Other Published Matter, Nesoi		n
512	Published Printed Music & Music Manuscripts		n
910	Waste & Scrap	91	n
920	Used Or Second-h& Merchandise	92	n
980	Goods Returned (exports For Canada Only)		n
990	Special Classification Provisions, Nesoi	99	n

Note: The Rauch column tags the categories as w=goods traded on an organized exchange (homogeneous goods), r=reference priced, n=differentiated products. See Rauch (1999)

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