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Gender Norms and Female Labor Supply: Evidence from Export Shocks in Vietnam*

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Abstract

We examine the relationship between economic development and female labor force participation, with a focus on the impact of gender norms. Analyzing quasi-random variation in provincial exports in reunified Vietnam from 2002 to 2018, we find that a positive economic shock led to a significant decline in women's labor market engagement, particularly among married women from wealthier households and those with husbands in more skilled occupations. This trend is more pronounced in the South (formerly capitalist) than in the North (always socialist), and among native Southerners compared to Northerners relocated to the South after the war. Our findings highlight the importance of gender role attitudes in shaping women's responses to rising incomes.

JEL codes: *J16, J22, O12*

Keywords: *female labor force participation, social norms, gender role attitudes, income and substitution effects, trade liberalization*

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1. Introduction

The relationship between economic development and female labor force participation (FLFP) is an important topic that has received considerable attention (see, e.g., Goldin, 1995; Mammen and Paxson, 2000; Blau and Kahn, 2013; Olivetti, 2013; Gaddis and Klasen, 2014; Ngai and Petrongolo, 2017; Afridi et al., 2018; Klasen, 2019; Dinkelman and Ngai, 2022; Ngai et al., 2024). While many studies focus on testing the U-shaped relationship between FLFP and income (Boserup, 1970; Goldin, 1995), they also reveal notable variations in FLFP among countries with similar income levels, highlighting the influence of additional factors on women's economic engagement.

In this paper, we explore how economic growth affects women's labor market participation, emphasizing the influence of social norms. We examine the context of reunified Vietnam, particularly during the trade liberalization of the 2000s and its subsequent rapid growth. Following the US-Vietnam Bilateral Trade Agreement in 2002 and Vietnam's entry to the World Trade Organization in 2007, the country has been experiencing rapid export expansion (see Figure A1 and Table A1) and large inflows of foreign direct investment (FDI). Our investigation centers on how exogenous increases in economic opportunities affect women's labor market engagement and how these effects are moderated by prevailing gender role attitudes (e.g., the male breadwinner model vs. gender-egalitarian perspectives).

Vietnam serves as a compelling case study for analyzing shifts in female labor supply in the context of economic development. With a female-to-male labor force participation ratio exceeding 90%, Vietnam has one of the smallest gender gaps in labor force participation (LFP) worldwide, surpassing even advanced economies such as Sweden, the US, the UK, and Germany (Figure 1). However, since the 2000s, the gender gap in LFP has begun to widen, coinciding with rapid export expansion and rising incomes. Given the ongoing policy

discussions aimed at retaining female workers in the labor market, it is important to understand the conditions under which women's LFP may decline as incomes rise.

[Figure 1]

Our analysis draws on biennial microdata from the Vietnam Household Living Standards Surveys (VHLSS) for the period 2002–2018, combined with trade data from the United Nations Comtrade Database. To proxy for the exogenous progress of the local economy, we use predicted exports by province and year based on a Bartik instrument, allocating nationwide industry-specific exports to different provinces according to their initial (i.e., pre-2002) industry composition, similar to the approach used by Topalova (2010), Autor et al. (2013), and Kovak (2013). We then relate our outcomes of interest, such as individuals' working status, to the province-year level predicted exports within a difference-in-differences (DID) framework, conditioning on province FE and year FE. Although data on actual exports at the province-by-year level are not available, we confirm that predicted exports by province are significantly and positively correlated with gross regional domestic product (GRDP) per capita, available for 2010-2018.

Our main findings show that an increase in predicted provincial exports—referred to as "export shock" or "export exposure" for simplicity—leads to a significant decrease in women's employment, while men's employment remains largely unaffected. Specifically, provinces with one standard deviation (SD) higher export shock experience a decline in women's working status by 2.7 percentage points (pp). This shift translates to a widening of the gender gap in LFP by 3 pp (or 56% of the mean gender gap).

One might suspect that the decline in women's employment is due to demand-driven displacement from trade liberalization, but our analysis does not support this. We find that export shocks promote structural changes in labor allocation from agriculture to the manufacturing and services sectors. Additionally, these shocks shift workers into the formal

sector, aligning with findings from McCaig and Pavcnik (2015, 2018).[1] Importantly, female workers benefit more than male workers from expanding economic opportunities, with a swifter transition out of agriculture and into manufacturing and services. Specifically, a one SD increase in export exposure disproportionately raises women's employment (relative to men) in manufacturing by 1.4 pp (9.3% of the female average) and in services by 1.8 pp (5.5% of the female average). This trend corresponds with the rise of foreign direct investment in low-skilled, labor-intensive sectors in Vietnam. Overall, the evidence suggests that the decline in women's participation is not due to adverse labor demand shocks disproportionately affecting them.

Why would Vietnamese women reduce their labor supply amid expanding economic opportunities? We hypothesize that this relates to the balance between income and substitution effects, as well as household labor specialization. Our analysis reveals that the decline in female labor supply is driven entirely by married women, while single women display patterns similar to men. Among married women, the negative impact of export shocks is most pronounced among those from wealthier households and those with husbands in more skilled occupations, where the income effect (encouraging women to focus on home production) is more likely to outweigh the substitution effect (encouraging market work due to high opportunity costs) resulting from the export shock.

Based on these findings, we further hypothesize that whether income or substitution effects dominate for the same increase in income may depend on the prevailing gender role attitudes in society. Specifically, we anticipate that, when faced with rising incomes, women's

[1] McCaig and Pavcnik (2015, 2018) demonstrate that within just two years of the US-Vietnam Bilateral Trade Agreement (UVBTA) in December 2001, reductions in US tariffs on Vietnamese exports facilitated the reallocation of manufacturing workers to the formal sector, resulting in larger, more productive firms and higher wages. Our findings align with these effects, revealing similar patterns of export-induced formalization of employment based on nearly two decades of data (2002–2018). Recent research by McCaig et al. (2023) supports these conclusions. Additionally, we document a trade-induced structural shift from agriculture to manufacturing and services.

labor market attachment may be stronger in societies with gender-egalitarian norms than in those with traditional male breadwinner ideals.

Vietnam serves as a valuable context for this exploration. Before reunification in 1976, the northern and southern regions were governed by vastly different ideologies. During the Vietnam War (1954-1975), North Vietnam promoted gender equality and women's economic participation, while South Vietnam did not (Werner, 1981). Nearly 40 years after reunification, women's attachment to the labor market still varies significantly between the North and South: the LFP rate for women in the North is as high as 90%, comparable to that of men, while in the South it is around 80% (see Figure 2). Data from the World Values Survey further support this divergence in gender role attitudes, with Northern Vietnamese of both genders exhibiting more gender egalitarian perspectives.

Our analysis reveals significant regional differences in the impact of export shocks on FLFP. While women in both regions reduce their labor supply, the decline is more pronounced in formerly capitalist South Vietnam compared to socialist North Vietnam. Unlike Northern Vietnamese, Southerners experienced socialism more recently and to a lesser extent.[2] Consequently, Southern Vietnamese may be more susceptible to the resurgence of the male breadwinner model, influenced by trade liberalization and the growing presence of capitalism.[3] In the North, the negative impact on female labor supply is primarily observed among women married to husbands in the top earnings quartile. This gradient is absent in the South, where women reduce their labor supply across all quartiles of household wealth and husbands' earnings. This suggests that women's labor market attachment is weaker in the South,

[2] Since the Doi Moi reforms in 1986, Vietnam has transitioned from a centrally planned economy to a market economy, marking a departure from the post-reunification "lost decade." Despite being governed by a socialist regime since reunification in 1976, the influence of communist ideologies has significantly weakened (see, e.g., Werner and Bélanger, 2002; Le, 2012; Tarp, 2018).

[3] As Vietnam liberalizes its trade policies and shifts towards a market economy, its economic structure increasingly resembles the capitalist model that was predominant in former South Vietnam.

prompting them to withdraw from the workforce as soon as it becomes financially feasible. In contrast, Northern women demonstrate stronger labor market attachment, with the income effect becoming dominant only at a higher household income threshold.

Our finding that the trade-induced FLFP reduction is stronger in South Vietnam than in North Vietnam remains stable when excluding provinces in the Mekong River Delta or those historically part of the Khmer Empire, whose institutions are distinct from the rest of Vietnam (see Dell et al., 2018). We also use provincial exports predicted separately based on male-intensive and female-intensive industries to account for potential regional differences in economic structure. The results remain consistent with our baseline findings. This ensures that the North-South differences in FLFP effects are not driven by variations in the composition of exporting industries across regions, particularly regarding the gender-friendliness of the jobs created.

The North-South differences in behavior may reflect not only the influence of past political regimes and wartime experiences but also differences in other dimensions such as geography or institutional factors. To keep such environmental conditions constant, we leverage the forced migration policy implemented in the decade following reunification, known as the New Economic Zones (NEZ) program. Enacted by the Vietnamese Communist Party for both economic and political reasons (Desbarats, 1987; Dang et al., 1997), the policy relocated millions of Northerners to previously uninhabited mountainous or rural areas that formerly belonged to South Vietnam. Because these migrants were born and raised in the North, their exposure to the socialist regime is longer than that of native Southerners currently residing in the same provinces.[4]

[4] See, e.g., Antecol (2000), Fisman and Miguel (2007), Giuliano (2007), Fernández and Fogli (2009), and Blau et al. (2011), for studies using variation in immigrants' country of origin to identify the role of culture and social norms.

Our findings indicate that, in response to provincial export shocks, the labor supply responses of the North-born population living in the South closely resemble those of individuals in the North, highlighting the lasting influence of wartime values. These results hold even in our most restrictive specifications, where we directly compare North-born and South-born migrants, confirming that the effects observed among individuals from the North align with those of their Northern counterparts and are not merely a function of migration status.

By examining women's labor supply responses to Vietnam's rapid export expansion from 2002 to 2018, we provide a new perspective on understanding the relationship between economic development and women's labor market engagement (see e.g., Boserup, 1970; Goldin, 1995; Mammen and Paxson, 2000; Blau and Kahn, 2013; Olivetti, 2013; Gaddis and Klasen, 2014; Ngai and Petrongolo, 2017; Klasen, 2019; Dinkelman and Ngai, 2022; Ngai et al., 2024; Haddad and Kattan, 2024). In a closely related work, Afridi et al. (2018) show that the LFP of married women in rural India decreased between 1987 and 2011, with increasing education levels among women (and men) as the most prominent factor. They suggest that changing returns to more educated women's work at home relative to market production helps explain the adverse effect on women's LFP in rural India. We complement Afridi et al. (2018) in two important ways. First, while the decline documented in rural India is from a baseline FLFP of around 50%, we establish a similar phenomenon in a context where the LFP of women is over 90%. Second, by examining the North-South differences in Vietnamese women's responses, we highlight the role of gender role attitudes in shaping the relationship between income and women's participation in market work.

We also add to the growing body of literature that highlights social norms as a key determinant of women's LFP and economic inclusion (see e.g., Fernández et al., 2004; Fortin, 2005; Fernández and Fogli, 2009; Maurin and Moschion, 2009; Doepke et al., 2012; Alesina

et al., 2013; Bertrand et al., 2015, 2021; Jayachandran, 2015; Bursztyn et al., 2017, 2020; Olivetti et al., 2020; Charles et al., 2022; Cortes et al., 2022; and Boelmann et al., 2024). In particular, we address studies exploring the impact of socialist legacies on women's labor market outcomes (see Bauernschuster and Rainer, 2012; Campa and Serafinelli, 2019; Fuchs-Schündeln and Schündeln, 2020; Lippmann et al., 2020; Boelmann et al., 2024). Our major departure from existing studies lies in our focus on the evolution of women's labor supply in response to positive economic shocks rather than static cross-sectional comparisons and in relating this to past political regimes and experiences during the Vietnam War.

In addition, we speak to the literature on the gendered implications of global integration. Cross-country studies show mixed results, varying by time period, income, and economic structure (Bussmann, 2009; Gaddis and Klasen, 2014). Using microdata, Gaddis and Pieters (2017) find no benefits for women from free trade in Brazil, while Juhn et al. (2013) show that technology advancements in Mexican exporting firms reduced gender wage and employment inequality. In China, Wang et al. (2022) find that import competition helped retain women in the labor force, whereas Keller and Utar (2022) report a shift toward family roles among Danish women, leading to long-term earnings losses. Erten and Keskin (2024) show that the differential labor market gains from Cambodia's WTO accession—favoring women over men—led to an increase in intimate partner violence. We contribute by examining export shocks in Vietnam, showing that women benefit more than men from trade openness, particularly in transitioning out of agriculture and into formal employment.

Furthermore, we relate to the literature examining the labor market impacts of Vietnam's trade liberalization and export-driven economic growth in recent decades. While prior studies have focused on key events such as the liberalization of rice trade in the 1990s (Edmonds and Pavcnik, 2005a, 2005b) or the 2001 US-Vietnam Bilateral Trade Agreement (McCaig, 2011; Fukase, 2013; McCaig and Pavcnik, 2015, 2018; Hoang and Nguyen, 2020),

our research centers on the subsequent two decades, from 2002 to 2018. By examining this more recent period, we can analyze the long-term effects of trade liberalization and export-driven growth on the Vietnamese labor market.

The paper is organized as follows. Section 2 briefly summarizes Vietnam's socio-politico landscape in recent history. Section 3 presents our empirical strategy, followed by data description in Section 4. Section 5 provides our main estimates, and Section 6 examines heterogeneity effects across regions. Section 7 presents further analysis based on the postwar migration policy as a natural experiment. Section 8 concludes.

2. Background

2.1 Colonial era and the division of Vietnam

Vietnam had traditionally been a patriarchal society with strong Confucian values (Ly 2021; Whitmore 2023), whose distinct emphasis on gender roles led to the subordination of women. When the Indochina peninsula came under French control in the second half of the 19th century, the French claimed authority over three regions of Vietnam: Tonkin in the north, Annam in the center, and Cochinchina in the south. Based on available data reconciled by Banens (2000), the population growth rates in Tonkin and Cochinchina before 1945 show striking similarities (see Table A2). At the end of the French colonial rule in Vietnam, the 1954 Geneva Agreements to resolve outstanding issues in French Indochina had resulted in Vietnam's partition into two zones, with the Democratic Republic of Vietnam (or the socialist North Vietnam) governing the north and the State of Vietnam (the future Republic of Vietnam, or the anti-communist South Vietnam) governing the south.[5] The demarcation line at the 17th parallel split Tonkin and

[5] The formation of the two states preceded the Geneva Agreements. The Democratic Republic of Vietnam was created in 1945, backed by the Soviet Union and China. The State of Vietnam was established in 1949, supported by France.

the northern half of Annam to the north, while Cochinchina and the southern half of Annam to the south. The separation was intended to be temporary, with a general election to be held by July 1956 to unify the country. Such an election was never realized, and the country remained divided over the next two decades until 1975.

2.2 Wartime, socialism, and the promotion of gender-egalitarian values in North Vietnam

During the period 1954-1975, the socialist government in North Vietnam advocated for a widespread improvement of Vietnamese women's social and political roles. The 1949 constitution stipulated that "women are equal to men in all respects" (Werner, 1981; Goodkind, 1995; Bryant, 1998). Land reforms and agricultural collectivization initiated in the early 1950s actively encouraged women's equal participation in collective labor, alongside the introduction of paid maternity leave—a feature entirely absent in anti-communist South Vietnam. Furthermore, the education level of Northern women had caught up with that of men for cohorts born after 1965, a milestone South Vietnam achieved only after reunification (see Figure A2).

Secondly, wartime necessity during the height of the Vietnam War (1965-1973) substantially increased Northern Vietnamese women's economic and political position. With the mass mobilization of men to the army, women assumed primary labor roles and, at the same time, engaged in civil activities. Their image was promoted as warriors and heroines of war (Werner and Belanger 2002).[6] The Communist Party mandated gender quotas, aiming for women to occupy 30% of leadership positions by 1960 and increase female labor share to at least 35% of the workforce, particularly in light industries, education, and health care

[6] The "Three Responsibilities" campaign called for women to contribute to war effort by replacing men enlisted in the army and taking up production, taking charge of family affairs and local administration, and encouraging their husband and sons to fight for reunification of the country.

(Resolution 153, 1967).[7] These campaigns were accompanied by training programs for women, the promotion of female cadres, and the provision of public childcare in nearly half of production cooperatives (Mai and Le, 1978).

2.3 Economic and social changes in reunified Vietnam

The two regions reunified in 1976 with the end of the Vietnam War and following the fall of Saigon, and Vietnam has since remained a *socialist* republic. Agricultural collectivization was implemented in the southern provinces, and the whole country underwent a rigidly planned economy (Tri 1988; Beresford 1988). By the late 1980s, nationwide educational parity between genders was achieved (Figure A2), alongside initiatives such as equal pay and generous childcare provision to incentivize female workforce participation (Werner 1981).

However, with the massive economic reforms in the late 1980s that began shifting Vietnam towards a "socialist-oriented market economy under state guidance" (i.e., the "Doi Moi" reforms initiated in 1986), the country's politico-economic stance on the gender role has been altered. Men have become associated with technology, while there has been a renewed emphasis on the importance of family for women. At the same time, there have been severe cuts to parental leave and subsidized childcare (Goodkind 1995; Nguyen 1999). Despite being more prevalent in former North Vietnam, childcare supply experienced nationwide stagnation between the decade following "Doi Moi" (Figure A3), a trend worth noting as reductions in childcare supply could have important implications on female labor supply.

[7] During 1961 to 1979, female ratio in the total workforce in North Vietnam increased from 43 to 63% in Light Industry, 12% to 60% in Education, 57% to 80% in Agriculture. On political and administrative spheres, the share of female public employees went from 5% in 1954 to 43% in 1979, share of female delegates in National Assembly went from 2% in 1946 to 30% in 1970. The percentage of female village leaders and female heads of production brigades was around 40% and 20%, respectively, in 1970 (Werner 1981).

Studies point to the post-socialist reversal of gender roles to the traditional male breadwinner model, as experienced in Eastern Europe and the former Soviet Union, as well as in China (LaFont 2001; Dumančić 2017). Nonetheless, Vietnam's FLFP rate has remained remarkably high at around 80% over the last three decades (International Labour Organization, 2022).[8] Socialist ideology, prioritizing gender role equalization and recognizing the necessity of female labor for rapid economic growth and modernization, contributes to this progress. Additionally, the "missing men" effect, resulting from imbalanced sex ratios due to high military mobilization and male mortality during the Vietnam War, left many women as primary breadwinners. Research suggests that the former has a more enduring impact on women's labor market attachment, pointing out that living under the communist North has a larger effect compared to the "missing men" effect (Kreibaum and Klasen 2015). Consistent with this line of argument, Figure 2 shows higher LFP rate of Northern women, who behave very similarly to men, than for Southern women.

