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The Vietnamese Boat People as a Natural Experiment**

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ABSTRACT

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

We provide evidence for the causal pro-trade effect of migrants and in doing so establish an important link between migrant networks and long-run economic development. To this end, we exploit a unique event in human history, i.e. the exodus of the Vietnamese Boat People to the US. This episode represents an ideal natural experiment as the large immigration shock, the first wave of which comprised refugees exogenously allocated across the US, occurred over a twenty-year period during which time the US imposed a complete trade embargo on Vietnam. Following the lifting of trade restrictions in 1994, US exports to Vietnam grew most in US States with larger Vietnamese populations, themselves the result of larger refugee inflows 20 years earlier.

JEL Classification: F14, F22

Keywords: migrant networks, US exports, natural experiment

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1 Introduction

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, 2014](#); [Allen, 2014](#); [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 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., 2015](#)). Studies almost ubiquitously uncover a positive correlation between migration and trade ([Genc et al., 2012](#)), to the extent that these results are often interpreted as evidence of a positive diaspora externality. Doubts persist however as to whether trading partners' cultural affinity or else bilateral economic policies might be driving the observed positive correlations ([Lucas, 2005](#); [Hanson, 2010](#)). These doubts are valid since the estimated

impacts of immigration on trade are quantitatively large and therefore represent an important channel through which migration might lead to gains from trade.

We use the exodus of the Vietnamese Boat People to the US as a natural experiment to establish a causal effect from Vietnamese immigration to US trade with Vietnam. The exodus started in April 1975 following the Fall of Saigon 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 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 an exogenous dispersion of Vietnamese refugees to the US 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 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 the introduction of US policies designed to welcome additional waves of Vietnamese refugees. These 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 most importantly 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 US exports going to Vietnam over the period 1995-2010, i.e. following the lifting of the trade embargo in 1994, grew most in those US States with larger Vietnamese populations, themselves the result of larger refugee inflows two decades earlier. Our 1995-cross-section results suggest that a 10% increase in the Vietnamese network raises exports to Vietnam by between 4.5% and 14%. Our results are robust when we additionally consider: the extensive margin, expressing exports in shares as opposed to levels, outliers and different types of goods traded. Furthermore we undertake a number of placebo exercises that further validate our results. In panel regressions, in which we include State fixed effects, we document how the overseas Vietnamese, known as the *Viet Kieu*, took advantage of a bilateral trade agreement signed between the US and Vietnam in 2001, in addition to Vietnam's preferential policies aimed at leveraging their contributions to national development, an example of a successful Diaspora-engagement program. 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 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 in the absence of the Boat People.

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 migration may foster development. 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.

Gould (1994) originally hypothesised two channels through which migrants may foster trade flows. He argued that immigrants may reduce the transaction costs of providing foreign market information, the so-called information channel and that immigrants' demand preferences, or nostalgia, may foster imports from their origin countries, what he termed the preference channel. By concentrating on the effect of (Vietnamese) immigration on (United States) exports, we isolate the information channel (see Felbermayr and Toubal (2012)). Nonetheless the 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).

The following Section provides an account of the events that followed the Fall of Saigon and elucidates our natural experiment. Section 3 presents our data and empirical model. Our results are then presented in Section 4 and 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 Communist

¹Despite 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.

Vietnamese North in April 1975 proved the catalyst for the first wave of refugees from Vietnam, as the 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.² The fortunate were rescued by ships’ 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 US President’s Special Interagency Task Force (IATF) for Indochina refugees was established on 18 April 1975. 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, 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 by matching them with sponsors, for example with US citizens that offered food, clothing and shelter until the refugees were financially independent.³

²According 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).

³Since 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).

The program of refugee resettlement began under emergency conditions and was carried out hurriedly. Due to its unprecedented scale and urgency, 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 dispersed throughout the US as policymakers, drawing on the lesson from the agglomeration of Cubans in Miami, were keen to avoid a similar Vietnamese refugee agglomeration.⁴ Haines (1996) writes 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”*. In the words of 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

⁴Card (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.

was also located in a State that had historically been the least attractive to migrants, Arkansas (Robinson, 1998). 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 1).

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.⁵ 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.*" Despite this hypothesized process the reality on the ground was very different, such that 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

⁵In 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.

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 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 had sponsors in specific 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 government 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.⁶ This suggests that 45% of refugees for whom we know residence, lived in a different State in 1980 than in 1975. 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. This secondary migration strongly suggests that the initial placement was exogenous to migrants' preferences.

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 state income per capita, the degree of state openness to migrants (captured by the immigrant share of State populations), remoteness from US 1978 customs ports (from where goods officially leave the US) or state unemployment. Our scatter plots also show 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 suggests that the allocation of refugees was most-likely not driven by differences in attitudes towards the US involvement in Vietnam in 1972, which could have affected sponsorship offers. Finally, the US census of 1970 records some 1,800 Vietnamese, mostly family members of American soldiers in addition to students, residing in the US at that time (of which 29 States in 1970 hosted zero

⁶The 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.

migrants). The allocation of refugees in 1975 is not correlated with the State's population share of Vietnamese in 1970 nor with the level of Vietnamese in 1970 once we control for State size (GDP), suggesting that the 1975 allocation was independent of any earlier settlement.

Last but not least, to demonstrate that the intensity of resettlement is not capturing differences in migrant characteristics, Figure 1 in the online appendix 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 the number of refugees resettled by State does not reflect any selection process that may have inadvertently occurred in the observables.

The initial distribution of Vietnamese persisted and led to the emergence of Vietnamese communities as additional waves of refugees drew on 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 population in Vietnam - and the third that coincided with the 1988 Amerasian Home Coming Act and the 1989 Humanitarian Operation Program.⁷ From 1980 onwards, hundreds of thousands were accepted that had previously lived in Southeast Asian refugee camps.

