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TRADE-INDUCED STRUCTURAL TRANSFORMATION AND HOUSEHOLD-LEVEL INEQUALITY: LESSONS FROM VIETNAM

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JOB MARKET PAPER

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Abstract

There is little consensus on whether access to foreign export markets can promote gender equality in developing countries. This paper leverages the US-Vietnam Bilateral Trade Agreement (BTA) that came into force in 2001 as a natural experiment to explore whether the disproportionate expansion of the female-intensive wearing apparel sector can promote gender equality at the household level. By using a difference-in-differences strategy and through relying on panel data, I find that women in provinces that were more exposed to the BTA were more likely to work in the wearing apparel sector. These women also increased their income substantially relative to their husbands. I then examine whether such improvements in labour market opportunities and relative income led to changes in the allocation of resources that could be indicative of higher female intrahousehold bargaining power. I find that the share of household resources allocated to ‘female-preferred’ goods did not increase in provinces that experienced more exposure to the BTA, nor did the share of ‘male-preferred’ goods.

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1 Introduction

Trade can promote gender equality by disproportionately expanding sectors which are female-intensive. Under these circumstances, access to foreign export markets can create the economic conditions for women, rather than men, to reallocate into high-productivity firms and sectors which tend to pay higher wages. Even where there has been no reallocation of labour, it has also been shown that trade can increase the wages of women within exporting firms and sectors ([Aguayo-Tellez et al., 2013](#); [Juhn et al., 2014](#)). However, whether trade alleviates or exacerbates gender inequality at the household-level in developing countries is not well understood.

Given that many developing countries integrate into the global supply chain by exporting goods in sectors that are predominantly female-intensive, it is important to examine the effects of trade at the household-level since there is an abundance of evidence that women’s intrahousehold bargaining position is strengthened when the relative wages and labour market opportunities of women improve ([Lundberg and Polak, 1994](#); [Aizer, 2010](#); [Molina and Tanaka, 2023](#)). Specifically, studies in this field emphasise that women’s relative income and labour market opportunities act as important transmission mechanisms for household-level female empowerment since they allow women to credibly raise the threat of divorce when negotiations between spouses break down. Another reason why it is important to study the effect of trade on women within the household is that strong female intrahousehold bargaining has been linked to intergenerational benefits ([Duflo and Udry, 2004](#); [Majlesi, 2016](#); [Almås et al., 2018](#); [Armand et al., 2020](#)).

This paper leverages the US-Vietnam Bilateral Trade Agreement (BTA) which came into effect in 2001 to study how the disproportionate expansion of female-intensive sectors can lead to the structural transformation of the female labour force, and its effect on women’s income relative to their husbands. This paper also explores whether the trade-induced improvements in women’s labour market opportunities had

downstream effects by examining whether households increased spending on ‘female-preferred’ goods.

A key advantage of leveraging the BTA to study the effect of trade on household-level gender inequality is that the trade agreement resulted in a large and exogenous decline in costs for Vietnamese exporters, especially those in female-intensive sectors. This entailed a rapid increase in goods exported by Vietnamese manufacturers in female-intensive sectors to the United States. Specifically, the wearing apparel sector grew the most in terms of value of Vietnam’s export to the US in the five years following the implementation of BTA, and was also the sector with the highest commodity export value in 2006 ([McCaig and Pavcnik, 2015](#)). This is not surprising given the fact that the wearing apparel sector saw the largest tariff cut under the BTA. Since over 70 percent of those working in the wearing apparel sector were women at the onset of the BTA, the subsequent integration of the Vietnamese wearing apparel sector into the global supply chain is expected to have structurally transformed the female labour force. Additionally, the BTA-induced structural transformation of the female labour force may have boosted the intrahousehold bargaining position of women by improving their relative wages and labour market opportunities. Thus, under a framework where (i) men and women are imperfect substitutes in the labour production, (ii) each sector utilises male and female labour at different intensities, and (iii) trade disproportionately expands female-intensive sectors relative to male-intensive sectors, the BTA is expected to have structurally transformed the female labour force while concomitantly improving women’s intrahousehold bargaining position ([Juhn et al., 2014](#); [Majlesi, 2016](#)).