[Figure 2]

Data from the World Values Survey for 2002, 2006, and 2019 also suggest Southern Vietnamese hold more conservative gender role attitudes. more conservative gender role attitudes held by the Southern Vietnamese. The Northern and Southern Vietnamese, however, do not systematically differ in their beliefs on other, non-gender-related dimensions. We come back to this point in section 6.1.

Vietnam's reopening to the world economy and global integration has brought about high economic growth, making Vietnam "the dragon that rose from the ashes" (Tarp 2018). Since the 2000s, Vietnam has been experiencing inflows of FDI and rapid export expansion due in part to the enactment of the US-Vietnam Bilateral Trade Agreement (UVBTA) in 2001

[8] International Labour Organization. "ILO Modelled Estimates and Projections database (ILOEST)" ILOSTAT. Accessed March 01, 2022. https://ilostat.ilo.org/data/.

and Vietnam's entry into the World Trade Organization (WTO) in 2007 (see Figure A1 and Table A1).

3. Empirical Strategy

Our goal is to understand how an exogenous expansion in economic opportunities between 2002-2018 affects women's labor market engagement, and how the pattern may differ according to the prevailing gender role attitudes. To proxy for the exogenous growth of the local economy, we use predicted exports for each province and year, based on a Bartik instrument. Specifically, we allocate nationwide industry-specific exports to provinces based on their initial industry composition prior to 2002, following the approach of Topalova (2010), Autor et al. (2013), and Kovak (2013).

Consider a variable $Exposure_{pt}$, which captures the (log of) predicted export per worker for province p in year t. We construct this variable by allocating nationwide industry-specific exports in each year to provinces according to their initial industry composition (based on industry-specific shares of local employment):

$$Exposure_{pt} = \log\left(\sum_{j} \frac{L_{pj,1999}}{L_{p,1999}} \times \frac{Export_{j,t}}{L_{j,1999}}\right) \quad (1)$$

where $L_{pj,1999}$ is province p's employment in industry j in 1999, and $L_{p,1999}$ is province p's total employment in 1999.[9] The variable $Export_{jt}$ is Vietnam's nationwide total export value in industry j in year t, which we scale by nationwide initial total employment in industry j, $L_{j,1999}$, similar to Autor et al. (2013).

[9] We use 1999 to measure sectoral and provincial employment in the initial (pre-2002) period, since the Vietnamese Census 1999 is the closest we can get to 2002, the beginning of our analysis window.

The exposure measure in equation (1) is a proxy of the local economy's development level, based on provincial exports driven by industry-specific global demand rather than unobserved local factors that may also correlate with women's labor market behavior. While data on actual exports at the province-by-year level are unavailable, we find that predicted exports by province and year show a significant positive correlation with gross regional domestic product (GRDP) per capita, which is available for the years 2010 to 2018 (see Figure 3). In section 5.1, we show that the results using this indicator for a subsample remain consistent with our baseline estimates.

[Figure 3]

We examine how predicted provincial export shocks—hereinafter "export exposure" or "export shock" for simplicity—affect individuals' labor market outcomes, by estimating the following difference-in-differences (DID) equation:

$$y_{ipt} = \alpha_0 + \alpha_1 Exposure_{pt} + \phi_p + \psi_t + \boldsymbol{X}_{ipt}\lambda + \boldsymbol{Z}_p\gamma_t + \epsilon_{ipt} \quad (2)$$

where y_{ipt} is the labor market outcome of individual i in province p in year t, such as working status. The variable $Exposure_{pt}$ is the (log of) province-by-year level predicted exports, as constructed in equation (1). Throughout the analysis, we condition on both province fixed effects (FE) (ϕ_p) and year FE (ψ_t), accounting for province-specific and time-invariant unobservables as well as common nationwide shocks that vary over time, respectively. In addition, we control for individual-level characteristics with vector $\boldsymbol{X}_{ipt}$, which includes an indicator for ethnic Viet (the majority ethnic group), gender, a cubic polynomial in age, and four categories of education (no education, primary, lower secondary, and upper secondary or higher).

Furthermore, we condition on a vector $\boldsymbol{Z}_p$ which includes a rich set of province-level initial (1999) characteristics, allowing for its effects to differ by time (captured in γ_t). In particular, we always include the initial employment share in manufacturing (interacted with

year FE) to account for the fact that export growth in Vietnam is primarily driven by the manufacturing sector (see Figure A1) and labor market trends in provinces with high versus low initial shares of manufacturing employment may systematically differ. By conditioning on the share of manufacturing industries in the baseline period (interacted with year FE), we use only the cross-sectional variation in the composition of industries within manufacturing (and within non-manufacturing) across regions for identification. Additionally, we control for the 1999 levels of gross output per capita in manufacturing and services, FLFP rates, and childcare supply (i.e., number of kindergarten classes per child aged 0-5), all interacting with year FE. These initial conditions further account for factors that may lead to differential evolution of female labor supply in different provinces. We cluster standard errors at the province level.

Our main coefficient of interest is α_1, which captures the effect of export exposure on labor market outcomes. Our identifying assumption is that conditional on the included controls in equation (2), there is no correlation between $Exposure_{pt}$ and ϵ_{ipt}. In light of recent developments in the shift-share literature (see Goldsmith-Pinkham et al., 2020; Borusyak et al., 2022), we argue that the validity of our identifying assumption stems from "exogenous shares." In Appendix B, we present several diagnostic tests—suggested in Goldsmith-Pinkham et al. (2020) and Borusyak et al. (2025)—that support the plausibility of this assumption.

To uncover the differential effects of export expansion by gender, we consider a variant of equation (2), where we additionally include the interaction between $Exposure_{pt}$ and a female indicator, $Female_i$, while allowing for gender-specific year FE ψ_{gt} (instead of year FE ψ_t). Furthermore, we also investigate North-South differences, interacting $Exposure_{pt}$ with a dummy indicating the province being in South Vietnam.

4. Data

Our main data stems from the Vietnam Household Living Standard Surveys (VHLSS) covering the period 2002-2018. The surveys are conducted every two years by the General Statistics Office (GSO) of Vietnam, with technical assistance from the World Bank. The VHLSS is nationally representative and by far the most comprehensive microdata set in Vietnam on the living standards of the population. We restrict our attention to individuals of working age (20-64) in each survey year, resulting in a total sample size of 402,833. In Table 1, we provide the average characteristics of individuals in our sample for the period 2002-2018.

[Table 1]

Our main outcome of interest is "work," a dummy indicating whether the individual has worked at any time during the previous 12 months. We refer to this as an indicator of LFP. As Figure 2 shows, the participation rate is very high for both men and women in both North and South Vietnam. It is, however, always lowest among Southern women (around 85% in 2002, compared to 93% for the other groups—Northern men, Northern women, and Southern men), and trending downward for this group.

Based on industries, we classify individuals into agriculture, manufacturing, construction, or service sectors. Based on the type of employer, we can distinguish between the formal sector (state enterprises, collectives, domestic or foreign firms) and the informal sector (self-employed or household business). Figure A4 documents the rapid transformation of Vietnam's economic structure since the 2000s, with a visible shift from agriculture to manufacturing and services for both men and women.

To capture the initial industry composition in 60 provinces prior to Vietnam's trade liberalization in the 2000s, we use the Vietnam Population and Housing Census 1999 (or the Census 1999), which consists of 3% of the population with 2,368,167 individuals, of which

1,135,981 are in the labor force.[10] Workers are employed in 153 industries according to International Standard Industrial Classification of All Economic Activities Revision 3 (ISIC3) at 3-digit level.

To obtain Vietnam's exports by industry, we use the United Nations Comtrade database (UN Comtrade) for the period 2002-2018. UN Comtrade provides detailed trade data at the product level using the Harmonized Coding and Description System (HS). We convert products (HS 6-digit level) to industries (ISIC3 3-digit level), using the concordance tables provided by the World Integrated Trade Solution.[11] Export values are expressed in 2018 VND based on annual VND/USD exchange rates and the Consumer Price Index obtained from Vietnam's General Statistics Office (GSO).

In equation (1), we construct the variable $Exposure_{pt}$ by combining each province's industry-specific employment shares in 1999 with nationwide export values per worker at the industry-by-year level. The mean (SD) of $Exposure_{pt}$ is 17.271 (0.952), see Table A1. The table also lists the top 10 exporting provinces in 2002 and 2018, together with the top 10 provinces experiencing the largest changes in $Exposure_{pt}$ over the study period.

As a first check, Figure 3 plots the correlation between export exposure and log GRDP per capita, available for 2010-2018.[12] The estimates come from the regression of log GRDP per capita at the province-year level on export exposure, controlling for a province's employment share in manufacturing in 1999. The regression is weighted by provinces' initial population size. As expected, our predicted export measure $Exposure_{pt}$ is highly correlated with the province's actual development indicator.

[10] In 2002, Vietnam had 61 provinces. In 2003, three new provinces were created by splitting Dien Bien from Lai Chau, Dak Nong from Dak Lak, and Hau Giang from Can Tho. In 2008, Ha Tay was merged into Ha Noi, resulting in a total number of 63 provinces. Taking these changes into account, we define 60 provinces with consistent geographical boundaries over the study period.

[11] https://wits.worldbank.org/product_concordance.html.

[12] Data on GRDP per capita by province are provided by the General Statistics Office (GSO) of Vietnam, expressed in constant 2018 VND.

In Figure 4, we illustrate the spatial variation in $Exposure_{pt}$. Panel (a) shows the levels of $Exposure_{pt}$ for 2002 and 2018, respectively, while Panel (b) shows the change in $Exposure_{pt}$ between 2002 and 2018. These measures vary widely across Vietnam, as well as within both the North and South.

[Figure 4]

5. Export-induced Economic Development and Female Labor Supply

5.1 Overall effects

We start by documenting the effects of export-driven economic expansion on the LFP of Vietnamese men and women over the period 2002-2018. Table 2 presents the estimates of equation (2) using the working status of individuals as the dependent variable. The variable "work" indicates whether the person ever worked in the last 12 months. The first two columns show the average effects for all individuals, while the last two columns report the differential effects of export exposure by gender. Individual-level controls include ethnicity, gender, a cubic polynomial in age, and education level. All specifications (except column 4) include an interaction between the initial share of employment in manufacturing with year FE, so that we only exploit variation in sub-industries within manufacturing and within non-manufacturing in the base period (1999).

[Table 2]

Column 1 shows a negative, albeit insignificant, effect of export exposure on work status. Column 2 controls for the full set of initial province social and economic conditions interacted with year FE, aiming to address potential confounding factors. Specifically, we control for a province's initial gross output per capita in manufacturing and service. This

accounts for the possibility that FLFP in provinces at varying levels of economic development follow different trajectories, confounding the effect of export exposure on FLFP. We also control the initial provincial FLFP and childcare supply (proxied by the number of kindergarten classes per 0-5-year-old child). Given that childcare availability is an important determinant of women's decision to supply market work, controlling for childcare supply rules out this potential confounder. We find that an increase in export exposure has a small but negative effect on overall LFP.

This result, however, masks substantial gender differences. Column 3 separates the effects by gender, using a triple difference approach and allowing for gender-specific year FE. In provinces with one SD (0.952) higher export exposure, equivalent to export growth of 160%, women's working status declines by 2.7 pp ((-0.031 + 0.003) * 0.952), while there is no corresponding effect for men. This translates to a 3 pp widening of the gender gap in LFP, or 56% of the mean gender gap (0.03 / (0.918 - 0.865)).[13] This gender differential effect remains virtually unchanged in column 4, where we control for province-by-year FE, allowing provinces to follow different trends.[14]

Alternative measures of economic growth. In Table 3, we gauge the robustness of our findings with alternative measures of provincial economic development. Columns 1 and 2 replicate our baseline estimates from columns 2 and 3 of Table 2, where export exposure is constructed using all traded industries. In columns 3 and 4, we construct export exposure based on manufacturing industries only. The estimates remain largely unchanged. This is reassuring given that manufacturing is the primary driver of exports in Vietnam.

[13] Wang et al. (2022), examining the effect of import competition in China, find that in a prefecture experienced average tariff reduction (30 pp), the gender employment gap is reduced by about 6 pp.

[14] Note that in column 4, the province-by-year FE absorbs the base exposure variable, which varies at the province-year level. Moreover, the interactions between province-specific initial characteristics and year FE are also absorbed by the province-by-year FE.

[Table 3]

In columns 5 to 8, we use a subsample that restricts the time window to 2010-2018, during which data on provincial GRDP per capita are available. Columns 5 and 6 repeat the analysis using our main export exposure indicator—using all traded industries, showing that the effects are also robust to the choice of time frame. The estimates in column 6 show that in response to a one SD increase in export exposure, women's LFP decreases by 2.2 pp, or 2.5 percent of the mean (0.022 / 0.859). In columns 7 and 8, we use log GRDP per capita as an explanatory variable. A one SD increase in log GRDP per capita (0.518) is associated with a 2 pp (0.518 * (-0.030 - 0.009)) reduction in FLFP, or 2.3 percent of the mean (0.02 / 0.859). Although less precisely estimated, the results obtained using GRDP per capita are consistent with our baseline, demonstrating that using export exposure as a proxy for economic development is reasonable.

Export shocks and sectoral allocation of labor. One might suspect that the observed decrease in FLFP documented above is due to the displacement of female labor during trade liberalization. To shed light on this, we examine the effects of export exposure on economic sector and employer type, conditional on working. Results are reported in Table 4, using our preferred specification from column 2 (for Panel A) and column 3 (for Table B) of Table 2.

[Table 4]

Panel A shows that export shocks shift workers out of agriculture (column 1) and into manufacturing and services (columns 2 and 4), based on the sample of all individuals who have worked in the previous 12 months. Moreover, the positive export shocks in the local economy facilitate the transition of the workforce to the formal sector, particularly foreign-owned firms (columns 5 and 6), consistent with prior findings on trade-induced formalization in Vietnam

within the manufacturing sector (see McCaig and Pacvnik, 2018).[15] Panel B reveals that, when remaining in the workforce, female workers benefit more than male workers from these emerging economic opportunities, with a swifter transition out of agriculture and into manufacturing and services as well as foreign firms. Specifically, a one SD increase in export exposure (0.952) disproportionately raises women's probability of employment (relative to men) in manufacturing by 1.4 pp (9.3% of the female average) and in services by 1.8 pp (5.5% of the female average). This trend aligns with the rise of FDI in low-skilled, labor-intensive manufacturing in Vietnam (McCaig, 2011).

In addition, we examine the effect of export exposure on wages. Specifically, we repeat the analysis from Table 2, replacing the dependent variable with log annual earnings (expressed as 1,000 VND in 2018).[16] If the decline in the employment rate is due to a negative labor demand shock, then we would expect a negative relationship between export exposure and wages. In contrast, if the decline in the employment rate is supply-driven, we would expect a positive (or nonnegative) relationship between export exposure and wages. As shown in Table A3, wages and export exposure are positively correlated. This holds for both men and women, with no significant gender difference. The results remain consistent whether using earnings from the main job (columns 1 and 2) or from all jobs combined (columns 3 and 4).[17] Overall, the evidence suggests that the decline in women's participation is unlikely due to adverse labor demand shocks disproportionately affecting female workers.

[15] Formal firms include all state enterprises, collectives, foreign firms, and registered private businesses under the Enterprise Law. Self-employed individuals or household businesses, typically with fewer than two workers and unregistered, are classified as informal.

[16] In the VHLSS data, we observe wages for a subsample of individuals who reported receiving salaries in the past 12 months. This subsample comprises around 34% (42%) of the full sample for annual earnings from the main job (from all jobs).

[17] In Table A4, we zoom in on North and South Vietnam. For ease of interpretation, the coefficients in this table are reported as the total effect for each gender-by-region group, rather than using men as the reference group as in the main analysis. The positive relationship between wages and export exposure is also observed for both men and women in each region. Point estimates for wage increases are largest for Southern women, although the difference compared to Northern women is not statistically significant. This result holds across all specifications, whether using annual earnings from the main job only versus all jobs combined (columns 1 and 4), or when excluding the southernmost provinces whose institutions differ from the rest of Vietnam (columns 2, 3, 5, and 6).

5.2 Heterogeneity by marital status and household income

Why would Vietnamese women reduce their labor supply amid expanding economic opportunities? To further understand the drivers behind this phenomenon, we investigate possible heterogeneity in women's responses based on household characteristics. In Table 5, we examine whether the labor supply response to export exposure differs by marital status.[18] Column 1 reports separate estimates for single and married individuals. Column 2 further reports the differential effects by gender, comparing single women with single men, and married women with married men. The results indicate that the negative effect of export exposure on employment is concentrated among married individuals, particularly married women, while there is no corresponding effect for married men. In contrast, the impact of export exposure on singles is positive, with a small and statistically insignificant gender difference.

[Table 5]

Restricting our attention to married women, we further examine heterogeneity by household wealth and husband characteristics in Table 6. In each column, we use all observations that can be matched to the corresponding household or husband characteristics. The number of observations in columns 2 and 3 is smaller since wage and earnings information is available only for those in wage employment.[19] Based on columns 1-3, we find that relative to the reference group (lowest quartile), the reduction in the working rate is stronger for women in the highest quartile of household wealth or husbands' wages/earnings. In column 4, we find no significant difference across husbands' education levels. We return to this point in the next section, where we highlight substantial regional heterogeneity between North and South

[18] The share of married individuals in our sample is 84% (see Table 1).
[19] Nearly all individuals in the formal sector report wage and earnings, but only around one in every five informal workers reports this information. The results remain virtually unchanged when excluding women with husbands in agriculture from the sample.

Vietnam. In column 5, we find that women with husbands in medium or high-skilled occupations exhibit a stronger decrease in labor supply, compared to the reference group in low-skilled occupations. [20]

[Table 6]

The concentration of negative effects on the LFP among married women—particularly those in wealthier households or those with higher-skilled husbands—indicates that household-level labor allocation between home and market work matters. With the trade liberalization in the 2000s and the subsequent rapid rise in income, Vietnamese families may have found that it was no longer necessary for both spouses to work. If the husband's income is sufficient, women may reduce their labor supply to enjoy more leisure and/or specialize in home production. This suggests that whether the income effect (i.e., higher wages inducing women to drop out of the labor market) dominates the substitution effect (i.e., higher wages prompting women to increase their labor supply) in the context of export-driven economic growth may depend on the prevailing gender role attitudes. We examine this hypothesis in the next section.