Whereas the US Government facilitated movements of Vietnamese Boat People to

⁷The 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.

the US, their stance towards 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 from its previous focus on the North of Vietnam, which had been in place since 1964, hence imposing a trade embargo on 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.⁸ 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.

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 sharpens our natural experiment as the sequence of events, from the exogenous migrant shock to the opening-up of trade, closely mimics an experimental setting and removes concerns of reverse causality. Nevertheless, it is strictly the exogenous initial allocation of Vietnamese that matters for our identification.

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

⁸Relations 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

of ethnic diversity on redistribution preferences and, in a slightly different approach, by [Damm and Dustmann \(2014\)](#) 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.⁹

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, just eleven days after the last camp closure. Migration data for the year 1995 are taken from the 2000 US Census, from 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. These anonymous micro data were obtained from the The Integrated Public Use Microdata Series ([Ruggles et al., 2010](#)).¹⁰

Figure 5 shows the concentrations of Vietnamese across US States in 1995.¹¹ The top ten metropolitan areas are listed below Figure 5. 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 Figure 5, 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

⁹Ongoing work 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.

¹⁰Our analysis can only be conducted at the State level since more disaggregated data for our instrument are unavailable.

¹¹The 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.

correlation between the two data series is 0.98, such that our instrument is strong. (See our online appendix for first-stage results confirming the validity of our instrument (Table 3)).

Our baseline cross-section regressions take the following form:

$$X_i = \beta_0 + \beta_1 V_i + \beta_2 C_i + \epsilon_i \quad (1)$$

Here V_i is the stock of Vietnamese migrants in 1995, X_i are the exports of State i to Vietnam in 1995 and C_i is a set of control variables. We include income per capita - as richer states more likely export more differentiated products to Vietnam - and total state exports and state GDP to control for state openness and state size respectively. Our baseline model also includes a variable capturing manufacturing as a percentage of state GDP to account for the economic structure of US states as well as East and West coast dummy variables that aim to capture the states various transportation costs for exporting to Vietnam. The β s are parameters to be estimated and ϵ_i is the error term (we take the logarithms of continuous variables). We instrument V_i with the stock of refugees in 1975.

In light of the seminal paper by [Silva and Tenreyro \(2005\)](#), we use an IV version of a Pseudo-Poisson Maximum Likelihood estimator (PPML), as in [Tenreyro \(2007\)](#). The use of this estimator ensures consistent estimates of elasticities in log linear models in cases where the log of the error term may not be independent of the regressors. Its use is now widespread in the estimation of gravity equations in international trade, as discussed in detail in [Head and Mayer \(2014\)](#). An additional benefit of this estimator is that unlike log linear models it can be estimated even when the dependent variable is equal to zero.¹²

¹²Although the PPML estimator is commonly used on count data, the data used do not have to conform to a Poisson distribution in order for the PPML estimator to be consistent as shown by [Gourieroux et al. \(1984\)](#).

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 online appendix Table 1 for the concordance and classification into differentiated or homogenous goods). 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 online-appendix Table 1). The data for our other control variables are taken from the US Bureau of Economic Analysis. Summary statistics are provided in online-appendix Table 2.

4 Results

Our baseline second-stage results are shown in Table 2. Both reduced-form and IV estimations confirm the causal effect of Vietnamese immigrants on US exports to Vietnam. A 10% rise in Vietnamese immigration to a specific US state is estimated to causally increase that states' exports to Vietnam by between 4.5% and 13.8%. Our estimated β s of interest are therefore significantly higher than most comparable estimates in the existing literature, which reflects our context in which Vietnamese migrants could have had a larger effect on US state exports (since no trade previously existed between the two nations) because information constraints between the two countries will likely have been very high.¹³

¹³Given that the literature has shown that migrant networks influence FDI as well as trade (Kugler and Rapoport, 2007; Aubry et al., 2014; Javorcik et al., 2011), it is worth noting that one channel through which the Vietnamese might promote exports to Vietnam is via complementary FDI flows. In a broader context therefore, one concern is that point estimates resulting from studies that examine the impact of migration on trade represent an upper-bound in the absence of investment data. The use of our instrument should alleviate this concern in the current study. Moreover, a supplementary analysis demonstrates at least for US state level FDI data for the years for between 2003 and 2010, the only years for which, to the best of the author's knowledge such data are available, no correlations exist between those FDI data and either our dependent variable nor our instrument, thereby lending further credence

To confirm the validity of our results we perform a number of robustness exercises, which are presented in Table 3. Regression results in columns (1) and (2) adopt an alternative dependent variable, either exports as a share of total (state) exports or else exports as a share of state GDP, as an alternative way of capturing state size effects. Columns (3) and (4) demonstrate that our results are robust to excluding potential outliers, either West Coast states or California specifically. The results in columns (5) and (6) rather replace our key independent variable, the stock of Vietnamese immigrants by US state with the stock of Chinese immigrants and the stock of all Asian immigrants respectively, so as to ensure that it is specifically Vietnamese migrants that are driving the observed relationship. In the case of Chinese migrants, our results indicate that greater numbers of Chinese are associated with lower US state exports to Vietnam, while our results for all Asian migrants are insignificant.¹⁴ Finally, to check whether our results also provide evidence of the network/search view of trade (Rauch, 1996, 2001), we follow Rauch and Trindade (2002) and run our baseline regression dividing exports into differentiated goods and homogenous goods, which we define as both reference-price goods and organized-market goods (see online-appendix Table 1 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. In line with theory and the existing literature, we only find a robust pro-trade effect for differentiated products (columns (7) and (8)).

to our results. This analysis is not included in the paper for the sake of brevity but is available on request from the authors.