On the other hand, it is also conceivable that despite the improvement in women’s outside options, women may be prevented from being empowered at the household level since these effects are mediated by social norms surrounding female employment, male identity and divorce ([Kotsadam and Villanger, 2022](#)). For example, if husbands feel as though their traditional roles have been undermined, they may resort to violence to exert control over women’s wages as was found in [Eswaran and Malhotra \(2011\)](#),

Bobonis et al. (2013), and Heath (2014). In such an outcome, male backlash could cancel out the effect of women’s improved outside options. Furthermore, although the improvement in women’s relative wages and labour market opportunities have been shown to translate into higher intrahousehold bargaining power in contexts where divorce or separation is commonly practiced, it is unclear whether they play an equally important role as transmission mechanisms where divorce is less widely accepted, such as in Vietnam (Bloch and Rao, 2002; Bulte and Lensink, 2019). This question is pertinent since models of noncooperative bargaining between spouses stress that the income and labour market opportunities of women *at the point of divorce* – and not throughout the marriage – is a function of her intrahousehold bargaining position (Majlesi, 2016). If women cannot credibly both raise and execute the threat of divorce due to social norms, the outside option is practically non-existent in such a model and improvements in women’s relative wages and labour market options is not expected to translate into higher intrahousehold bargaining power (Bhalotra et al., 2018; Calvi and Keskar, 2021; Kotsadam and Villanger, 2022).

This paper uses a difference-in-differences approach which exploits provincial variation in exposure to the BTA akin to Topalova (2010) and gender differences in initial sector composition per Autor et al. (2019). Using three waves of panel data from the Vietnam Household Living Standards Survey, I first assess whether women’s outside options improved by examining whether women were more likely than men to reallocate into the wearing apparel sector, and whether their wages increased relative to their husbands. I then move on to examining if, as predicted by the intrahousehold bargaining literature, the improvement in labour market opportunities resulted in higher intrahousehold bargaining power for women.

A key challenge to identifying shifts in women’s intrahousehold bargaining position is that spouses’ bargaining power is not observed directly. A common way of proxying for intrahousehold bargaining dynamics is by examining changes in allocation of household

resources.¹ Thus, I look at whether households in provinces more exposed to the BTA increased their share of total household expenditure on ‘female-preferred’ goods such as health, education and food, and less of goods which align with ‘male preferences’ such as tobacco (Ashraf, 2009; Almås et al., 2018; Armand et al., 2020). I also focus on whether investment into daughters increased relative to sons in provinces more exposed to the BTA.

I find that although women’s labour market options improved in provinces that were more exposed to the BTA, and that in these regions women were able to considerably increase their wages relative to their husbands, I find a lack of evidence that this translated into higher intrahousehold bargaining power. Households in more liberalised provinces did not increase their share of total household expenditure on food, education and health nor did the share of expenditure on tobacco increase. Finally, unlike what is predicted by Qian (2008) and Heath and Tan (2018), I find that investment in daughters’ education did not increase amongst households in provinces where the spousal contribution gap was smaller. These results would lend credence to the explanation that social norms may render economic improvements ineffective in bolstering women’s intrahousehold bargaining position.

This paper contributes to two distinct bodies of literature. The first looks at the impact of access to foreign export markets on the labour market outcomes of workers

¹Field and lab experiments confirm that preferences over how household finances are spent are in fact gendered, and contrary to unitary models of the household which assume that households have a single welfare function, how household resources are allocated should be seen as having resulted from intrahousehold bargaining since men and women have different preferences. Notably, strong female intrahousehold bargaining power has been shown to be associated with higher spending on female private goods and lower consumption of male private goods such as tobacco and alcohol. Strong female bargaining power within the household has additionally been shown to translate into a higher share of household expenditure on public goods that may have intergenerational benefits. Armand et al. (2020) and Almås et al. (2018) find that when the recipient of targeted cash transfers are women, households of all income distribution in Macedonia increased their spending on food. Using Mexican PROGRESA data, Doepke and Tertilt (2019) show that under a noncooperative model of the household where there is a disparity in earnings between spouses, high female bargaining power is correlated with investment in children’s human capital. Finally, Qian (2008) and Heath and Tan (2018) demonstrate that when women are empowered at the household-level, investment in daughters increase.

in developing countries. With respect to studies that look specifically at the effect of the BTA on workers in Vietnam, [McCaig \(2011\)](#) show that low-educated workers experienced an increase in wages, [Fukase \(2013\)](#) record a Stolper-Samuelson type effect where low-skilled workers experienced larger wage growth than skilled workers, and [McCaig and Pavcnik \(2013\)](#) conclude that the share of workers in manufacturing increased by 5 percentage points. However, the aforementioned studies do not consider the differential effects of the BTA on the structural transformation of the female and male labour force despite the fact that the sector which saw the largest increase in value of export to the US was the female-intensive wearing apparel sector. Thus, in assessing the impact of the BTA on structural transformation in Vietnam, I look also at the different ways in which the Vietnamese male and female labour force responded to access to the US export market.