6. Labor market behavior of women in North and South Vietnam

To explore the hypothesis on how household-level decisions on labor allocation might be shaped by gender role attitudes, we examine potential heterogeneity in women's responses between South Vietnam (formerly capitalist) and North Vietnam (always socialist). The latter's sustained exposure to socialist ideologies—particularly gender-egalitarian values—may make them more resistant to the resurgence of the male breadwinner norm. This analysis is further

[20] We code the International Classification of Occupations (ISCO) occupation groups 1-2 as "Manager/Professional", groups 3-8 as "Medium-skilled", and group 9 as "Elementary". Armed forces occupations, representing 0.3% of total workforce, are excluded from the analysis. See https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation.

motivated by the stylized facts regarding the differences in gender role attitudes between the two regions, as detailed below.

6.1 Survey evidence on gender role attitudes

To gain insights into regional variations in gender role attitudes in Vietnam, we draw on the World Values Survey (WVS). In Vietnam, the WVS was carried out in 2001 (wave 4), 2006 (wave 5), and 2019 (wave 7), allowing us to observe the attitudes of the Vietnamese people in the two regions on gender-related and gender-neutral issues. We pool all years and report the mean responses of the South Vietnamese (relative to the North Vietnamese, the reference group) with confidence intervals at 95% level, while conditioning on year FE.

In the first panel of Figure 5, we report the North-South difference in gender role attitudes, focusing on respondents' (dis)agreement with statements such as, "When jobs are scarce, men should have more rights to a job than women," "University is more important for a boy than for a girl," "Men make better business executives than women do," and "[There is a] problem if women have more income than [their] husbands."[21] As shown, respondents from the South exhibit more conservative attitudes than their Northern counterparts, and this is true for both males and females (see Figure A5). Conversely, there is no systematic difference between the two regions regarding core beliefs on gender-neutral dimensions such as effort, luck, and fairness (as seen in the second panel of Figure 5). Overall, evidence from the survey data aligns with the enduring disparities in gender role attitudes between Northern and Southern Vietnamese populations, stemming from the country's prior division and wartime experiences.

[Figure 5]

[21] We recode "Strongly agree," "Agree," and neutral responses as 1 (Agree), while "Disagree" and "Strongly disagree" are recoded as 0 (Disagree).

It is worth noticing that the historical state of Vietnam, the Dai Viet kingdom, was heavily influenced by Confucianism, which has long-lasting negative impacts on gender equality (Ly, 2021; Vu and Yamada, 2023; Whitmore, 2023). With the kingdom's gradual expansion from northern Vietnam to the southern regions over a millennium, one might expect more entrenched traditional gender roles in the North compared to the South. While historical data during the French colonial period (before 1945) is scarce, early 20th-century vital statistics support this view. Banens (2000), reconciling from various sources, notes serious under-registration of female births all over the country.[22] In Cochinchina (southern Vietnam) during 1915-1937, the male/female ratio at birth ranged from 1.16 to 1.19. In Tonkin (northern Vietnam), the ratio was even higher—1.12 in hospitals and 1.71 for home births (Gourou, 1936; Banens, 2000)—implying a stronger son preference and higher gender inequality in the North.[23] However, the prevailing higher gender-egalitarian values in North Vietnam today point to the counteracting impact of socialism and experiences during the Vietnam War on gender role attitudes.

6.2 Heterogeneous effects on FLFP across regions

In Table 7, we examine the differential effects of export shocks on working rate by gender and region (North vs. South), in a variant of equation (2). Here, we allow for gender-by-region FE, in addition to all the included controls in column 3 of Table 2. Section 2 describes the North-South boundary at the 17th parallel north (see panel (b) of Figure 4). Columns 1-3 are based on the full sample while columns 4-6 restrict attention to the sample of married women.

[22] According to Banens (2000), the male/female ratio at birth has been normal (1.05) over the reconstituted period of the 20th century, with similar population growth rates across regions (see Table A2).
[23] This is a reasonable assumption given Tonkin's proximity to China and, as such, is more influenced by Confucianism. While the Viet people have inhabited the northern part of Vietnam for thousands of years, their settlement in the southern part started relatively recently, just three centuries ago.

Column 1 shows that while men's participation is hardly affected, women's participation in the labor market significantly decreases in both regions with an increase in export exposure. Looking at $\beta_1 - \alpha_1$ (which reflects the South-North difference in women's disproportionate response relative to men), we find that the decline in women's participation is roughly 1 pp larger in the South than in the North for one SD increase in export exposure.

[Table 7]

North-South historical differences. To ensure that the North-South difference in FLFP responses stems from the different political regimes and experiences during the Vietnam War (1954-1975) rather than other cultural and institutional differences between regions, we consider subsamples constituting the various territories of Vietnam, reflecting the historical and geographical development of the country.

The southernmost part of Vietnam (consisting of 12 provinces in the Mekong River Delta and three other southeastern provinces) was not incorporated into Vietnam until 1833.[24] The region once belonged to the Khmer Empire, potentially subjecting it to very different institutions and norms from the rest of Vietnam (historically Dai Viet). Using a regression discontinuity design, Dell et al. (2018) show persistent differences for villages on the two sides of the Dai Viet – Khmer border. In particular, economic development and living standards on the Dai Viet side of the boundary are higher, due to stronger norms regarding local cooperation and civic engagement. In addition, the Mekong River Delta plays a vital role in the agricultural production and food security of Vietnam as a whole: the delta produces half of the country's rice and one-third of its GDP, factors that may interact with female employment if women are

[24] The country gradually expanded southward (with the "Nam tien" movement, literally translated into moving towards the south), conquering the Kingdom of Champa along the central coast of Vietnam (starting from the beginning of the 14th century and completed in the end of the 17th century). Shortly afterward, Vietnamese settlers established the province of Gia Dinh (now Ho Chi Minh City).

disproportionately employed in agriculture. For these reasons, we first drop from the sample the 12 provinces in the Mekong River Delta (column 2) and then all the 15 that were historically on the Khmer side (column 3).

Upon excluding the southernmost provinces, point estimates suggest that the reduction in FLFP is more than twice as large in the South, and the difference is significant at the 1% level. This reinforces our hypothesis of cultural divergence between the two regions during the war. In columns 4-6, we repeat the analysis for married individuals only. The point estimates are somewhat larger but remain consistent with the results from the full sample.

North-South differences in economic structure. One could argue that the stronger reduction of female labor supply in the South of Vietnam is due to different economic structures between the two regions that may create relatively fewer employment opportunities for Southern women. One may also believe that due to the larger agricultural sector in the South, Southern women might face greater displacement when agricultural jobs disappear. Data from the Census 1999, however, do not support these conjectures. Panel (a) of Figure A6 illustrates that, in 1999, the economic structure of the two regions was similar.[25] Zooming into the manufacturing sector (Panel (b)), we see that although female and male workers concentrate in different industries, there is little North-South difference within gender.

In Table 8, we conduct a more direct check to support the argument that regional economic structures do not explain the stronger reduction in FLFP in the South, focusing on married individuals. To isolate the North-South behavioral differences, we estimate the effects of provincial export exposure predicted separately for female-intensive and male-intensive industries (see equation (1)). This approach ensures that the North-South difference in FLFP is

[25] If anything, a larger share of the workforce in the North is engaged in agricultural activities and slightly less engaged in manufacturing.

not driven by variations in the composition of exporting industries, particularly the female-friendliness of the jobs created. We define an industry as female-intensive if the share of female workers in that industry in 1999 is above the median (around 36%).

[Table 8]

For ease of comparison, column 1 replicates the baseline results for the married sample from column 4 of Table 7. In columns 2 and 3, we observe negative effects on women's working status in response to either method of constructing the provincial export exposure—both of which are strongly correlated, with the effects being larger in the South. Columns 4-6 confirm that these patterns hold when using only manufacturing industries to construct provincial export exposure.

North-South differences in home responsibilities. A remaining concern is that the observed North–South differences may stem from differing demands for women's home production across the two regions. For example, women in the South may have more children or larger families to care for, which could make it more difficult for them to participate in market work.

Using VHLSS data, Figure A7 shows similar household sizes in North and South Vietnam, with a gradual decline from 2002 to 2018. Using census data from 1999, 2009, and 2019, Figure A8 plots births per woman by age group (15–24, 25–39, 40–49), revealing similar declining trends across regions. The declining trend in fertility is most substantial for women aged 40–49, which aligns with the end of their fertile age and more closely reflects the total fertility rate. This pattern alleviates the concern that greater home responsibilities, rather than traditional gender role attitudes, are the primary drivers of North-South differences in women's participation in market work.

6.3 Heterogeneity by household income

In the previous section, we establish that the stronger trade-induced reduction FLFP of Southern compared to Northern women can be attributed to enduring differences in gender norms between the two regions, rather than other economic structure or institutional factors. How do these differences in gender norms influence the response of women across the wealth and income distributions? In this section, we revisit the heterogeneity analysis by household and husband's characteristics in Table 6, allowing for differential effects between the North and South. Results are presented in Figures 6 and 7 (estimates are reported in Tables A5 and A6, respectively).

[Figure 6]

[Figure 7]

While the negative impact on female labor supply in the North is primarily observed among women married to husbands in the top earnings quartile or in wealthier households, this gradient is absent in the South, where women reduce their labor supply across all quartiles of household wealth and husbands' earnings (Figure 6). This suggests that women's labor market attachment is weaker in the South, prompting them to decrease market work as soon as it becomes financially feasible. In contrast, Northern women demonstrate stronger labor market attachment, with the income effect becoming dominant only at a higher household income threshold. A similar pattern emerges when considering the husband's education and skill levels (Figure 7). These results highlight the interplay between gender norms and socioeconomic status: in traditional male breadwinner societies, the income effect manifests at lower thresholds, while in gender-egalitarian societies, it dominates at higher income levels. These results remain robust when excluding 12 provinces in the Mekong River Delta or all 15 provinces from the former Khmer Kingdom.

7. Further Evidence from Postwar Migration Policy

7.1 New Economic Zones program and North-born population in the South

We have so far argued that gender role attitudes, nurtured under different political regimes and experiences during the Vietnam War era are driving the North-South differences in women's labor supply responses to trade-induced regional economic growth. Still, one could argue that North and South Vietnam have always been vastly diverse geographically, economically, and culturally. To ensure that our results are indeed driven by different gender role attitudes prevalent in North vs. South Vietnam, rather than other deep-rooted institutional and environmental differences between the two regions, we exploit a historical event in which millions of people were moved across the country in the aftermath of the reunification of Vietnam.

Known as the New Economic Zones (NEZ) program and implemented by the Vietnam Communist Party, millions of people were relocated to uninhabited mountainous or rural areas in the southern and central regions, formerly part of South Vietnam. The NEZ policy played a vital role in Vietnamese planning, ranking as the top priority among all government agricultural projects. To ensure the success of these initiatives, the State integrated them into the five-year plans and annual socio-economic development plans (Jones 1982; Desbarats 1987; Dang et al. 1997; Gendreau 2000). During the first five-year period (1976-1980), over 1.5 million migrants (out of a target of four million) were relocated, 40% of whom came from the North. By the year 2000, more than five million people had relocated across the country. Table A7 provides details on planned and actual migration figures from 1976 to 2000.

The establishment of the NEZs served multiple objectives, including redistributing the population to alleviate overcrowding in the Red River Delta in the north and reducing urban population density in southern cities. Additionally, it aimed to reclaim lands for food

production to support a postwar nation facing food shortages, and address both internal and external security (General Statistics Office 1991).[26] Before the onset of Doi Moi in 1986, Vietnam's economy was heavily centralized, giving the Government substantial control over migratory flows. The organized resettlement program left migrants (or "resettlers") with little to no agency in determining their relocation. With the liberalization of the economy and the relaxation of social controls in recent years, internal migration has become increasingly less restricted.

The program's nature allows us to use it as a natural experiment, wherein North-born immigrants (with early exposure to socialism) are subject to the same environment as the Southern population (with later exposure to socialism).[27] Data from VHLSS 2014, 2016 and 2018 provide information on the birth province of individuals. Based on this information, we construct a dummy for birth origin, $BirthNorth_i$, indicating whether or not a person was born in North Vietnam. Figure 8 illustrates the shares of North-born individuals and all immigrants by provinces in South Vietnam. The eight darkest-shaded provinces are those with the highest share of immigrants, closely matching the designated New Economic Zones in the mountainous or rural areas. We refer to these provinces as the "Destination" ones.

[Figure 8]

In Figure A9, we present the average LFP rate by gender and place of birth (Southern-born vs. Northern-born) among individuals aged 20-64 residing in South Vietnam. The LFP rate among Northern-born women (living in the South) is very high, reaching as much as 90%

[26] The Central Highlands lie on the borders of Vietnam. The resettlement of inhabitants into thinly populated yet strategically sensitive areas near the Cambodian, Laotian, and Chinese borders was considered imperative for national defense (Desbarats 1987).

[27] In the context of North-South movement of employees at an Italian bank, Ichino and Maggi (2000) disentangle the effects of birth origin vs. current work location. In that paper, a small number of movers are assigned to a new environment in which the existing locals form the majority. In our context, the forced migrants from the North were placed in destinations that were largely uninhabited initially, making the environment conducive to retaining norms and values cultivated in the North.

in 2014. Although it declines slightly over time, their participation rate remains much higher than that of native Southern women.

7.2 Patterns of response by birth origin

In a sample of Southern provinces only, we estimate a variant of equation (2), interacting $Exposure_{pt}$ with a birth origin indicator (Northern-born or Southern-born) and with a gender indicator. We retain the sample of individuals who were born between 1954 and 1979, corresponding to the war and the early stage of the NEZ resettlement, thereby increasing the likelihood that they moved due to the program rather than self-selection into migration. [28] We additionally control for an interaction term between $BirthNorth_i$ and $Destination_p$ since Northern-born migrants living in the eight Destination provinces might have unobserved characteristics (e.g., reason for moving or relocation challenges) very different from those of people in the other areas, where $Destination_p$ is an indicator for being one of the Destination provinces (see Figure 8).

Results are reported in Table 9. In column 1, the sample consists of individuals residing in all Southern provinces. In column 2, the sample is further restricted to migrants living in the South, including both Southern-born migrants and Northern-born migrants. Since the Northern-born migrants were born and grew up under the socialist North, their exposure to the socialist regime is almost 30 years longer than that of the Southerners. To the extent that former

[28] We exclude those born before 1954 due to the historical event where over 1 million Northern residents fled to the South during the 300-day Passage of Freedom following the 1954 Geneva Accords. This group, known as *Bac-54* (literally North-1954), predominantly comprised political and Catholic refugees fleeing potential persecution by the communist government. Second, we exclude cohorts born after 1979 since we do not observe the timing of migration and therefore cannot be sure that they moved under the NEZ policy, particularly since 1986. Additionally, the income effect is less relevant for younger individuals, who are also more likely to be single. As discussed in section 5, the reduction in FLFP is primarily observed among married women. Nevertheless, we find similar results when extending the sample to cohorts born 1954-1989, as reported in Table A8.

exposure to socialism has long-lasting effects on gender role attitudes, we expect to see the Northern-born population living in the South behave more similarly to people living in the North. This is indeed the case for women born between 1954 and 1979. Focusing on column 1, the effect of export exposure on women's LFP (relative to men) is -0.038 for the Southern-born. The corresponding estimate for the Northern-born women is -0.024, or 37% smaller in absolute terms compared to the Southern-born women. This suggests that while both Northern-born migrants and native Southern women reduce their labor supply in response to export shocks, Northern-born women do so to a lesser extent, despite sharing the same contemporaneous institutions.

In column 2, we obtain similar results when restricting the sample to migrants only. The differential effect for Northern-born women relative to Southern-born women ($\beta_1 - \alpha_1$) is -0.010, significant at the 1% level. Directly comparing migrants of different birth origins helps alleviate concerns about potential unobserved differences between migrants and non-migrants, safeguarding the finding on the North-South differential effect among women against inherent migration characteristics. Interestingly, the magnitude of this difference mirrors that of our benchmark result in Table 7 (column 1) when comparing women who currently live in North and South Vietnam. In columns 3 and 4 where we further restrict the sample to Destination provinces, the results on the relative reduction of FLFP by gender and birth origin hold.

[Table 9]

8. Conclusions

We explore the impact of gender role attitudes on women's labor supply in response to rising incomes and expanding economic opportunities. Our study focuses on reunified Vietnam, particularly during the trade liberalization and rapid growth of the 2000s. While Vietnam today

shares similar institutions, its history of division (1954-1975) resulted in starkly different regimes and experiences in the North and South. The socialist North promoted gender equality and women's economic participation, whereas the capitalist South maintained a traditional male breadwinner norm.

Utilizing quasi-random variation in provincial export growth from 2002 to 2018, we find that positive export shocks, while facilitating the transition of workers from agriculture to the formal sector, significantly reduce women's LFP—especially among married women whose husbands are in skilled occupations. This decline is more pronounced in the South than in the North, and among native Southerners compared to Northerners who migrated south after the war.

Our findings suggest that the prevailing gender role attitudes—whether the male breadwinner norm or gender-egalitarian values—can influence women's engagement in the labor market in contrasting ways as incomes rise. This has important implications for emerging economies. A key question for future research will be whether women in the North will resist the resurgence of the male breadwinner norm or gradually adopt behaviors similar to those of their Southern counterparts in the coming decades.