¹⁴It might be the case that authorities allocated Vietnamese refugees to states with low Asian populations so as to avoid concentration. This would imply that information frictions with Asia were abnormally high in those states, which could lead to trade expanding disproportionately due to a mean reversion. In fact the initial allocation of Vietnamese migrants was *positively* correlated with existing Asian communities, although we find the overall number of Asians across states did not have any influence on US state exports.

As an additional robustness check, we also analyse the impact of Vietnamese migration on US state exports along a crude measure of the extensive margin, i.e. the number of industries (out of 28 (NAICS)) with positive exports to Vietnam. Our results (Table 4 in the online appendix) indicate that doubling of Vietnamese migration increases the number of industries exported to Vietnam by around 18%, which is considerable when the breadth of our product categories is taken into account. Further robustness checks including alternate specifications and OLS estimates can be found in the working paper version of this article (Parsons and Vezina, 2014).

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. Our results in Table 4, which show that Vietnamese migrants exert no effect on trade with any of the other ten countries, provide additional evidence of the causal link between Vietnamese immigration to US states and US state trade with Vietnam.

To further analyse the effect of the Vietnamese migrant network on exports in the 15 years following the lifting of the trade embargo, i.e. from 1995 to 2010, we estimate panel regressions of the following form:

$$X_{it} = \gamma_i + \alpha_t + \beta_0 V_i \times \alpha_t + \beta_1 C_{it} + \epsilon_{it} \quad (2)$$

Where V_i remains the stock of Vietnamese migrants in 1995, X_{it} are the exports of State i to Vietnam in year t from 1995 to 2010, α_t are year dummies and γ_i state fixed effects. The inclusion of state fixed effects completely rules out the possibility that some unobserved state-level variable being correlated with our instrumental variable still exists. C_{it} remains our set of control variables equivalent to those in equation 1. Results of our IV-PPML estimates are presented in the left panel of Figure 6, which shows the heterogeneity of

the impact of Vietnamese immigration on trade from 1995-2010 (see Table 5 in online appendix for the corresponding regression table). According to our estimates, the migrant effect is not statistically different across years from that in 1995 until 2005. In those years after 2005 the elasticity of trade with respect to migration is significantly larger, by 0.26 percentage points on average. These interaction coefficients can be also be interpreted as the marginal yearly growth in exports due to Vietnamese migrants. For example, the coefficient on the 2008 year dummy, 4.112, suggests that exports were 61 times higher than in 1995 in a State with one Vietnamese (where $\ln(\text{Vietnamese})=0$). In an average State with 10,000 Vietnamese, exports were 406 times higher in 2008 than in 1995. The right panel of Figure 6 illustrates the results of a similar regression where we do not include state fixed effects. This allows us to include V_i in our regression and thus to estimate the effect of the 1995 migrants over time, not just the yearly differences. It shows that the elasticity is around 0.4 from 1995 to 2005 and increases to around 0.5 from 2005 to 2010. The right panel also shows that the yearly differences in this panel specification are similar to the ones in state-fixed effect specification.

Our results indicate that States' exports to Vietnam caused by Vietnamese migration are larger after 2005. One seemingly plausible explanation for this 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. An alternative mechanism must therefore be responsible. One possibility is a delayed effect of another key trade-policy event, i.e. the signing of the US-Vietnam Bilateral Trade Agreement in 2001; while yet another 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 in and do business with Vietnam. The plan 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 2001 or 2008, which is interacted with our measure of migrant networks. We can therefore examine whether the trade creation effects of the 2001 or 2008 policy changes are higher in those States that host greater numbers of Vietnamese migrants. Specifically, we run the following regression:

$$X_{it} = \alpha_i + \beta_1 POLICY_t + \beta_2 POLICY_t \times V_i + \epsilon_{it} \quad (3)$$

where α_i are State fixed effects, $POLICY_t$ is a dummy variable that switches from zero to one in years after 2001 or 2008. We instrument $POLICY_t \times V_i$ with $POLICY_t \times 1975$ refugees. Results from these panel regressions, which can be found in Table 6 in the online appendix, demonstrate that those states that hosted greater numbers of Vietnamese immigrants in 1995 benefited relatively more from the policy changes in 2001 and 2008. In other words, the interaction of policy dummies and the Vietnamese network is positive and significant. In terms of the 2008 Vietnamese Government Action Plan, the results of which are presented in the right panel of Figure 7, state exports roughly doubled after 2008 in those States with the largest Vietnamese networks (we focus upon the four-year period around the policy change as it occurs late in our time period). In those States that hosted fewest Vietnamese, the growth of exports was still around 30%. The effects of the Bilateral Trade Agreement across States were of similar magnitude, as summarized in the middle panel of Figure 7. Finally, the left panel of Figure 7 summarizes the results when we interact a time trend, rather than a policy dummy, with the Vietnamese network. The idea is to generalise the previous results and estimate how the Vietnamese migrants affected the average yearly growth over the whole period. We find that moving from the lowest to the highest number of Vietnamese

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

increases export growth significantly, by around 8 percentage points, from 23% to 31%.

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 migrants), 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 8 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 that the export share going to Vietnam would have been about 50% smaller had Vietnamese migrant stocks been around 95% lower.

5 Conclusion

Using the exodus of the Vietnamese Boat People as a natural experiment, we establish a causal effect from migrant networks to trade. We use 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 of Vietnamese immigration on US state exports to Vietnam. Our baseline results show that a doubling of Vietnamese migration to US states

leads to between a 45% and a 138% increase in State exports in 1995, and that moving from the lowest to the highest number of Vietnamese increases export growth from 1995 to 2010 by around 8 percentage points. Our results are robust when we also consider: the extensive margin, expressing exports in shares as opposed to levels, outliers and different types of goods traded. In addition we estimate a number of placebo regressions that further validate our results. 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 migration may foster development.