More broadly, this paper contributes to a growing corpus of research which examines the intersection of trade and gender in developing countries. The majority of studies within this field detail how trade affects the absolute and relative changes in the wages of female workers compared to male workers within the same sector or firm. Here, there is consensus that through various mechanisms, trade brings about greater gender equality. An explanation for how trade reduces gender inequality is that competitive pressure between manufacturers reduces gender-based discrimination as predicted by the Becker model ([Black and Brainerd, 2004](#)). Another explanation is that trade causes manufacturers to undertake technological upgrading which benefits female workers who are thought to have a comparative advantage in brain-based work whereas male workers are considered to have a comparative advantage in brawn-based work ([Juhn et al., 2014](#)). Alternatively, trade can alleviate gender inequality in developing economies by expanding female-intensive sectors more rapidly than male-intensive sectors, and which causes a rise in demand for female workers amongst exporting manufacturers ([Aguayo-Tellez et al., 2013](#)). In contrast, [Gaddis and Pieters \(2017\)](#) find that Brazilian microregions which were more exposed to trade liberalisation only saw a reduction in

the gap between male and female labour force participation rates because male workers were being displaced from the tradable sector, and crucially, not because women were being absorbed into female-intensive tradable sectors.

However, whether trade alleviates gender inequality at the household level is an under explored area of research, and extant evidence indicate mixed results. [Erten and Keskin \(2021\)](#) record that female workers in Cambodian districts more exposed to tariff cuts arising from accession into the WTO saw an increase in paid employment whereas the reverse was true for male workers, and which caused women to suffer increased instances of intimate partner violence. In other settings however, [Aguayo-Tellez et al. \(2013\)](#) and [Majlesi \(2016\)](#) show that Mexican women were able to command a higher degree of control over the allocation of household resources as a result of the expansion in the manufacturing sector. In Myanmar’s case, women residing near factories that were integrated into the global value chain report higher input into household decision-making and lower tolerance for domestic violence ([Molina and Tanaka, 2023](#)). In revisiting the subject of trade’s impact on women’s intrahousehold bargaining position, this paper provides further evidence on the effects of trade on women’s intrahousehold bargaining power where there is few.

Finally, this paper improves the estimation of the effect of access to foreign export markets in developing countries in two different ways. By using panel data I am able to control for within-individual differences. Additionally, the BTA provides a unique opportunity to isolate the effect of a positive export shock on women’s household-level empowerment as the US granted market access to Vietnamese exporters immediately whereas Vietnam’s commitments under the BTA were gradually implemented over the course of 10 years ([McCaig and Pavcnik, 2013](#)).

The rest of this paper is organised as follows: Section [2](#) provides an overview of the Vietnamese labour force prior to the implementation of the BTA and summarises the tariffs applied to Vietnamese goods by the US pre and post-BTA. Section [4](#) looks at the differential effect of the BTA on the structural transformation of male and

female workers, and its effect of the spousal contribution gap. Section 5 discusses the effect of the closing of the spousal contribution gap on women’s intrahousehold bargaining power. Section 6 discusses why the BTA-induced structural transformation of the female labour force did not result in higher intrahousehold bargaining power for women, and Section 7 concludes.

2 Background

The BTA was signed in July 2000 and came into force on 10 December 2001. Under the BTA, Vietnam was given the status of Most Favoured Nation (MFN), having previously been treated as a Column 2 nation. The switch entailed dis-applying a set of pre-existing tariffs (Column 2 tariffs) and applying another set of pre-existing tariffs (MFN tariffs) which were, importantly for the identification strategy of this paper, not a result of bilateral negotiations (McCaig, 2011; McCaig and Pavcnik, 2018). Since neither the US nor Vietnam were able to negotiate sector-specific tariffs, and since tariffs incurred by Vietnamese exporters were not dependent on pre-existing sector performance, the BTA can be leveraged as a natural experiment for the purposes of this paper. Additionally, although the BTA granted Vietnam MFN status immediately in 2001, Vietnam’s obligations under the trade agreement to the US were staggered over the course of 10 years (McCaig, 2011). Moreover, Vietnam had granted the US MFN status prior to the enactment of the BTA. The one-sided nature of the BTA makes it possible to isolate the effect of access to foreign export markets on women’s labour market outcomes and intrahousehold bargaining power.