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Table 1: Characteristics of working age population in North and South Vietnam

		North		South	
	(1) All	(2) Women	(3) Men	(4) Women	(5) Men
Panel A. All individuals aged 20-64					
Female	0.51	1.00	0.00	1.00	0.00
	(0.50)	(0.00)	(0.00)	(0.00)	(0.00)
Year of birth	1971.69	1971.21	1971.70	1971.40	1972.42
	(13.03)	(13.19)	(13.23)	(12.94)	(12.79)
Age	39.87	40.22	39.78	40.21	39.30
	(12.31)	(12.37)	(12.40)	(12.26)	(12.19)
Married	0.84	0.89	0.83	0.85	0.78
	(0.37)	(0.31)	(0.37)	(0.36)	(0.42)
Ethnic Viet (majority)	0.83	0.74	0.73	0.91	0.91
	(0.38)	(0.44)	(0.45)	(0.29)	(0.29)
Education:					
None	0.20	0.16	0.12	0.29	0.20
	(0.40)	(0.36)	(0.32)	(0.45)	(0.40)
Primary school	0.24	0.18	0.16	0.31	0.29
	(0.43)	(0.38)	(0.37)	(0.46)	(0.46)
Lower secondary school	0.26	0.34	0.33	0.17	0.21
	(0.44)	(0.48)	(0.47)	(0.38)	(0.41)
Upper secondary/Vocational training or more	0.31	0.32	0.39	0.24	0.29
	(0.46)	(0.47)	(0.49)	(0.42)	(0.46)
Work in the last 12 months	0.89	0.91	0.92	0.82	0.92
	(0.31)	(0.28)	(0.27)	(0.38)	(0.28)
Observations	402833	94795	90544	110788	106706
Panel B. Conditional on having worked in the past 12 months					
Formal sector	0.22	0.21	0.23	0.22	0.24
	(0.42)	(0.40)	(0.42)	(0.41)	(0.42)
Working in foreign firms	0.03	0.04	0.02	0.04	0.02
	(0.17)	(0.19)	(0.13)	(0.20)	(0.15)
Industry:					
Agriculture	0.48	0.57	0.46	0.43	0.46
	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)
Manufacturing	0.14	0.14	0.14	0.16	0.12
	(0.35)	(0.35)	(0.34)	(0.37)	(0.33)
Construction	0.07	0.02	0.15	0.01	0.11
	(0.26)	(0.15)	(0.35)	(0.11)	(0.31)
Services	0.31	0.26	0.26	0.39	0.31
	(0.46)	(0.44)	(0.44)	(0.49)	(0.46)
Occupation:					
Elementary occupations	0.54	0.64	0.53	0.53	0.49
	(0.50)	(0.48)	(0.50)	(0.50)	(0.50)
Medium skilled occupations	0.36	0.26	0.38	0.38	0.42
	(0.48)	(0.44)	(0.49)	(0.49)	(0.49)
Managers/Professionals	0.09	0.10	0.09	0.09	0.09
	(0.29)	(0.29)	(0.28)	(0.29)	(0.29)
Observations	358806	86520	83246	91290	97750

Notes: Mean characteristics of individuals aged 20-64 in VHLSS 2002-2018 are reported. Panel B includes those who worked in the last 12 months. Armed forces occupations, representing 0.3% of total workforce, are excluded from the analysis. Standard deviations in parentheses.

Table 2: Provincial exports and employment responses

	Dependent variable: Work			
	(1)	(2)	(3)	(4)
Exposure	-0.007	-0.013***	0.003	
	(0.005)	(0.004)	(0.005)	
Female × Exposure			-0.031***	-0.031***
			(0.007)	(0.007)
Province FE	Yes	Yes	Yes	No
Year FE	Yes	Yes	No	No
Gender-by-year FE	No	No	Yes	Yes
Province-by-year FE	No	No	No	Yes
Province initial characteristics × year FE				
Share of manufacturing employment	Yes	Yes	Yes	No
Manufacturing gross output per capita	No	Yes	Yes	No
Service gross output per capita	No	Yes	Yes	No
Female labor force participation	No	Yes	Yes	No
Kindergarten classes per 0-5 child	No	Yes	Yes	No
Mean dep. var.	0.891	0.891		
Mean dep. var. - Men			0.918	0.918
Mean dep. var. - Women			0.865	0.865
Observations	402,833	402,833	402,833	402,833
R^2	0.128	0.129	0.131	0.132

Notes: "Work" is a dummy indicating whether the individual worked at any time during the past 12 months. The sample includes all individuals aged 20-64. All columns control for age in cubic polynomial, gender, education level, ethnicity, province fixed effects, year fixed effects, and interactions of provinces' initial characteristics with year dummies. Provinces' initial characteristics are taken from the Vietnam Statistical Yearbook 1999. Columns 3 and 4 allow for gender-by-year fixed effects. Column 4 allows for province-by-year fixed effects. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Effect of alternative indicators of development on employment

	Dependent variable: Work							
	Traded 2002-2018		Manufacturing 2002-2018		Traded 2010-2018		Log GRDP p/c 2010-2018	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure	-0.013***	0.003	-0.007	0.007	-0.009	0.006		
	(0.004)	(0.005)	(0.006)	(0.008)	(0.008)	(0.007)		
Female × Exposure		-0.031***		-0.027***		-0.029***		
		(0.007)		(0.005)		(0.007)		
Log GRDP per capita							-0.024*	-0.009
							(0.014)	(0.015)
Female × Log GRDP per capita								-0.030*
								(0.016)
Mean dep. var. - Men	0.918	0.918	0.918	0.918	0.917	0.917	0.917	0.917
Mean dep. var. - Women	0.865	0.865	0.865	0.865	0.859	0.859	0.859	0.859
Observations	402,833	402,833	402,833	402,833	270,731	270,731	270,731	270,731
R^2	0.129	0.131	0.129	0.131	0.131	0.132	0.131	0.131

Notes: Columns 1 and 2 report the baseline results from columns 2 and 3 of Table 2, where Exposure is export exposure driven by all traded industries. In columns 3 and 4, Exposure is export exposure driven by manufacturing industries. In columns 5 to 8, the time frame is restricted to 2010-2018. Columns 5 and 6 report the effects of export exposure driven by all traded industries. Columns 7 and 8 report the effects of log GRDP per capita. "Work" is a dummy indicating whether the individual worked at any time during the past 12 months. The sample includes all individuals aged 20-64. All columns control for age in cubic polynomial, gender, education level, ethnicity, province fixed effects, year fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Columns 2, 4, 6, and 8 allow for gender-by-year fixed effects. Standard errors are clustered at the province level, $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Provincial exports and sectoral allocation of workers

	Sector				Employer	
	(1) Agriculture	(2) Manufacturing	(3) Construction	(4) Services	(5) Formal firm	(6) Foreign firm
Panel A. Overall effect						
Exposure	-0.044**	0.020	-0.002	0.026***	0.024*	0.019*
	(0.020)	(0.019)	(0.004)	(0.007)	(0.013)	(0.010)
Mean dep. var.	0.479	0.142	0.072	0.307	0.223	0.031
Observations	358,806	358,806	358,806	358,806	358,338	358,338
R^2	0.285	0.089	0.072	0.185	0.285	0.093
Panel B. Effect by gender						
Exposure	-0.032*	0.013	0.003	0.016**	0.024*	0.012
	(0.018)	(0.018)	(0.005)	(0.008)	(0.012)	(0.010)
Female × Exposure	-0.025**	0.015***	-0.009	0.019***	0.000	0.014***
	(0.010)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)
Mean dep. var. - Men	0.458	0.130	0.127	0.286	0.232	0.021
Mean dep. var. - Women	0.501	0.154	0.017	0.328	0.213	0.041
Observations	358,806	358,806	358,806	358,806	358,338	358,338
R^2	0.285	0.090	0.073	0.186	0.285	0.096

Notes: The dependent variable in each column is a dummy indicator for being in the respective sector. The sample is restricted to working individuals aged 20-64. All columns control for age in cubic polynomial, gender, education level, ethnicity, province fixed effects, year fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). All columns in Panel B allow for gender-by-year fixed effects. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Heterogeneous effects by marital status

	Dependent variable: Work	
	(1)	(2)
Single		
Exposure	0.016*	0.018**
	(0.009)	(0.009)
Female × Exposure		-0.006
		(0.006)
Married		
Exposure	-0.019***	-0.002
	(0.004)	(0.005)
Female × Exposure		-0.033***
		(0.008)
Mean dep. var.	0.891	0.891
Observations	402,833	402,833
R^2	0.143	0.145

Notes: "Work" is a dummy indicating whether the individual worked at any time during the past 12 months. The sample includes all individuals aged 20-64. All columns control for age in cubic polynomial, gender, education level, ethnicity, province fixed effects, marital-status-by-year fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Column 2 allows for gender-by-year fixed effects and for gender-by-marital-status fixed effects. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Heterogeneous effects by wealth and husband's characteristics

	Dependent variable: Work				
	(1) Household wealth	(2) Husband hourly wage	(3) Husband annual earnings	(4) Husband education	(5) Husband occupation
Exposure	-0.006	-0.005	-0.005	-0.014***	-0.007
	(0.006)	(0.007)	(0.007)	(0.005)	(0.005)
Q2 × Exposure	-0.000	-0.000	0.001		
	(0.003)	(0.006)	(0.005)		
Q3 × Exposure	-0.007	-0.001	-0.001		
	(0.004)	(0.005)	(0.005)		
Q4 × Exposure	-0.013**	-0.015***	-0.014**		
	(0.006)	(0.004)	(0.005)		
Medium × Exposure				0.005	-0.012***
				(0.003)	(0.003)
High × Exposure				-0.004	-0.013
				(0.007)	(0.010)
Mean dep. var.	0.891	0.909	0.909	0.927	0.927
Observations	177,778	45,171	45,171	118,673	118,673
R^2	0.132	0.118	0.120	0.088	0.090

Notes: The sample is restricted to married women aged 20-64. Column 1 include married women with information on household wealth, columns 2 and 3 include married women whose husbands do waged work with information on hourly wage and annual earnings, columns 4 and 5 include married women with information on husbands' education and occupation skill level. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Additionally, columns 1 to 3 control for family SES quartile-specific year fixed effects (type of family SES is indicated at the top of the column), the reference group is Q1. Columns 4 controls husband education level-specific year fixed effects, the reference group is low education. Columns 5 control for husband occupation skill-specific year fixed effects, the reference group is low-skill occupation. Standard errors are clustered at province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Employment responses across various choices of territory

	Dependent variable: Work					
	Whole sample			Married		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Excl. 12 provinces in Mekong River Delta	Excl. 15 provinces on Khmer side pre-1833	All	Excl. 12 provinces in Mekong River Delta	Excl. 15 provinces on Khmer side pre-1833
North						
Exposure (α_0)	-0.005	-0.004	-0.005	-0.005	-0.004	-0.004
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
Female × Exposure (α_1)	-0.013***	-0.015***	-0.015***	-0.017***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
South						
Exposure (β_0)	-0.008	-0.005	-0.003	0.003	0.005	0.006
	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)
Female × Exposure (β_1)	-0.022***	-0.031***	-0.035***	-0.029***	-0.038***	-0.042***
	(0.006)	(0.005)	(0.005)	(0.007)	(0.006)	(0.006)
$\beta_0 - \alpha_0$	-0.003	-0.001	0.001	0.008	0.009	0.010*
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)
$\beta_1 - \alpha_1$	-0.009*	-0.017***	-0.020***	-0.012*	-0.020***	-0.023***
	(0.005)	(0.005)	(0.004)	(0.006)	(0.005)	(0.005)
Mean dep. var.	0.891	0.897	0.898	0.920	0.930	0.931
Observations	402,833	317,355	299,693	336,504	265,385	250,942
R^2	0.134	0.145	0.148	0.124	0.128	0.129

Notes: 12 provinces in Mekong River Delta include Long An, Tien Giang, Ben Tre, Tra Vinh, Vinh Long, Dong Thap, An Giang, Kien Giang, Can Tho, Hau Giang, Soc Trang, Bac Lieu, Ca Mau. 15 provinces on the Khmer side pre-1833 include the 12 provinces in Mekong River Delta and Tay Ninh, Binh Duong, Binh Phuoc. The sample is restricted to working individuals aged 20-64 in columns 1 to 3, and married working individuals aged 20-64 in columns 4 to 6. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, gender-by-year fixed effects, gender-by-region fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Employment responses driven by female- vs. male-intensive industry

	Dependent variable: Work					
	Traded			Manufacturing		
	(1) All	(2) Female-intensive	(3) Male-intensive	(4) All	(5) Female-intensive	(6) Male-intensive
North						
Exposure (α_0)	-0.005	-0.007	0.004	-0.007	-0.007	0.007
	(0.004)	(0.006)	(0.003)	(0.006)	(0.006)	(0.004)
Female × Exposure (α_1)	-0.017***	-0.018***	-0.011***	-0.012***	-0.011***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
South						
Exposure (β_0)	0.003	-0.008	0.009	0.002	-0.006	0.011
	(0.006)	(0.011)	(0.006)	(0.010)	(0.010)	(0.008)
Female × Exposure (β_1)	-0.029***	-0.026***	-0.024***	-0.026***	-0.024***	-0.019*
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.010)
$\beta_0 - \alpha_0$	0.008	-0.001	0.004	0.009	0.001	0.004
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
$\beta_1 - \alpha_1$	-0.012*	-0.009	-0.013**	-0.014**	-0.012**	-0.009
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)
Mean dep. var.	0.920	0.920	0.920	0.920	0.920	0.920
Observations	336,504	336,504	336,504	336,504	336,504	336,504
R^2	0.124	0.124	0.124	0.124	0.124	0.123

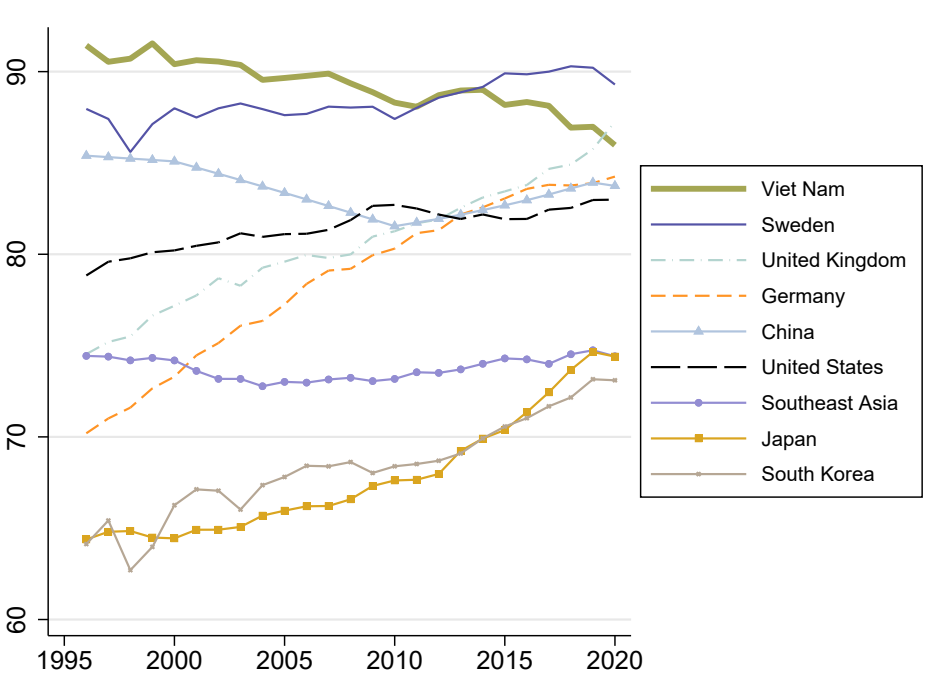
Notes: Column 1 reports the baseline results from column 4 of Table 7. In columns 1 to 3, Exposure is export exposure driven by traded industries. In columns 4 to 6, Exposure is export exposure driven by manufacturing industries. Columns 1 and 4 use export exposure driven by all industries, columns 2 and 5 use female-intensive industries, and columns 3 and 6 use male-intensive industries. An industry is female-intensive if the share of female workers in that industry is above median (36%) in 1999, and male-intensive otherwise. The sample is restricted to married individuals aged 20-64. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, gender-by-year fixed effects, gender-by-region fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Columns 2, 3, 5, and 6 additionally control for interactions of provinces' initial share of employment in female-intensive manufacturing with year dummies. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Employment responses by birth origin within the South, cohorts 1954-1979

	Dependent variable: Work			
	All Southern provinces		Destination provinces	
	(1) All	(2) Migrants	(3) All	(4) Migrants
Southern-born				
Exposure (α_0)	-0.004	-0.085	-0.193	-0.192
	(0.020)	(0.055)	(0.145)	(0.237)
Female × Exposure (α_1)	-0.038***	-0.035***	-0.036***	-0.030**
	(0.007)	(0.007)	(0.007)	(0.009)
Northern-born				
Exposure (β_0)	-0.002	-0.088	-0.194	-0.194
	(0.021)	(0.055)	(0.145)	(0.236)
Female × Exposure (β_1)	-0.024***	-0.024***	-0.021***	-0.021***
	(0.005)	(0.005)	(0.006)	(0.006)
$\beta_0 - \alpha_0$	0.002	-0.003	-0.001	-0.002
	(0.004)	(0.003)	(0.004)	(0.003)
$\beta_1 - \alpha_1$	0.014*	0.010***	0.014**	0.009*
	(0.007)	(0.004)	(0.006)	(0.004)
Mean dep. var.	0.880	0.877	0.900	0.905
Observations	72,901	17,430	17,934	11,205
R^2	0.114	0.147	0.109	0.115

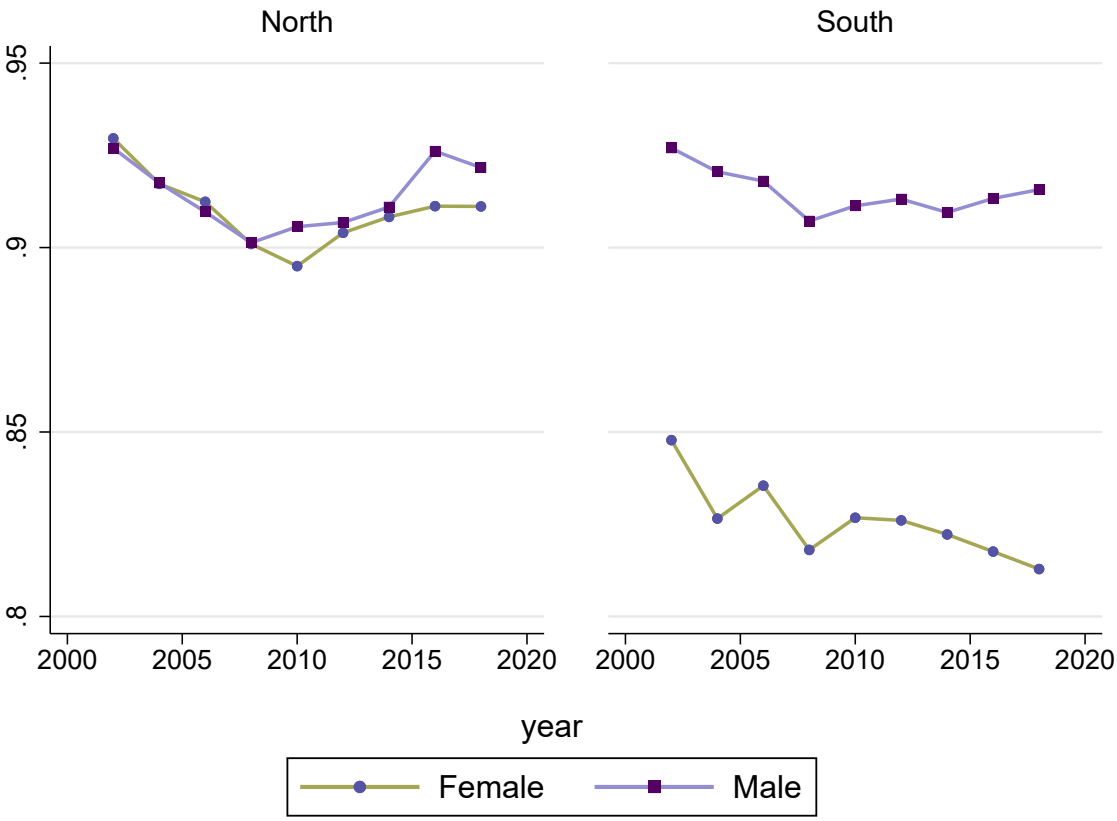
Notes: In columns 1 and 2, the sample includes all 32 provinces in the South. In columns 3 and 4, the sample includes eight "Destination" provinces in the South–those with highest shares of Northern-born immigrants. The sample is restricted to individuals aged 20-64 from 1954-1979 birth cohorts. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, gender-by-year fixed effects, gender-by-birth-origin fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Columns 1 and 2 control for for gender-by-birth-origin-by-destination fixed effects. Columns 1 and 3 control for birth-origin-by-destination fixed effects. Birth origin is an indicator for being born in the North. Destination is an indicator for living in a Destination province. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Female to male labor force participation rate across countries