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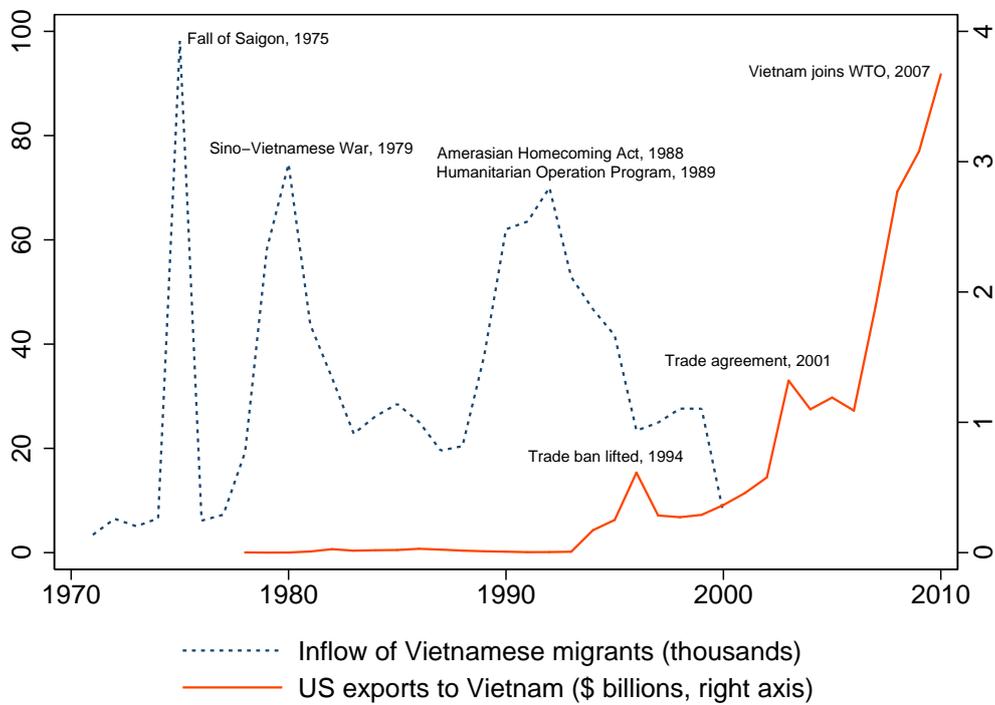
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Figure 1: Vietnamese inflows to the US and US Exports to Vietnam



Sources: US Census 2000 and USITC.