The BTA significantly reduced the cost of Vietnamese imports, with an average tariff reduction of 20 percentage points across all industries. The manufacturing sector benefited the most under the BTA with an average tariff reduction of 30 percentage points whereas the average tariff rate for the non-manufacturing sector fell from 5 percent to 1 percent. As the BTA reduced the cost of exporting light manufactured goods for

Vietnamese exporters, the increased volume of trade with the US entailed an increased demand for low-skilled workers in the manufacturing sector. In their papers on the effect of the BTA on the Vietnamese labour market, [McCaig and Pavcnik \(2018\)](#) show that the trade agreement can be attributed to expanding the share of workers in the manufacturing sector by 5 percentage points.

Table 1: Summary of Column 2 and MFN Tariffs for all traded sectors and the manufacturing sector.

Mean Tariff Rate	All sectors	Manufacturing	Non-manufacturing
Column 2	22%	33%	5%
MFN	2%	3%	1%

Figure 1: Sector-level tariff cuts under the BTA.

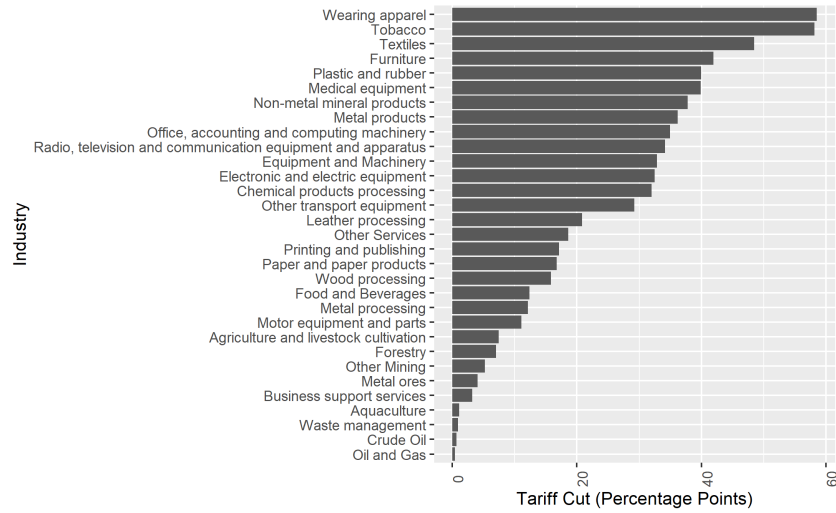


Table 2: Main commodity exports from Vietnam to the US between 1998 and 2006.

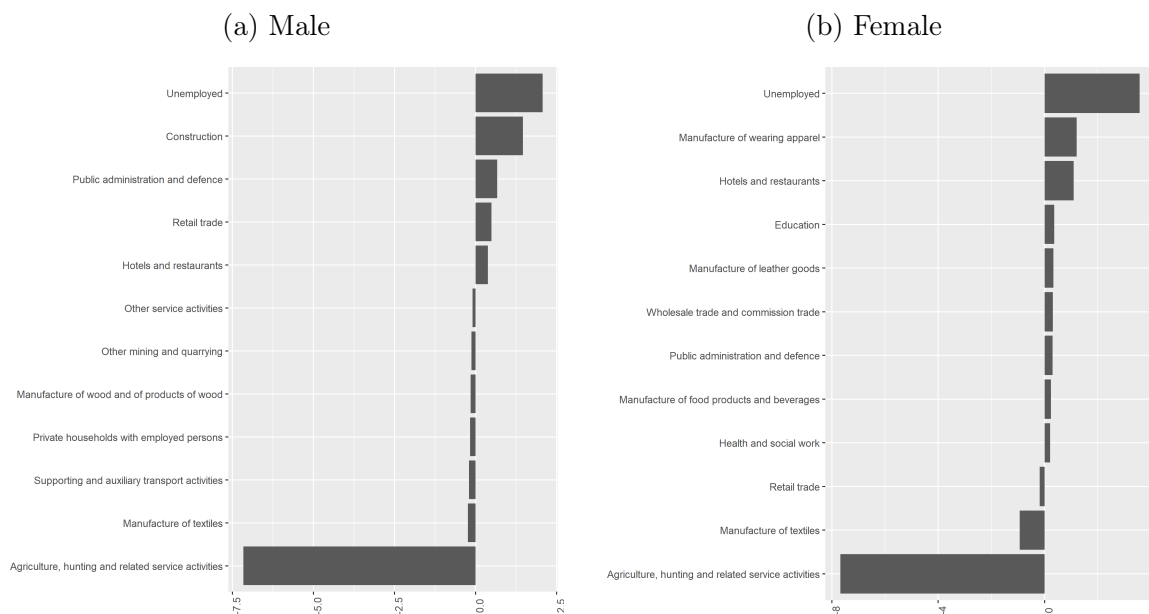
SITC Code	SITC Description	1998 Commodity Export Value (million USD)	2006 Commodity Export Value (million USD)	Growth (%)
84	Articles of Apparel and clothing accessories	28	3233	11464.19
85	Footwear	115	952	728.15
33	Petroleum, petroleum products and relate materials	48	911	1815.39
82	Furniture and parts thereof	1	895	74962.8
03	Fish	93	651	598