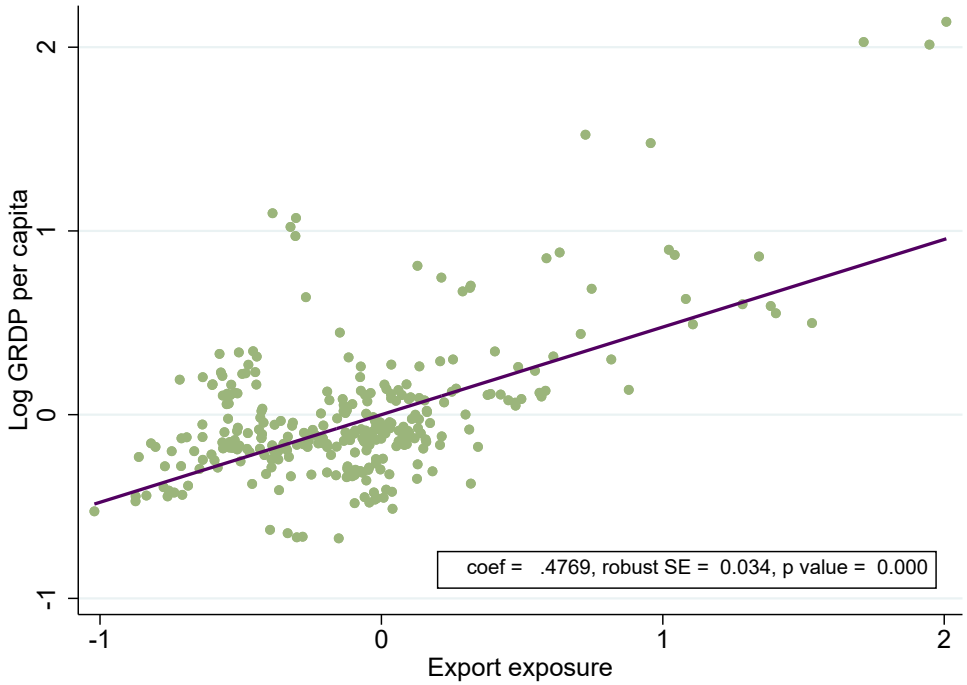
Notes: Southeast Asia includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. Sources: International Labor Organization.

Figure 2: Labor force participation rate by gender and region in Vietnam, 2002-2018



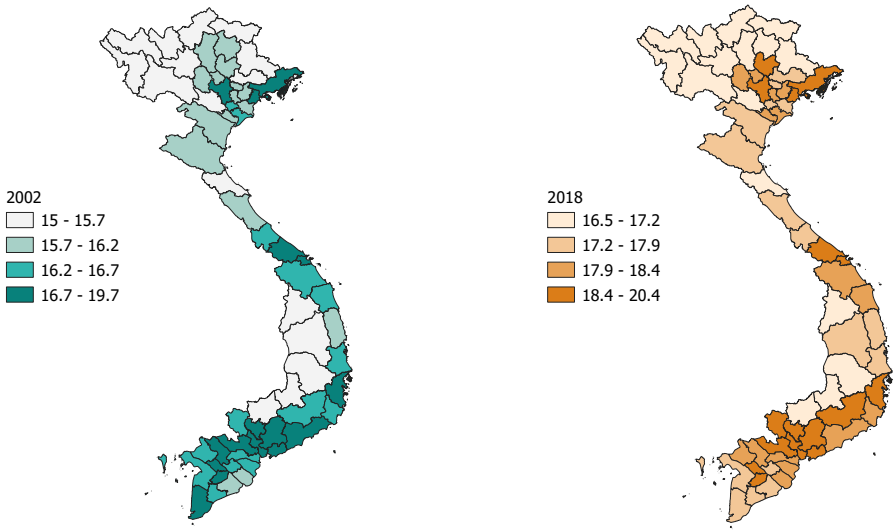
Notes: This figure plots the share of individuals aged 20-64 who reported to have worked in the last 12 months.
Source: VHLSS 2002-2018.

Figure 3: Regional development indicators: Log GRDP per capita vs. export exposure

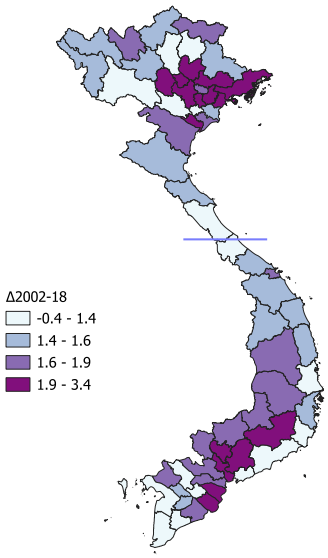


Notes: N = 120. Observations at province-year level, data in 2010-2018. Data on provinces' Gross Regional Domestic Product per capita (GRDP per capita) are from the General Statistics Office of Vietnam (GSO). Export exposure is log predicted export per worker, as defined in equation (1). The plots partial out year-specific effects of a province's share of manufacturing employment in 1999. Regression models are weighted by provinces' share of national population in 1999. A province's share of manufacturing employment in 1999 and share of the national population in 1999 are taken from the Census 1999.

Figure 4: Spatial variation in export exposure between 2002 and 2018



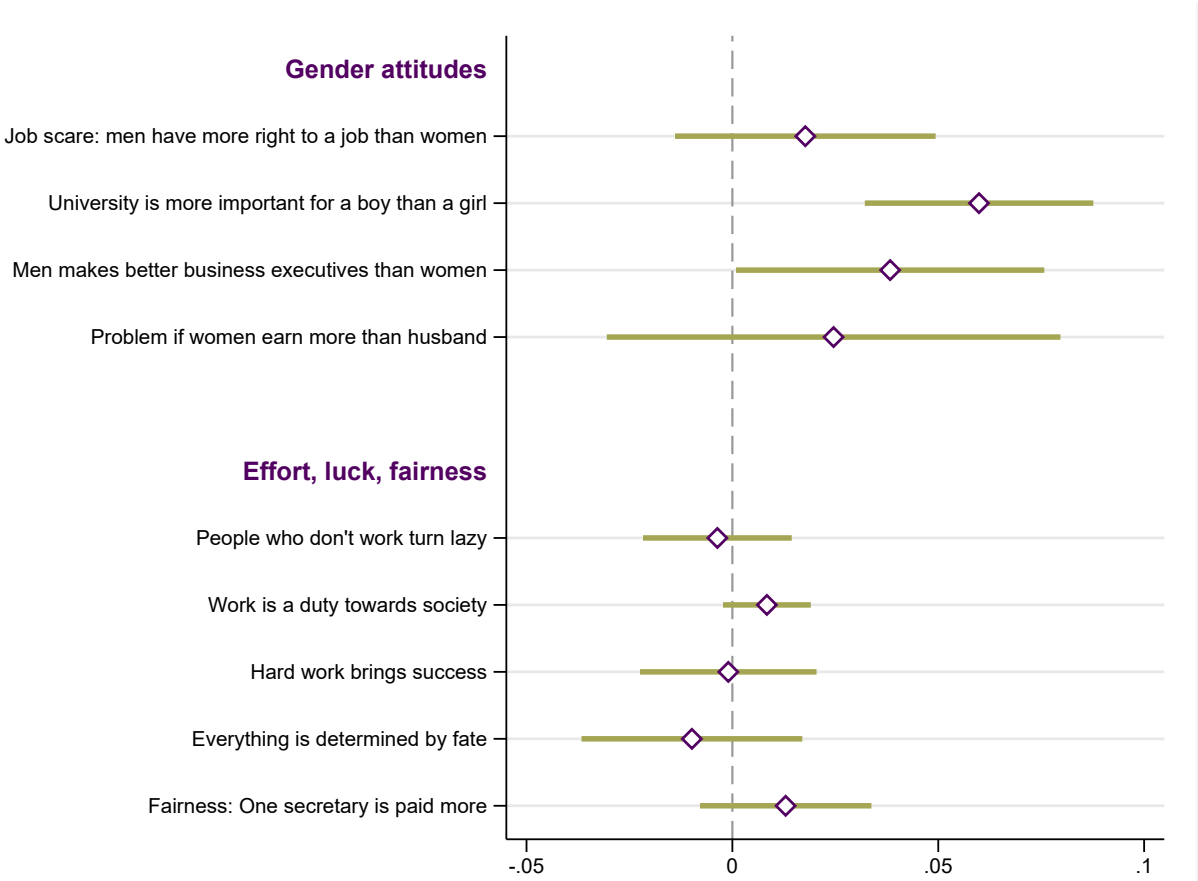
(a) Export exposure in 2002 and 2018



(b) Change in export exposure, 2002-2018

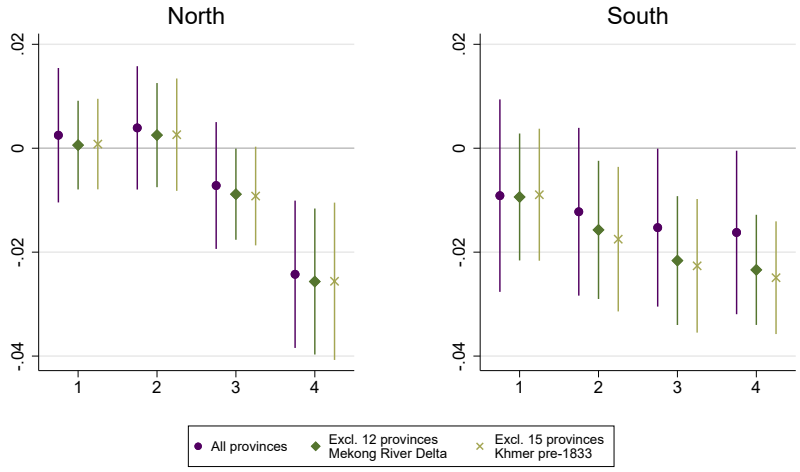
Notes: Export exposure is log predicted export per worker, as defined in equation (1). Export values (constant 2018 VND) from United Nations Comtrade Database (UN Comtrade) are adjusted for the Consumer Price Index obtained from the General Statistics Office (GSO) of Vietnam. In Panel B, the solid purple line represents the 17th parallel north, the Demilitarized Zone dividing North and South Vietnam.

Figure 5: Opinions of Southern Vietnamese compared to Northern Vietnamese

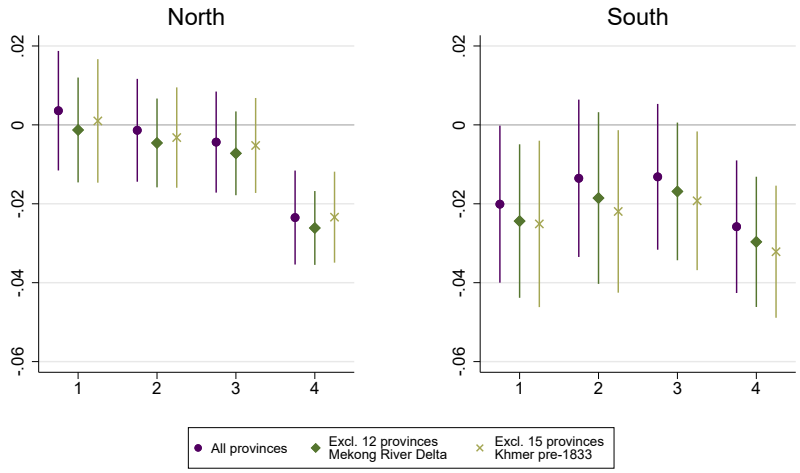


Notes: Coefficients come from separate regressions of each outcome (opinion) on the South indicator, controlling for year fixed-effects, with confidence intervals at 95% level. Answers are recoded from "Strongly Agree", "Agree" and "Neither" into 1 (Agree); "Disagree" and "Strongly Disagree" into 0 (Disagree). Source: World Values Survey 2001, 2006 and 2019.

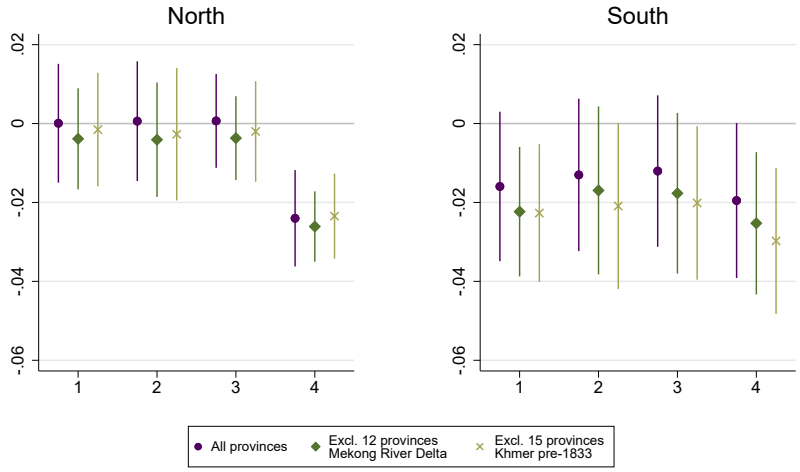
Figure 6: Heterogeneous effects by quartile of wealth and husband earnings



(a) Household wealth



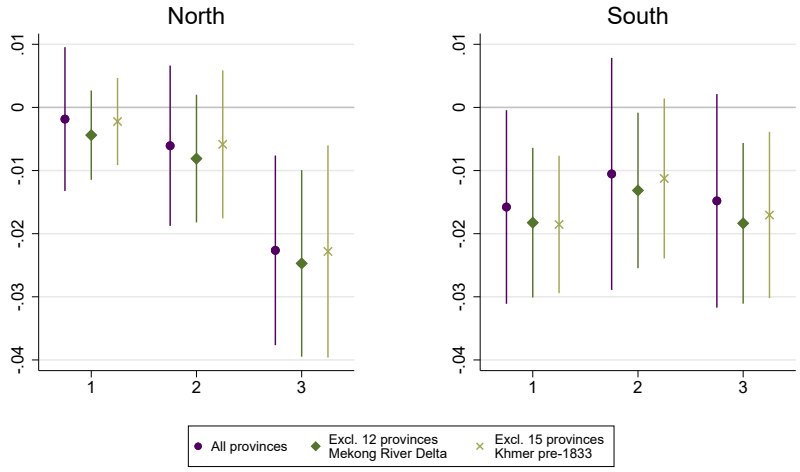
(b) Husband's hourly wage



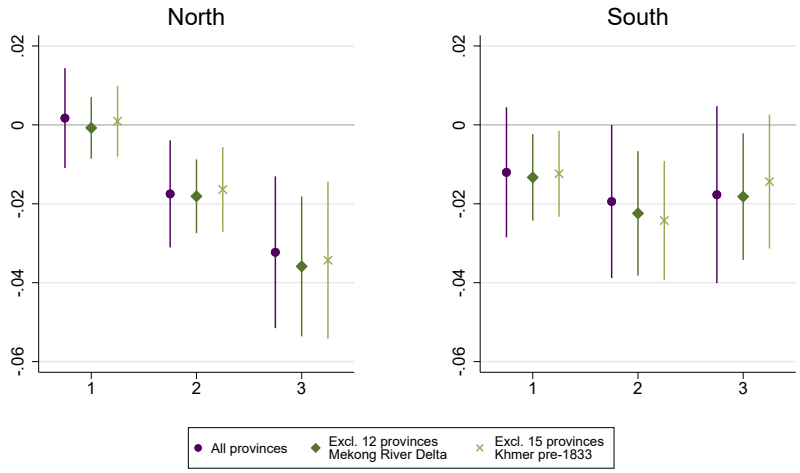
(c) Husband's annual earnings

Notes: The sample is restricted to married women aged 20-64. Coefficients (with 95% confidence intervals) are obtained from a regression where we interact $Exposure_{pt}$ *in equation (2) with quartile of wealth or husband earnings and indicator for South, controlling for age in cubic polynomial, education level, ethnicity, province fixed effects, interactions of provinces' initial characteristics with year fixed effects, quartile-by-region fixed effects, and quartile-specific year fixed effects. Standard errors are clustered at the province level,* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 7: Heterogeneous effects by husband education and occupation skill



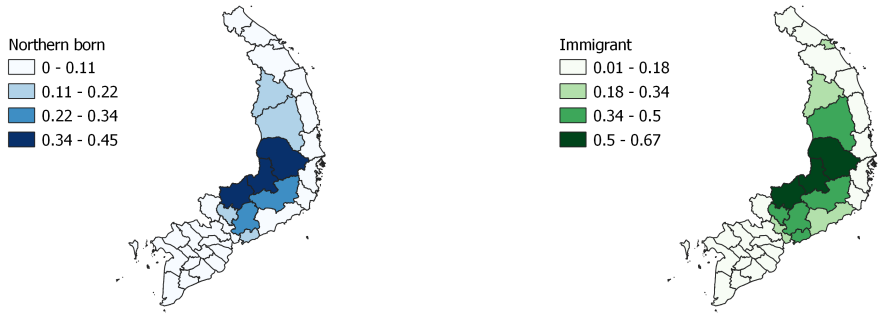
(a) Husband education level



(b) Husband occupation skill

Notes: The sample is restricted to married women aged 20-64. Coefficients (with 95% confidence intervals) are obtained from a regression where we interact $Exposure_{pt}$ *in equation (2) with level of husband education or husband occupation skill and indicator for South, controlling for age in cubic polynomial, education level, ethnicity, province fixed effects, interactions of provinces' initial characteristics with year fixed effects, husband-education/occupation-by-region fixed effects, and husband-education/occupation year fixed effects. Standard errors are clustered at the province level,* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 8: Northern-born and immigrant shares by provinces in South Vietnam



Notes: Northern born are people whose birth province belongs to former North Vietnam. Immigrants are those born in a province different from the current province, regardless of whether the birth province is in North or South Vietnam. Source: VHLSS 2014 – 2018.