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

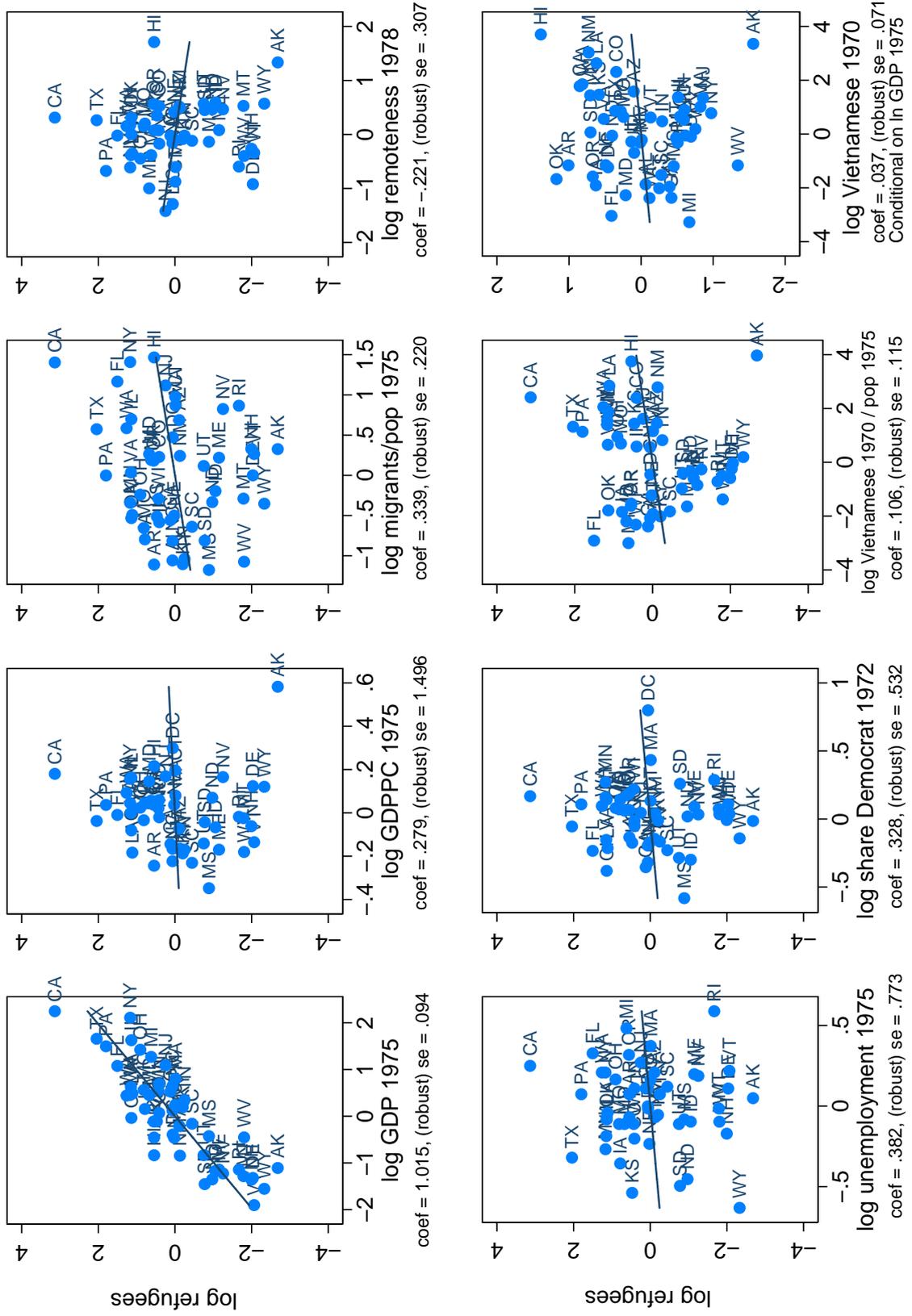
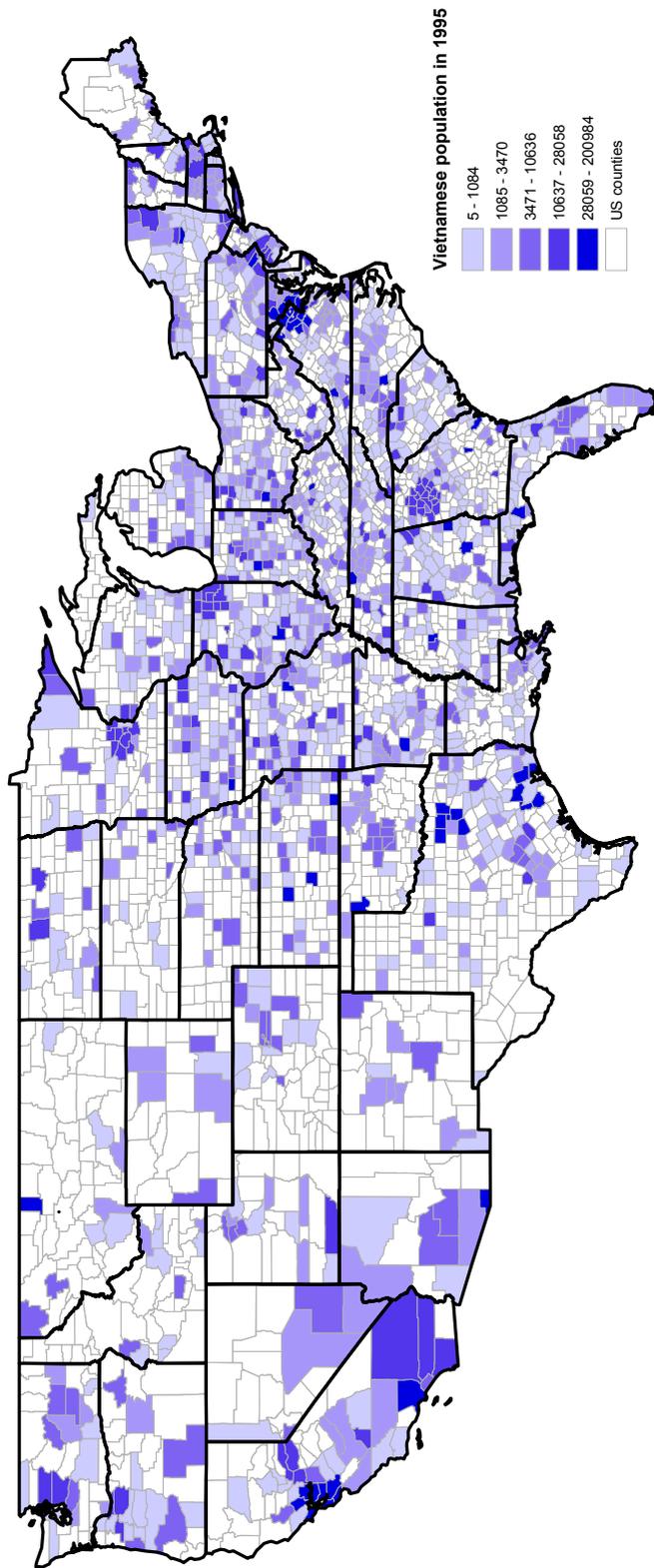
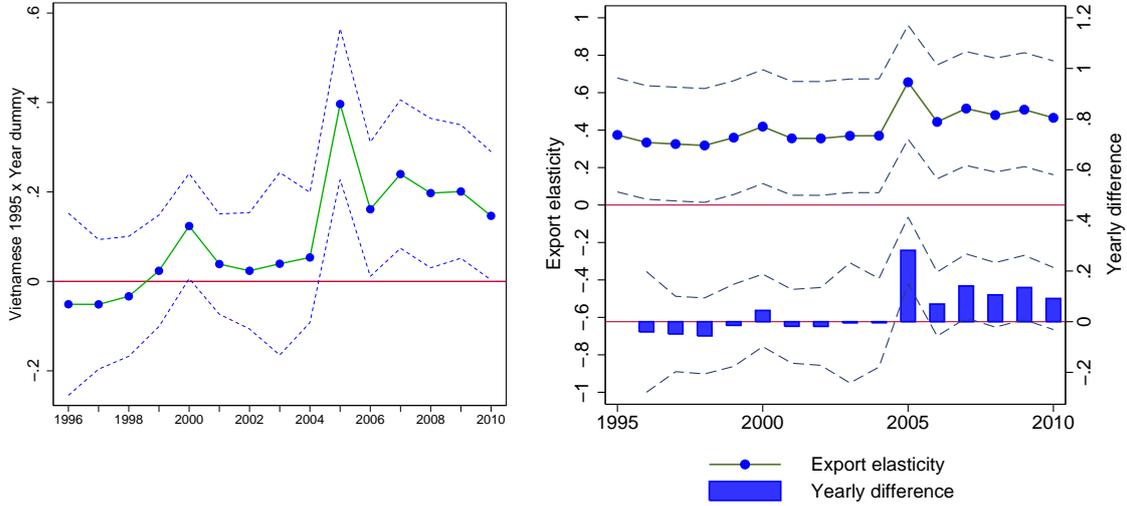