Appendix A

Table A1: Summary statistics of Exposure and growth of exports across provinces between 2002 and 2018

Panel A. Descriptive statistics of Exposure

	Mean	Std. dev.	Min	Max	Obs.
Exposure	17.271	0.952	15.046	20.413	540

Panel B. Top 10 largest exporting provinces by year

	Year 2002			Year 2018		
Rank	Province	Exposure	Export per worker (million VND)	Province	Exposure	Export per worker (million VND)
1	Ba Ria - Vung Tau	19.721	367.109	Ho Chi Minh City	20.353	690.453
2	Ho Chi Minh City	18.252	84.497	Ha Noi, Ha Tay	19.978	474.519
3	Dong Nai	17.833	55.582	Dong Nai	19.927	451.059
4	Binh Duong	17.731	50.173	Binh Duong	19.864	423.333
5	Da Nang	17.537	41.318	Thai Nguyen	19.433	275.26
6	Hai Phong	17.237	30.61	Ba Ria - Vung Tau	19.351	253.601
7	Ha Noi, Ha Tay	17.199	29.486	Hai Phong	19.275	235.005
8	Khanh Hoa	17.057	25.563	Da Nang	19.214	220.963
9	Quang Ninh	17.028	24.842	Quang Ninh	18.997	178.002
10	Thua Thien-Hue	16.992	23.965	Long An	18.692	131.162

Panel C. Top 10 largest change in Exposure in period 2002-2018

Rank ΔExposure	Province	ΔExposure	ΔExport per worker (million VND)
1	Thai Nguyen	3.398	266.056
2	Ha Noi, Ha Tay	2.778	445.033
3	Phu Tho	2.349	78.256
4	Bac Giang	2.231	43.885
5	Hung Yen	2.138	68.03
6	Binh Duong	2.133	373.16
7	Ben Tre	2.13	81.395
8	Ho Chi Minh City	2.101	605.957
9	Dong Nai	2.094	395.477
10	Hai Phong	2.038	204.395

Notes: Observations at province-year level, with 60 provinces in 9 time periods. Exposure is constructed according to equation (1). Export values (constant 2018 VND) from United Nations Comtrade Database (UN Comtrade) are adjusted for Consumer Price Index obtained from the General Statistics Office (GSO) of Vietnam.

Table A2: Population by regions before and after the 1954 division

Panel A. Population growth rate before 1945

	Tonkin (north)	Annam (center)	Cochinchina (south)	Vietnam (total)
Gross birth rate	37.8	29.6	37	37.5
Gross death rate	22-24	17.6	24.1	24.2
Growth rate	14	12	12.9	13.3

Panel B. Population before the 1954 division (in millions)

	Tonkin (north)	Annam (center)	Cochinchina (south)	Vietnam (total)
1901	5.5	4.5	3	13
1911	6.1	5.5	3.8	14.7
1921	6.9	4.9	3.8	15.8
1926	7.4	5.6	4.1	17.1
1931	8.1	5.1	4.8	17.7
1936	8.7	5.7	4.6	19
1943	9.8	7.2	5.6	22.6

Panel C. Population after the 1954 division (in millions)

	North Vietnam	South Vietnam	Vietnam
1955	13.6	13.6	27.2

Sources: Banens (2000) (constructed from Indochina Statistical Yearbooks and Vietnam Statistical Yearbooks).

Table A3: Wage effect by gender

	Dependent variable: Log annual earnings			
	Main job		All jobs (incl. benefits)	
	(1)	(2)	(3)	(4)
Exposure	0.088***	0.096***	0.104***	0.103***
	(0.024)	(0.025)	(0.034)	(0.035)
Female × Exposure		-0.018		0.003
		(0.012)		(0.014)
Mean dep. var. - Men	10.546	10.546	10.320	10.320
Mean dep. var. - Women	10.395	10.395	10.173	10.173
Observations	137,802	137,802	168,178	168,178
R^2	0.461	0.461	0.455	0.455

Notes: The dependent variable in columns 1 and 2 is log annual salary from the main job, in columns 3 and 4 is log annual earnings from all jobs including bonuses and benefits. The sample includes individuals aged 20-64 working for wage or salary. All columns control for age in cubic polynomial, gender, education level, ethnicity, province fixed effects, year fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Columns 2 and 4 allow for gender-by-year fixed effects. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Wage effect by gender and region

	Dependent variable: Log annual earnings					
	Main job			All jobs (incl. benefits)		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Excl. 12 provinces in Mekong River Delta	Excl. 15 provinces on Khmer side pre-1833	All	Excl. 12 provinces in Mekong River Delta	Excl. 15 provinces on Khmer side pre-1833
North						
Male × Exposure (α_0)	0.098***	0.109***	0.101***	0.111***	0.133***	0.110***
	(0.027)	(0.033)	(0.035)	(0.036)	(0.040)	(0.034)
Female × Exposure (α_1)	0.063**	0.071**	0.066*	0.093***	0.115***	0.096***
	(0.027)	(0.034)	(0.036)	(0.031)	(0.034)	(0.032)
South						
Male × Exposure (β_0)	0.111***	0.129**	0.108**	0.098**	0.127**	0.090*
	(0.040)	(0.048)	(0.052)	(0.046)	(0.048)	(0.049)
Female × Exposure (β_1)	0.127***	0.135***	0.114**	0.129***	0.156***	0.119**
	(0.038)	(0.047)	(0.049)	(0.046)	(0.046)	(0.045)
$\beta_0 - \alpha_0$	0.013	0.021	0.008	-0.012	-0.006	-0.020
	(0.037)	(0.047)	(0.049)	(0.032)	(0.033)	(0.032)
$\beta_1 - \alpha_1$	0.064*	0.064	0.048	0.036	0.040	0.023
	(0.036)	(0.045)	(0.047)	(0.036)	(0.033)	(0.032)
Mean dep. var.	10.484	10.550	10.546	10.261	10.312	10.295
Observations	137,802	109,807	101,750	168,178	134,427	125,546
R^2	0.462	0.457	0.459	0.455	0.474	0.475

Notes: 12 provinces in Mekong River Delta include Long An, Tien Giang, Ben Tre, Tra Vinh, Vinh Long, Dong Thap, An Giang, Kien Giang, Can Tho, Hau Giang, Soc Trang, Bac Lieu, Ca Mau. 15 provinces on the Khmer side pre-1833 include the 12 provinces in Mekong River Delta and Tay Ninh, Binh Duong, Binh Phuoc. The dependent variable in columns 1 to 3 is log annual salary from the main job, in columns 4 to 6 is log annual earnings from all jobs including bonuses and benefits. The sample includes individuals aged 20-64 working for wage or salary. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, gender-by-year fixed effects, gender-by-region fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Heterogeneous effects by wealth and husband earnings: North-South difference

	Household wealth	Husband hourly wage	Husband annual earnings
	(1)	(2)	(3)
North			
Exposure (α_0)	0.003	0.004	0.000
	(0.006)	(0.008)	(0.008)
Q2 × Exposure (α_1)	0.001	-0.005	0.001
	(0.004)	(0.006)	(0.006)
Q3 × Exposure (α_2)	-0.010*	-0.008	0.001
	(0.006)	(0.006)	(0.004)
Q4 × Exposure (α_3)	-0.027***	-0.027***	-0.024***
	(0.007)	(0.005)	(0.005)
South			
Exposure (β_0)	-0.009	-0.020**	-0.016*
	(0.009)	(0.010)	(0.009)
Q2 × Exposure (β_1)	-0.003	0.007	0.003
	(0.005)	(0.010)	(0.006)
Q3 × Exposure (β_2)	-0.006	0.007	0.004
	(0.006)	(0.008)	(0.008)
Q4 × Exposure (β_3)	-0.007	-0.006	-0.004
	(0.005)	(0.007)	(0.009)
$\beta_0 - \alpha_0$	-0.012*	-0.024**	-0.016**
	(0.007)	(0.009)	(0.007)
Mean dep. var.	0.891	0.909	0.909
Observations	177,778	45,171	45,171
R^2	0.133	0.118	0.121

Notes: The sample is restricted to married women aged 20-64. Column 1 include married women with information on household wealth, columns 2 and 3 include married women whose husbands do waged work with information on hourly wage and annual earnings. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, interactions of provinces' initial characteristics with time dummies (as in column 3 of Table 2). Additionally, each column controls for family SES quartile × south fixed effects and quartile-specific year fixed effects (type of family SES is indicated at the top of the column). In each region, the reference group is Q1. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Heterogeneous effects by husband education and occupation skill: North-South difference

	Dependent variable: Work	
	Husband education	Husband occupation
	(1)	(2)
North		
Exposure (α_0)	-0.002	0.002
	(0.006)	(0.006)
Medium × Exposure (α_2)	-0.004	-0.019***
	(0.004)	(0.003)
High × Exposure (α_3)	-0.021***	-0.034***
	(0.007)	(0.007)
South		
Exposure (β_0)	-0.016**	-0.012
	(0.008)	(0.008)
Medium × Exposure (β_2)	0.005	-0.007*
	(0.004)	(0.004)
High × Exposure (β_3)	0.001	-0.006
	(0.004)	(0.006)
$\beta_0 - \alpha_0$	-0.014**	-0.014**
	(0.006)	(0.006)
Mean dep. var.	0.927	0.927
Observations	118,673	118,673
R^2	0.088	0.091

Notes: The sample is restricted to married women aged 20-64 with information on husbands' education and occupation skill level. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Additionally, column 1 controls for husband education level × south fixed effects and husband education level-specific year fixed effects, and column 2 controls for husband occupation skill level × south fixed effects and husband occupation skill-specific year fixed effects. In each region, the reference group is low education (column 1) or low-skill occupation (column 2). Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Number of immigrants to New Economic Zones

Period	Objective	Achievement	Annual average
1976-1980	4,000,000	1,520,600	304,120
1981-1985	1,000,000	1,257,300	251,460
1986-1990	1,600,000	1,142,600	228,520
1991-1995	1,000,000	902,000	180,400
1996-2000	1,000,000	210,700*	105,350*
Total	8,600,000	5,033,200**	239,700**

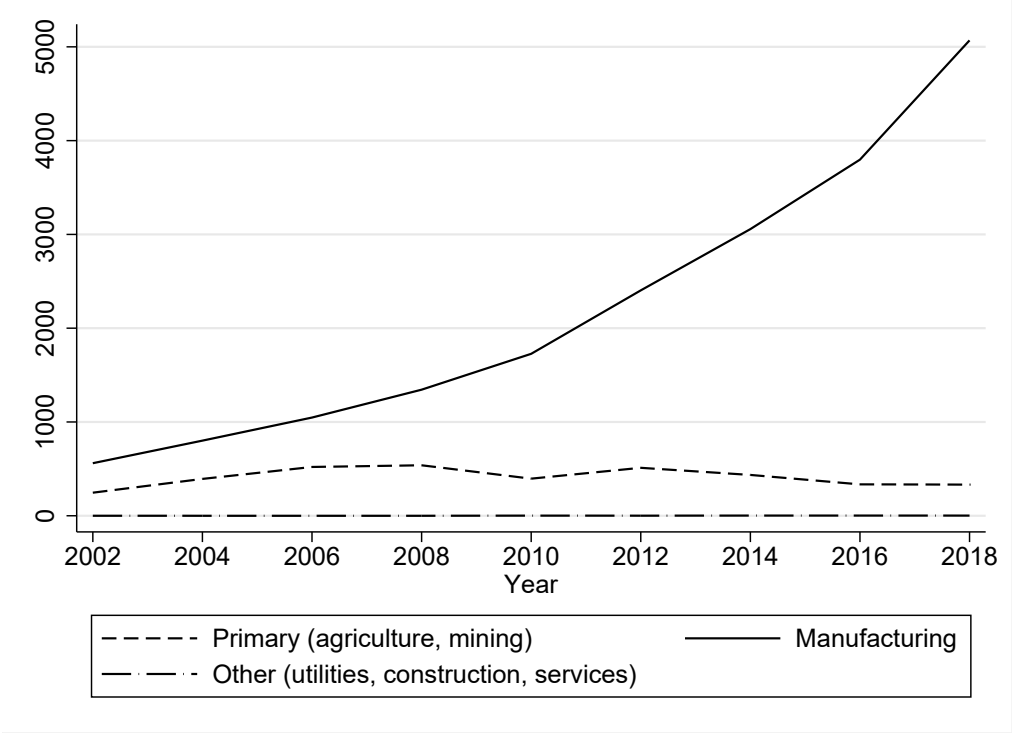
*Sources: Gendreau et al. (2000), compiling from Directorate of Migration and Construction of New Economic Zones, * data for 1996-97, ** data for 1976-1997.*

Table A8: Employment responses by birth origin within the South, cohorts 1954-1989

	Dependent variable: Work			
	All Southern provinces		Destination provinces	
	(1) All	(2) Migrants	(3) All	(4) Migrants
Southern-born				
Exposure (α_0)	-0.014	-0.062	-0.101	-0.123
	(0.019)	(0.045)	(0.078)	(0.156)
Female × Exposure (α_1)	-0.031***	-0.028***	-0.030***	-0.027***
	(0.006)	(0.006)	(0.007)	(0.007)
Northern-born				
Exposure (β_0)	-0.012	-0.064	-0.103	-0.125
	(0.019)	(0.045)	(0.077)	(0.156)
Female × Exposure (β_1)	-0.020***	-0.020***	-0.020***	-0.020**
	(0.005)	(0.005)	(0.006)	(0.006)
$\beta_0 - \alpha_0$	0.002	-0.002	-0.002	-0.002
	(0.003)	(0.002)	(0.003)	(0.003)
$\beta_1 - \alpha_1$	0.011*	0.008**	0.011*	0.007*
	(0.007)	(0.003)	(0.005)	(0.003)
Mean dep. var.	0.893	0.892	0.915	0.918
Observations	100,873	22,636	25,727	14,468
R^2	0.100	0.138	0.099	0.110

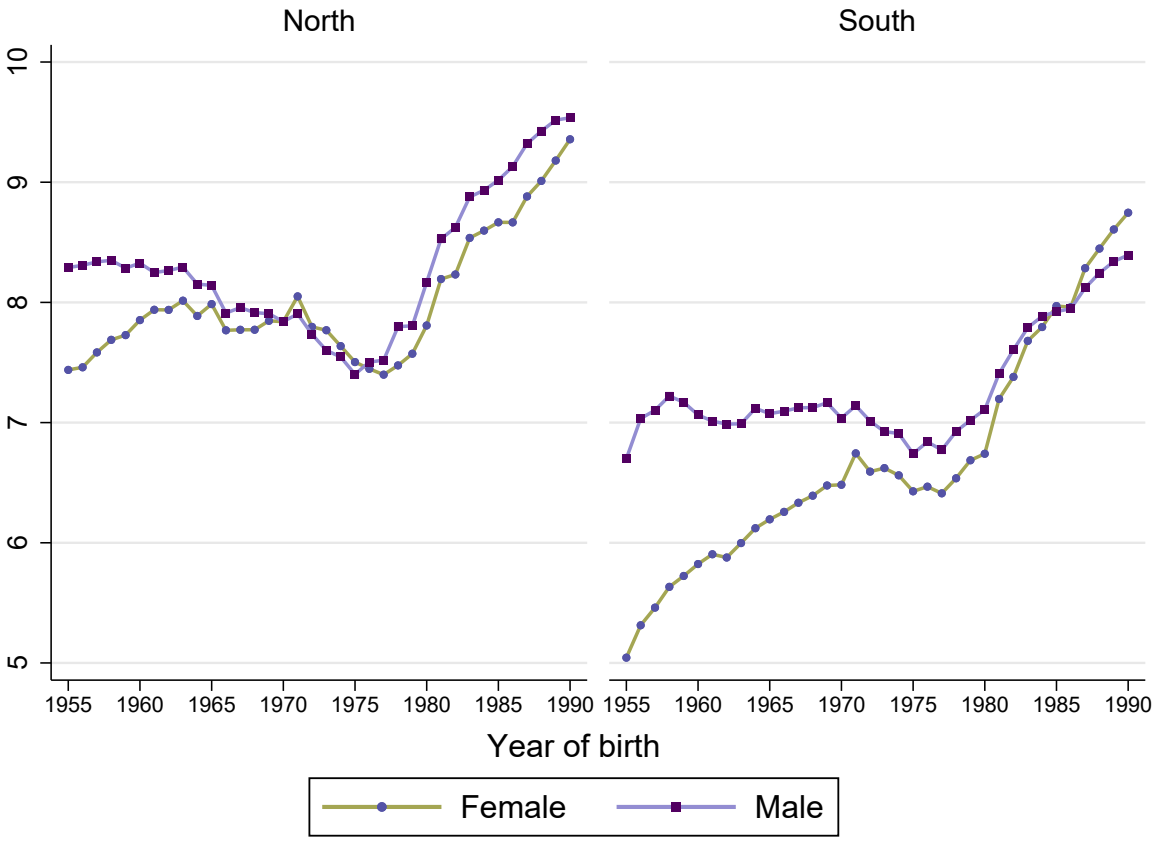
*Notes: In columns 1 and 2, the sample includes all 32 provinces in the South. In columns 3 and 4, the sample includes eight "Destination" provinces in the South–those with highest shares of Northern-born immigrants. The sample is restricted to individuals aged 20-64 from 1954-1989 birth cohorts. All columns control for age in cubic polynomial, education level, ethnicity, province fixed effects, gender-by-year fixed effects, gender-by-birth-origin fixed effects, and interactions of provinces' initial characteristics with year dummies (as in column 3 of Table 2). Columns 1 and 2 control for for gender-by-birth-origin-by-destination fixed effects. Columns 1 and 3 control for birth-origin-by-destination fixed effects. Birth origin is an indicator for being born in the North. Destination is an indicator for living in a Destination province. Standard errors are clustered at the province level, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.*

Figure A1: Export value by industry, 2002-2018 (trillion VND, constant 2018 price)



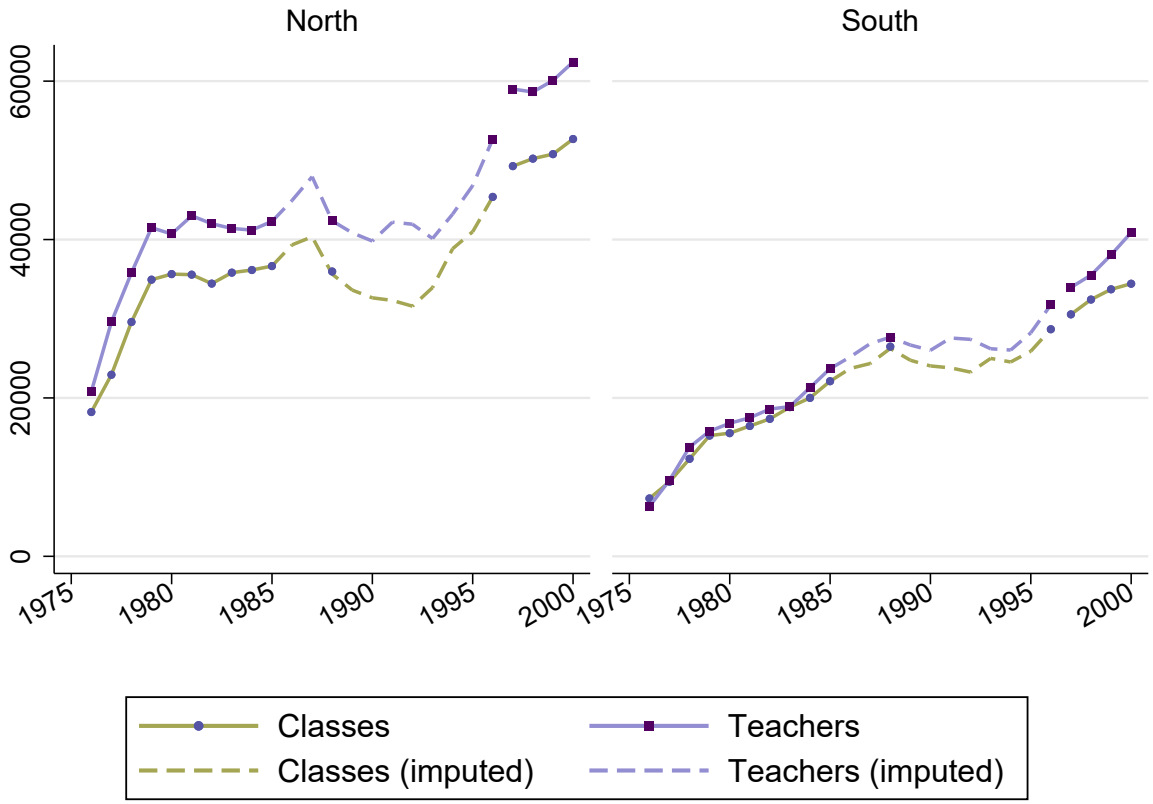
Notes: Unit in Trillion VND, constant 2018 price. Source: UN Comtrade.

Figure A2: Average years of schooling by gender and region



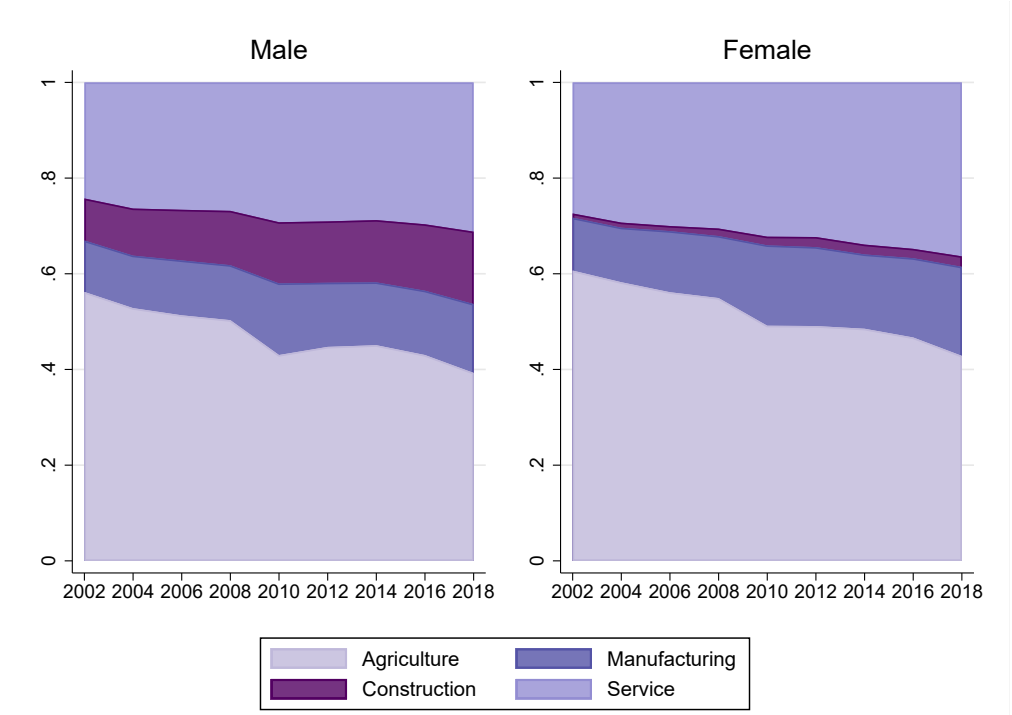
Source: Vietnam Population and Housing Census 2009.

Figure A3: Number of kindergarten classes and teachers by region



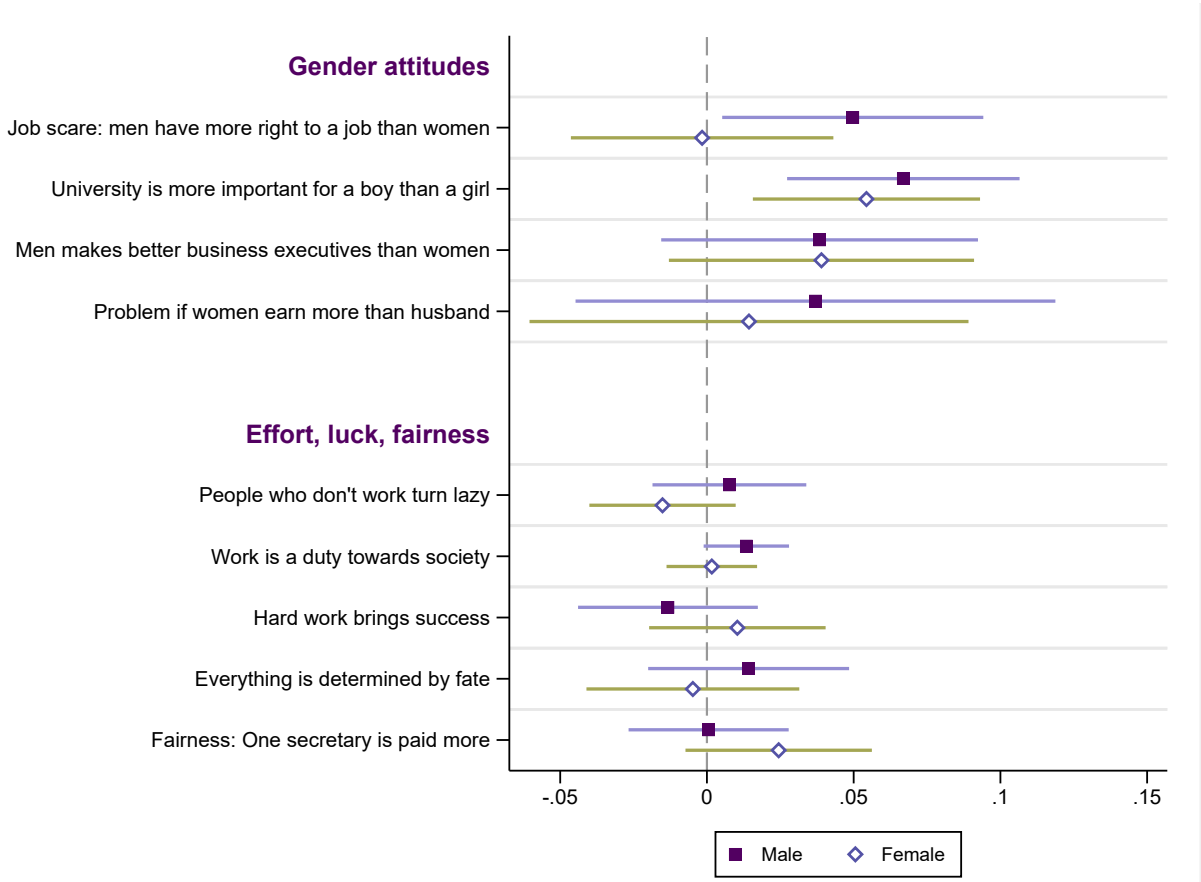
Notes: The dash lines use figures apportioned to each region using country-level data, applying region shares in 1985 for 1986-1987, 1988 for 1989-1992, and 1996 for 1993-1995. Source: General Statistics Office of Vietnam.

Figure A4: Industry employment composition by gender over time



Notes: The sample is restricted to working individuals aged 20-64. Source: VHLSS 2002-2018.

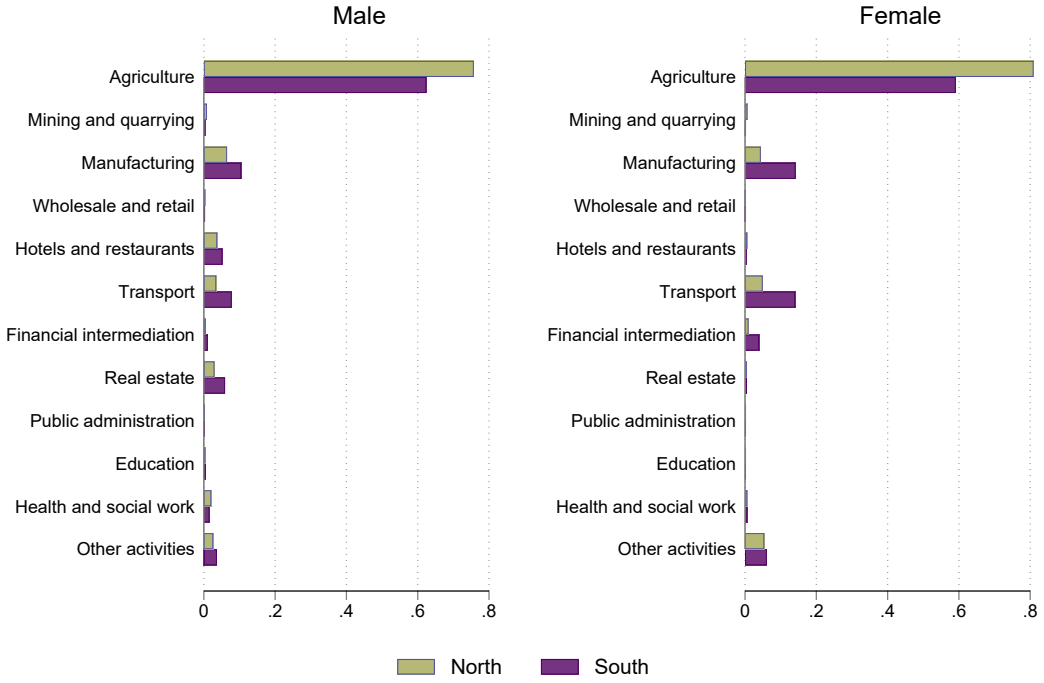
Figure A5: Opinions of Southern Vietnamese compared to Northern Vietnamese by gender



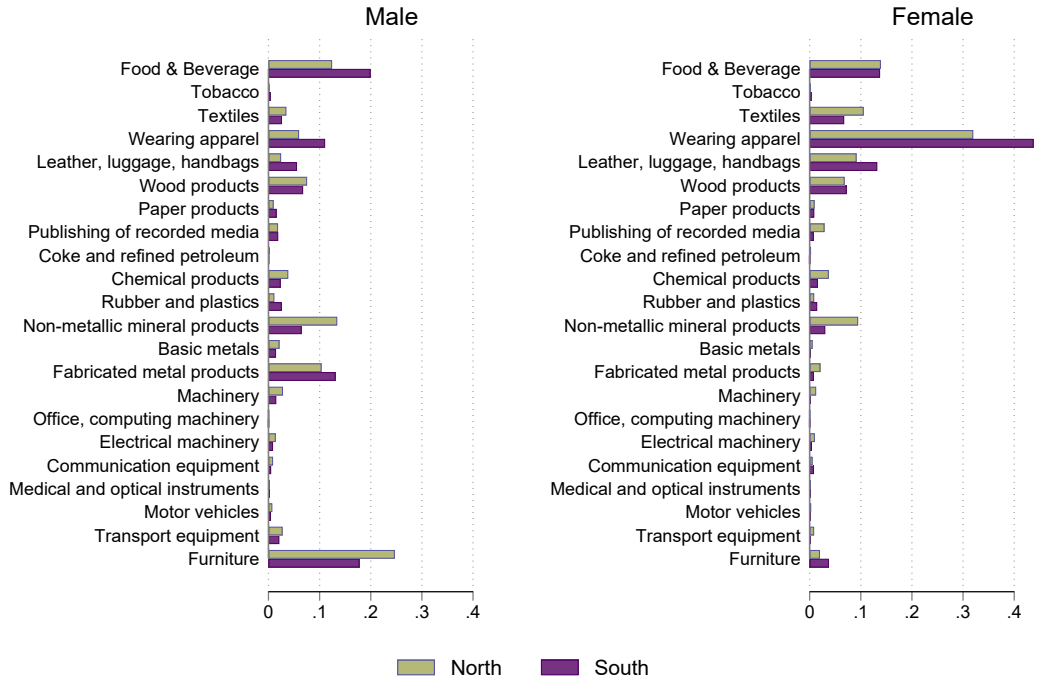
Notes: Coefficients come from separate regressions of each outcome (opinion) on the South indicator, controlling for year fixed-effects and separately for each gender. Answers are recoded from "Strongly Agree", "Agree" and "Neither" into 1 (Agree); "Disagree" and "Strongly Disagree" into 0 (Disagree). Source: World Values Survey 2001, 2006 and 2019.

Figure A6: Employment share by region in 1999

(a) 1-digit industry employment structure by region in 1999

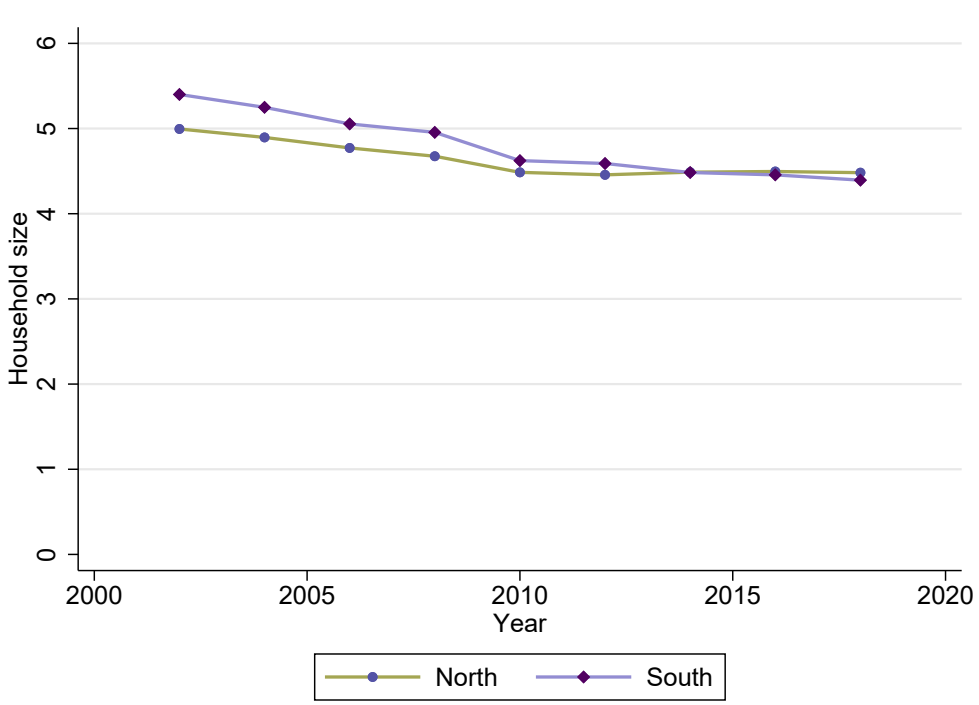


(b) 2-digit manufacturing employment share by region in 1999



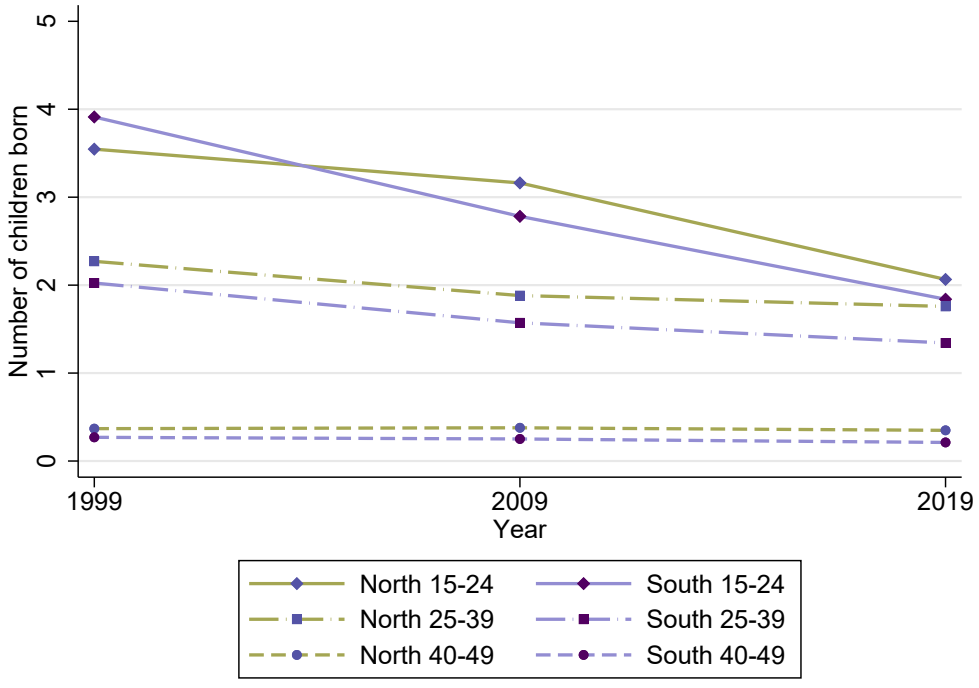
Notes: Predicted export exposure is constructed according to equation (1). Export values (constant 2018 VND) from United Nations Comtrade Database (UN Comtrade) are adjusted for the Consumer Price Index obtained from the General Statistics Office (GSO) of Vietnam. In Panel B, the solid purple line represents the 17th parallel north, the Demilitarized Zone dividing North and South Vietnam.