Figure 5: Vietnamese migrants in the US, 1995



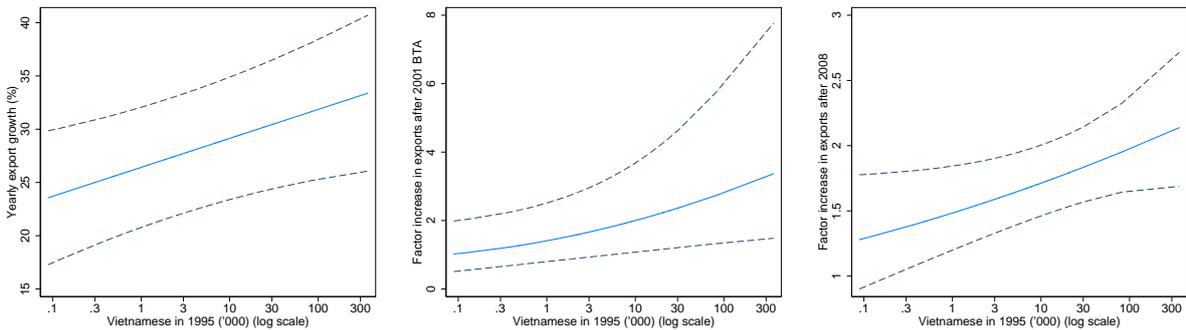
Top-10 metropolitan areas (number of Vietnamese): Los Angeles-Long Beach, CA (200,984); San Jose, CA (79,961); Houston-Brazoria, TX (46,839); San Francisco-Oakland-Vallejo, CA (46,489); Washington, DC/MD/VA (33,845); Dallas-Fort Worth, TX (30,279); San Diego, CA (28,058); Seattle-Everett, WA (24,796);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

Figure 6: The Pro-Export effect of the Vietnamese



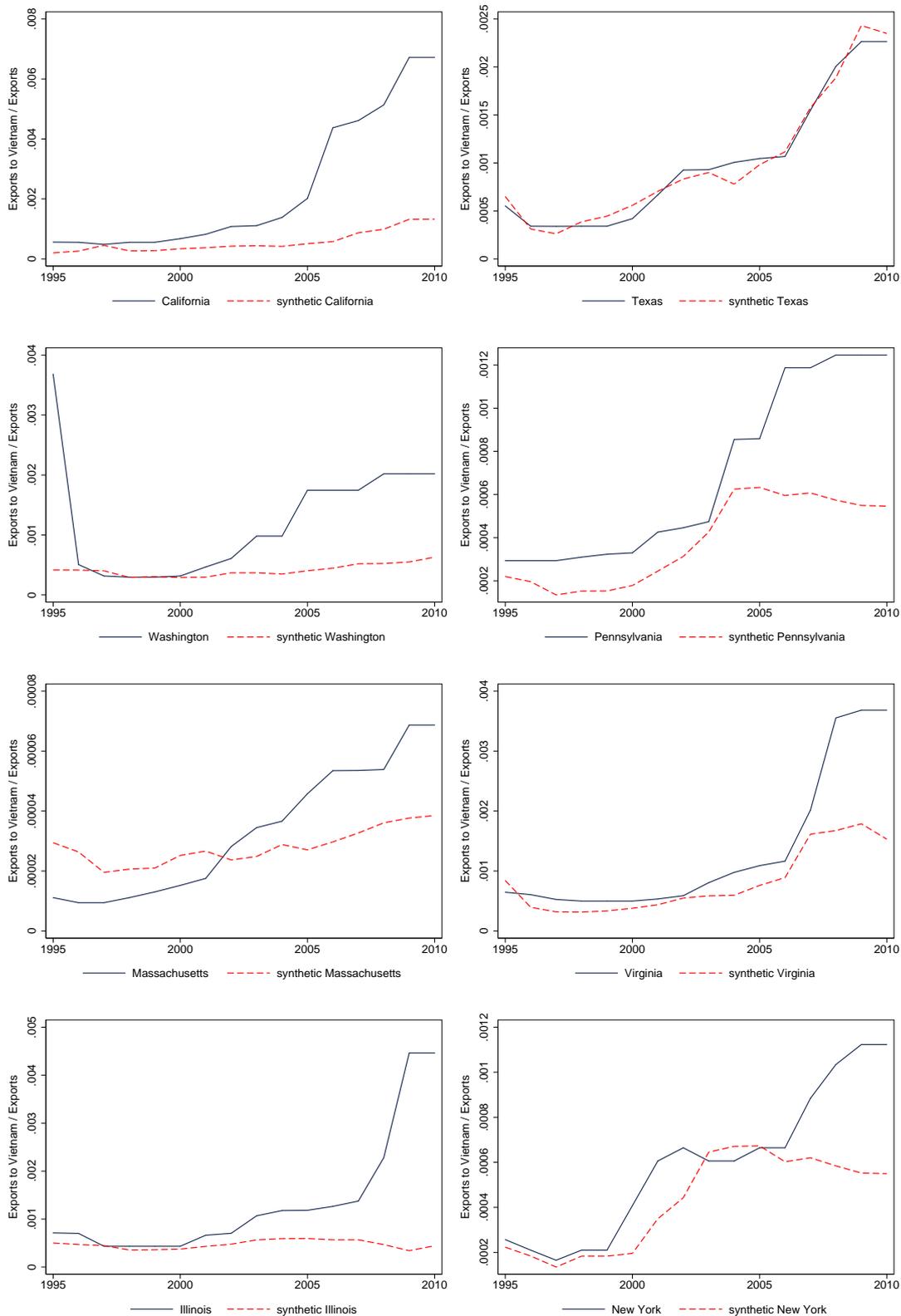
Note: The figures show the yearly differences in the effect of 1995 Vietnamese on US exports to Vietnam based on regression results of Table 5 in the online appendix. The dashed lines give the 90% confidence intervals. The left panel estimates are conditional on state fixed effects and thus do not include the intercept.