Figure A7: Household size



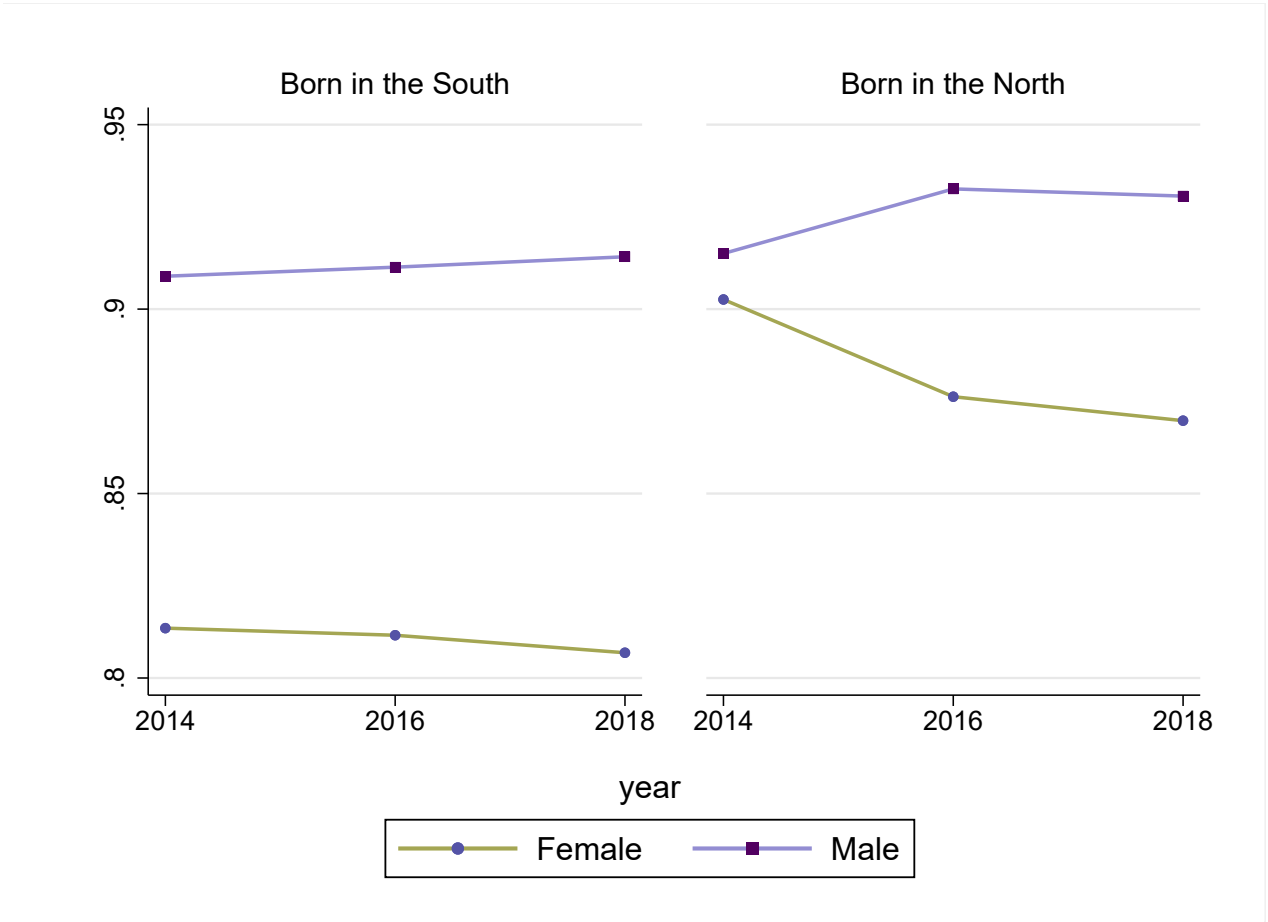
Source: VHLSS 2002-2018.

Figure A8: Fertility by age group



Source: Vietnam Population and Housing Censuses 1999, 2009 and 2019.

Figure A9: Labor force participation rate by gender and birth origin, South Vietnam subsample



Notes: This figure plots the share of southern individuals aged 20-64 who reported to have worked in the last 12 months, separately by birth origin and gender. Southerners born in the North are people whose birth province belongs to former North Vietnam territory. Source: VHLSS 2014 – 2018.

Appendix B. Plausibility of Share Exogeneity

In Section 3, we argue that our identifying assumption, i.e., the exogeneity of the shift-share instrument in our main equation, stems from "exogenous shares" (Goldsmith-Pinkham et al., 2020). We support this assumption using the diagnostic tests suggested in Goldsmith-Pinkham et al. (2020) and Borusyak et al. (2025).

We first aggregate the individual-level outcomes to the province level and estimate a province-level analogue of equation (2):

$$\bar{y}_{pt} = b_0 + b_1 Exposure_{pt} + \phi_p + \psi_t + \bar{\boldsymbol{X}}_{pt}\lambda + Z_p\gamma_t + u_{pt}, \quad (2a)$$

which can also be expressed in first differences:

$$\Delta\bar{y}_{pt} = b_1 \Delta Exposure_{pt} + \Delta\psi_t + \Delta\bar{\boldsymbol{X}}_{pt}\lambda + Z_p\Delta\gamma_t + \Delta u_{pt}. \quad (2b)$$

Following Goldsmith-Pinkham et al. (2020), we then determine the five industries with the highest Rotemberg weights, i.e., industries most important for determining variation in $Exposure_{pt}$, to examine the variation in the data that the estimator is using. As reported in **Table B1**, these five instruments account for 79 percent (0.831/1.049) of the positive weight in the estimator.

We visually inspect the dispersion of point estimates across instruments in **Figure B1**, which illustrates the heterogeneity of these estimates against the first-stage F-statistics. We find that the point estimates are fairly consistent across instruments, with minimal dispersion. Moreover, the high-weight industries are closely aligned with the overall point estimate. Focusing on the five key industries, we conduct two additional diagnostic tests to assess the plausibility of the identifying assumption.

Pretends. Our analysis focuses on the period between 2002 and 2018, when Vietnam's export was expanding rapidly. To check potential "pretrends," we obtained employment data from VHLSS 1998. Specifically, we check whether the change in a province's employment rate in

the pre-shock period ($\Delta\bar{y}_{pt}$ between 1998 and 2002) may correlate with the employment shares of the five key industries or the shift-share variable itself ($\Delta Exposure_{pt}$ between 2002 and 2018), using equation (2b). Regressions are weighted by province's 1999 population.

As shown in the first panel of **Table B2**, we do not find significant correlations between employment growth during the pre-period (1998-2002) and the industry shares (columns 1 through 5). Moreover, employment growth during the pre-period is uncorrelated with future growth in export exposure (column 6). In contrast, when looking at the study period (2002-2018), in the second panel, most correlations between industry shares and employment growth during the study period (2002-2018) are negative. In particular, the estimate in column 6 is the province-level first-difference analogue of our baseline results (column 2 of Table 2). The point estimate is the same (-0.013), however, it is less precisely estimated due to using only the initial and final years (omitting the intermittent years used in the main analysis).

Correlates of Initial Industry Composition. Next, we examine the correlates of the industry employment shares in the initial period. In **Table B3**, we examine the correlation between the employment shares of the five industries and key provincial characteristics in 1999 which we believe may be correlated with the innovation term in determining employment growth (Δu_{pt}). In the last column, we also report the relationship between these covariates and $\Delta Exposure_{pt}$ (between 2002 and 2018). These characteristics explain a fair amount of the cross-sectional variation in the shares and the shift-share variable itself.

In all regressions in the paper, we control for these observables. Moreover, in Table 2, the inclusion of these covariates shifts the estimate away from zero (from -0.007 in column 1 to -0.013 in column 2). This suggests that unobserved confounders, if having similar effects as these observables, would make the estimate even more negative. We formally assess the extent of bias in our estimates by conducting the Oster test (Altonji et al, 2005; Oster, 2019). The

results are provided in **Table B4**. Panel A shows results for the individual-level regression while Panel B shows results for the province-level regression. Columns 1 and 2 indicate movement in coefficients as we include controls for province initial characteristics (interacted with year dummies). If we assume that the unobservable confounders are as important as the observable (i.e., set $\delta = 1$ in the framework of Oster (2019)), then the effect of export exposure becomes even more negative, see columns 3 and 4 (under different assumptions of R-squared movement).

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Table B1: Summary of Rotemberg weights

Panel A: Negative and positive weights

	Sum	Mean	Share
Negative	-0.049	-0.003	0.045
Positive	1.049	0.022	0.955

Panel B: Correlations of Industry Aggregates

	α_k	g_k	β_k	F_k	Var(z_k)
α_k	1				
g_k	0.675	1			
β_k	0.009	-0.004	1		
F_k	0.692	0.378	0.007	1	
Var(z_k)	-0.056	-0.076	0.002	-0.071	1

Panel C: Top 5 Rotemberg weight industries

	$\hat{\alpha}_k$	g_k	$\hat{\beta}_k$	95 percent CI	Ind. Share
TV, radio transmitters, line telephony	0.366	1433.805	-0.014	(-0.026, 0.006)	0.013
Crude petroleum and natural gas	0.268	759.045	-0.022	(-0.038, -0.003)	0.015
General purpose machinery	0.097	331.500	-0.021	(-0.050, 0.003)	0.033
Office, accounting, computing machinery	0.056	1978.641	-0.019	(-0.050, 0.050)	0.003
TV, radio receivers, recording apparatus	0.044	460.477	-0.005	(-0.022, 0.039)	0.012

Panel D: Estimates of β_k for positive and negative weights

	α-weighted Sum	Share of overall β	Mean
Negative	0.003	-0.186	-0.129
Positive	-0.017	1.186	0.020

This table reports statistics about the Rotemberg weights. In all cases, we report statistics about the aggregated weights with normalized growth rates, where we aggregate a given industry across years and normalize growth rates to the per-period average. Panel A reports the share and sum of negative weights. Panel B reports correlations between the weights ($\hat{\alpha}_k$), the national component of growth (g_k), the just-identified coefficient estimates ($\hat{\beta}_k$), the first-stage F-statistic of the industry share (F_k), and the variation in the industry shares across locations (Var(z_k)). Panel C reports variation in the weights across years. Panel C reports the top five industries according to the Rotemberg weights. The g_k is the national industry growth rate, $\hat{\beta}_k$ is the coefficient from the just-identified regression, the 95 percent confidence interval is the weak instrument robust confidence interval using the method from Chernozhukhov and Hansen (2008) over a range from -10 to 10, and Ind. Share is the industry share (multiplied by 100 for legibility). Panel D reports statistics about how the values of $\hat{\beta}_k$ vary with the positive and negative Rotemberg weights.

Table B2: Relationship between industry shares and trends in work

	(1) TV, radio transmitters, line telephony	(2) Crude petroleum and natural gas	(3) General purpose machinery	(4) Office, accounting, computing machinery	(5) TV, radio receivers, recording apparatus	(6) Δ Exposure
Pre-exposure						
ΔWork$^{1998-2002}$	0.101	0.035	0.100	0.167	0.512	-0.002
	(0.231)	(0.055)	(0.079)	(0.730)	(0.388)	(0.012)
Current period						
ΔWork$^{2002-2018}$	-0.204	0.035	-0.048	-1.142**	-0.334	-0.013*
	(0.147)	(0.035)	(0.052)	(0.435)	(0.239)	(0.007)

Notes: Each coefficient comes from a separate regression of change in average provinces' working rate on a 1999 industry share (columns 1 to 5) or on change in Exposure during 2002-2018 (column 6). All specifications control for provinces' initial characteristics and end-of-period demographic background (average age, share female, share population by education level, share major ethnicity at the province level). Results are weighted by provinces' initial population in 1999. For legibility, coefficients and standard errors of the first five columns are divided by 100. Coefficients and standard errors of the last column is not scaled. Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B3: Relationship between industry shares and provinces' initial characteristics

	TV, radio transmitters, line telephony	Crude petroleum and natural gas	General purpose machinery	Office, accounting, computing machinery	TV, radio receivers, recording apparatus	Δ Exposure
Share Mfg. Emp.	0.000	-0.005	-0.001	0.000	0.001	0.014
	(0.001)	(0.005)	(0.002)	(0.000)	(0.001)	(0.021)
Mfg output	0.004	0.055	0.028	0.004	0.006	0.117
	(0.006)	(0.046)	(0.018)	(0.002)	(0.004)	(0.152)
Service output	0.029	-0.023	0.002	-0.003	0.010	0.194
	(0.021)	(0.030)	(0.022)	(0.006)	(0.011)	(0.238)
Female LFP	0.078	-0.486	0.125	0.030	0.062	3.840
	(0.053)	(0.418)	(0.153)	(0.013)	(0.032)	(1.495)
Kindergarten	0.002	0.003	-0.001	-0.000	0.001	0.003
	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)	(0.014)
R^2	0.432	0.261	0.136	0.418	0.613	0.264
Observations	60	60	60	60	60	60

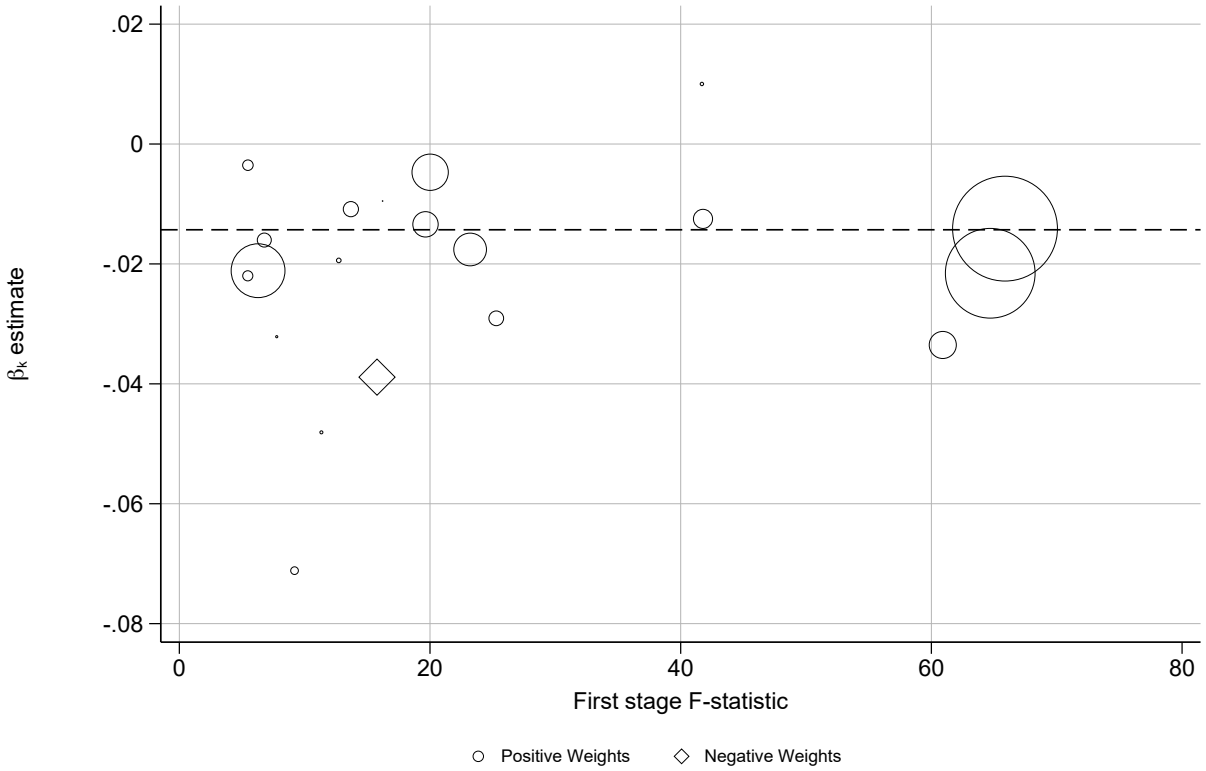
Notes: Each of the first five columns reports results of a single regression of a 1999 industry share on 1999 characteristics. The last column reports results when regressing change in Exposure during 2002-2018 on 1999 characteristics. Results are weighted by provinces' initial population in 1999. For legibility, coefficients and standard errors of the first five columns are multiplied by 100. Coefficients and standard errors of the last column is not scaled. Standard errors in parentheses.

Table B4: Oster test for coefficient stability

$\beta_{baseline}$ (Std. error) $[R^2 = \mathring{R}]$ (1)	$\beta_{controlled}$ (Std. error) $[R^2 = \tilde{R}]$ (2)	$\beta_{bias-adjusted}$ if $R^2_{max} = \tilde{R} + (\tilde{R} - \mathring{R})$ $[R^2_{max}]$ (3)	$\beta_{bias-adjusted}$ if $R^2_{max} = min(1, 1.3\tilde{R})$ $[R^2_{max}]$ (4)
Panel A. Individual level			
-0.007	-0.013	-0.069	-3.407
(0.005)	(0.004)		
[0.128]	[0.129]	[0.130]	[0.168]
Panel B. Province level			
-0.012	-0.013	-0.015	-0.150
(0.005)	(0.005)		
[0.887]	[0.901]	[0.916]	[1.000]

Notes: The dependent variable is "Work" for the individual-level regression in Panel A, and average provinces' working rate for the province-level regression in Panel B. Column 1 shows the baseline effects. Baseline controls include demographic background (age in cubic polynomial, gender, education level, ethnicity in Panel A, and average age, share female, share population by education level, share major ethnicity at the province level in Panel B), province fixed effects, year fixed effects, and interaction of provinces' initial share of manufacturing employment with year dummies. Column 2 shows the estimated effects in our full model when additionally controls for interactions of provinces' initial characteristics with year dummies. The estimates in column 1 and column 2 of Panel A correspond to column 1 and column 2 of Table 2 in the main text, respectively. Columns 3 and 4 show the bias-adjusted effect under the assumption on R^2_{max} specified in the column header and $\tilde{\delta} = 1$.

Figure B1: Heterogeneity of β_k



Notes: This figure plots the relationship between each instrument's β_k, first-stage F-statistics and the Rotemberg weights. Each point is a separate instrument's estimate (industry share). The figure plots the estimated β_k for each instrument on the y-axis and the estimated first-stage F-statistic on the x-axis. The size of the points are scaled by the magnitude of the Rotemberg weights, with the circles denoting positive weights and the diamonds denoting negative weights. The horizontal dashed line is plotted at the value of the overall $\hat{\beta}$ estimated at the province level. The figure excludes instruments with first-stage F-statistics below 5.