Figure 7: The Pro-Export effect of the Vietnamese



Note: The figures show the variation in the effect of a time trend, a BTA dummy, and a 2008-policy dummy on US exports to Vietnam across states according to the number of 1995 Vietnamese. These are based on the IV-PPML regression results of Table 6 in the online appendix. The dashed lines give the 90% confidence intervals.

Figure 8: Case studies



Note: The solid lines plot the data. The dashed lines the synthetic counterfactuals as explained in Section 4.

Table 1: The Vietnamese in the United States

State	Vietnamese 1995	% of pop 1995	Refugees 1975	Exports to Vietnam	% of Exports 1995-2010
California	364192	1.15	30495	4755.6	0.27
Hawaii	7767	0.65	2411	19.0	0.24
Washington	31103	0.57	5205	2069.7	0.34
Texas	82142	0.43	11136	2327.1	0.12
Oregon	12411	0.39	2448	770.2	0.40
Massachusetts	23890	0.39	1439	182.7	0.06
Virginia	24566	0.37	5620	320.3	0.16
Louisiana	14947	0.34	3916	306.9	0.08
Kansas	6794	0.26	1953	202.8	0.20
Minnesota	11483	0.25	4250	246.2	0.12
Oklahoma	8055	0.24	3716	47.4	0.09
Colorado	8995	0.24	2350	101.9	0.10
Maryland	11773	0.23	2828	186.4	0.18
District of Columbia	1240	0.21	613	15.8	0.12
Nevada	3321	0.21	519	14.4	0.03
Utah	3763	0.19	964	59.0	0.06
Georgia	13501	0.18	1622	666.9	0.23
Iowa	5094	0.18	3352	174.5	0.17
Pennsylvania	20583	0.17	8187	411.9	0.12
Arizona	7027	0.16	1444	148.9	0.07
Nebraska	2433	0.15	1418	205.7	0.42
Florida	20492	0.14	5237	572.4	0.11
Missouri	7575	0.14	3154	122.5	0.09
Connecticut	4634	0.14	1304	218.5	0.14
New Jersey	10717	0.13	1918	235.2	0.07
North Carolina	9022	0.12	1334	525.0	0.18
Alaska	721	0.12	94	26.4	0.05
Illinois	13543	0.11	4675	945.8	0.17
New York	20490	0.11	4749	597.7	0.08
New Mexico	1837	0.11	1047	8.6	0.03
Arkansas	2280	0.09	2127	198.1	0.36
Mississippi	2205	0.08	493	132.9	0.21
Alabama	3368	0.08	1439	123.1	0.08
Michigan	7578	0.08	2949	131.4	0.02
North Dakota	502	0.08	408	3.7	0.02
Tennessee	3777	0.07	1250	421.2	0.18
Vermont	387	0.07	106	9.7	0.02
Delaware	475	0.07	173	33.3	0.08
Ohio	6961	0.06	3496	338.3	0.07
Rhode Island	604	0.06	545	9.1	0.04
South Carolina	2162	0.06	926	202.3	0.11
Idaho	666	0.06	421	48.4	0.10
South Dakota	361	0.05	604	22.9	0.18
Kentucky	1881	0.05	1174	129.1	0.07
Indiana	2780	0.05	2175	149.4	0.05
Wisconsin	2338	0.05	2461	254.2	0.12
New Hampshire	511	0.04	171	42.9	0.11
Maine	486	0.04	376	18.6	0.05
West Virginia	361	0.02	268	57.2	0.12
Wyoming	89	0.02	143	23.1	0.22
Montana	123	0.01	360	4.7	0.05

Note: States are ranked by Vietnamese share of pop in 1995. Exports are the sum of US Exports to Vietnam from 1995-2010 in USD million.

Table 2: 1995 Cross section

	(1)	(2)	(3)	(4)	(5)	(6)
	Exports to Vietnam					
	PPML	PPML-RF	IV-PPML	PPML	PPML-RF	IV-PPML
ln (Exports to World)	0.208 (0.249)	0.328 (0.300)	0.156 (0.280)	0.271 (0.314)	0.842*** (0.293)	0.148 (0.491)
ln (GDP)	0.445 (0.536)	0.367 (0.488)	0.356 (0.470)	0.297 (0.660)	-0.818 (0.626)	-0.724 (0.737)
ln (Vietnamese)	0.360* (0.188)		0.453** (0.195)	0.483** (0.239)		1.381** (0.662)
ln (1975 Refugees)		0.459** (0.206)			1.073*** (0.335)	
ln (Income per capita)				-2.870 (1.859)	-1.675 (1.422)	-3.115 (2.931)
ln (Mfg share of GDP)				0.464 (0.674)	1.403** (0.689)	1.334 (0.852)
West Coast				0.268 (0.360)	0.082 (0.317)	-0.692 (0.652)
East Coast				1.054** (0.482)	1.493*** (0.423)	1.256 (0.782)
Constant	1.758 (2.742)	-0.307 (2.823)	3.144 (3.329)	29.334 (18.524)	13.672 (14.446)	38.527 (33.444)
N	51	51	51	51	51	51
R-sq	0.64	0.65		0.75	0.85	

Dependent variable is 1995 Exports to Vietnam. The 51 obs. are 50 US States and Washington DC. Columns 1 to 3 give the PPML, PPML-RF (reduced form) and IV-PPML estimates, respectively. Columns 4 to 6 provide the same estimates with extra controls. The figures in parenthesis are robust standard errors, and * stands for statistical significance at the 10% level, ** at the 5% level and *** at the 1% percent level.

Table 3: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Export share	GDP share	Without West Coast	Without California	Exports to Vietnam	Exports to Vietnam	Differentiated	Homogenous
ln (Vietnamese)	0.223** (0.109)	0.332*** (0.121)	0.677* (0.388)	0.766** (0.350)			0.815** (0.410)	3.238 (4.437)
ln (Income per capita)	0.451 (1.133)	-1.152 (1.346)	-1.014 (1.377)	-0.720 (1.295)	-0.496 (1.465)	-3.198** (1.580)	0.540 (1.943)	-11.811 (17.841)
ln (Mfg share of GDP)	1.142* (0.692)	-0.467 (0.565)	0.687 (0.965)	0.804 (0.866)	-0.452 (0.543)	-0.048 (0.550)		
West Coast	-0.423 (0.416)	0.404 (0.515)			1.510** (0.366)	0.912** (0.446)	-0.736 (0.646)	0.618 (1.889)
East Coast	0.518 (0.328)	0.760* (0.421)			0.930** (0.401)	1.027** (0.462)	0.043 (0.485)	5.967 (9.321)
ln (Exports to World)			-0.089 (0.520)	-0.019 (0.474)	0.243 (0.318)	0.342 (0.296)		
ln (GDP)			0.599 (0.892)	0.387 (0.638)	1.849*** (0.550)	0.854 (0.605)	-0.273 (0.699)	-3.260 (5.165)
ln (Chinese)					-0.634*** (0.229)			
ln (Asians)						0.013 (0.282)		
ln (Differentiated Exports to World)							0.331 (0.284)	
ln (Homogenous Exports to World)								1.166 (2.846)
Constant	-14.227 (10.893)	11.264 (12.838)	14.059 (14.977)	11.247 (14.450)	-2.507 (15.182)	28.489* (15.824)	-2.461 (19.044)	111.655 (152.774)
N	51	51	48	50	51	51	51	51

IV-PPML estimates. Dependent variable is Exports to Vietnam as a share of the State's total exports in column 1, Exports to Vietnam as a share of the State's GDP in column 2, Exports to Vietnam in columns 3 to 6, Differentiated Exports to Vietnam in column 7 and Homogenous Exports to Vietnam in column 8. The 51 obs. are 50 US States and Washington DC. The figures in parenthesis are robust standard errors, and * stands for statistical significance at the 10% level, ** at the 5% level and *** at the 1% percent level.

Table 4: Placebos

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Cambodia	China	Indonesia	Japan	Korea	Laos	Malaysia	Philippines	Taiwan	Thailand
ln (Vietnamese)	-0.169 (0.384)	0.231 (0.316)	0.009 (0.319)	-0.310 (0.273)	-0.158 (0.170)	-2.981 (4.276)	0.551 (0.393)	0.183 (0.214)	0.239 (0.211)	0.106 (0.285)
ln (Exports to World)	0.866** (0.364)	1.072*** (0.325)	0.869*** (0.264)	0.789*** (0.167)	0.800*** (0.182)	0.656 (1.889)	0.893*** (0.248)	0.842*** (0.268)	1.221*** (0.147)	0.419*** (0.132)
ln (Income per capita)	6.047 (5.123)	-0.400 (1.292)	-1.047 (1.016)	0.992 (0.871)	0.744 (0.659)	-2.634 (5.827)	-1.547 (1.821)	-1.800** (0.906)	-0.812 (0.810)	0.313 (1.287)
ln (GDP)	0.941 (0.577)	-0.386 (0.624)	0.169 (0.471)	0.385 (0.309)	0.334 (0.292)	4.447 (6.934)	-0.555 (0.541)	-0.033 (0.397)	-0.604*** (0.216)	0.478 (0.471)
ln (Mfg share of GDP)	-4.481*** (0.948)	-1.607*** (0.502)	-1.062** (0.520)	-1.417** (0.563)	-1.361*** (0.387)	1.412 (8.652)	1.045** (0.473)	-0.055 (0.509)	-0.098 (0.227)	-0.481 (0.508)
West Coast	0.613 (1.035)	-0.187 (0.472)	0.211 (0.528)	1.420*** (0.388)	1.333*** (0.308)	7.916 (11.672)	0.600 (0.562)	0.894** (0.398)	0.606** (0.274)	0.811 (0.524)
East Coast	-1.905 (1.276)	0.276 (0.399)	0.171 (0.271)	-0.210 (0.202)	-0.133 (0.193)	2.566 (2.210)	-0.166 (0.388)	-0.326 (0.220)	0.046 (0.196)	-0.435 (0.306)
Constant	-78.631 (53.265)	0.564 (14.611)	5.982 (10.148)	-9.420 (10.124)	-9.091 (7.053)	-8.069 (47.465)	15.183 (16.304)	15.458 (9.579)	4.378 (7.658)	-1.133 (11.543)
N	51	51	51	51	51	51	51	51	51	51

IV-PPML estimates. Dependent variable is Exports to placebo country in 1995. The 51 obs. are 50 US States and Washington DC. The figures in parenthesis are robust standard errors, and * stands for statistical significance at the 10% level, ** at the 5% level and *** at the 1% percent level.