Source: Author's calculations from data downloaded from the U.S. International Trade Commission's website.

Concomitant to Vietnam’s increased trade with the US was the process of structural transformation which the country’s labour force underwent. In particular, aggregate employment in the agricultural sector fell from 70 percent of the workforce in 1990 to 58.1 percent in 2006. This reduction was accompanied by an increase in workers in the manufacturing sector from 8 percent in 1990 to 14 percent in 2008 ([McCaig and Pavcnik, 2013](#)). While the rate of exit out of the agricultural sector was comparable for male and female workers, female workers largely reallocated into traded sectors whereas male workers tended to reallocate into non-traded sectors. Figure 2, shows the different sectors which grew and shrank by gender of employment composition between 2001 and 2005. As can be seen from panel (b) of Figure 2, the sector which grew the most in terms of the female labour force was wearing apparel sector which grew by 1.16 percentage points. On the other hand, the sector which grew the most during the same period in terms of the male labour force was the construction sector. This difference in destination of where workers reallocated out of the agricultural sector into suggests that while both the male and female labour force underwent structural transformation, the BTA had more of an impact on reallocating female workers. Table 16 in the Appendix A confirms that the male employment structure was less affected by the BTA.

As the wearing apparel sector predominantly absorbed female workers in the four years subsequently to the enactment of the BTA, and as the foreign wage premium was found to be largest among low-educated women by [Fukase \(2014\)](#), women’s outside options are expected to have improved as higher-paid jobs became more accessible. The descriptive statistics found in Table 3 confirm the view that among workers who remained in the agricultural sector and workers who reallocated into the wearing apparel sector, women who reallocated into the wearing apparel sector were the group which increased their wages the most.

Figure 2: Change in male and female employment composition between 2001 and 2005.



Source: Author's calculations from panel component of VHLSS 2002/2006.

Table 3: Wages of men and women who did and did not reallocate into the wearing apparel sector before and after the BTA.

	Did not reallocate		Reallocated	
	Male	Female	Male	Female
<i>2001 Annual Income</i>				
('000) VND	3084.45	2771.29	4842.80	3368.45
<i>2005 Annual Income</i>				
('000) VND	9023.65	7912.84	14875.20	13396.19
% Change in Wages	192	186	207	298

Source: Author's calculations from panel component of VHLSS 2002/2006.

3 Data

3.1 Tariff data

Data on the tariff schedules applied to Vietnamese imports before and after the BTA was taken from [McCaig \(2011\)](#). To construct sector-level tariffs according to the 3-digit ISIC system, [McCaig \(2011\)](#) matched tariff lines of traded industries in Vietnam with the World Integrated Trade Solution database. This allowed me to then match the aggregated 3-digit ISIC sector tariffs to the 2-digit ISIC occupation codes listed in the Vietnam Household Living Standards Survey (VHLSS). For further details on the procedure, please refer to [McCaig \(2011\)](#).

3.2 The Vietnam Household Living Standards Survey

The Vietnam Household Living Standards Survey (VHLSS), conducted by the General Statistics office of Vietnam (GSO), is a nationally representative dataset that is primarily a repeated cross section, but also contains a panel component. The VHLSS contains rich information about each household member's occupation and income, as well as a breakdown of household expenditure on education, food, and private goods such as tobacco. A key advantage of using the VHLSS to study the impact of the BTA on household allocation of resources is that educational expenditure is itemised at the individual-level. This allows me to determine whether the BTA increased investment in the education of daughters, relative to sons.

Since the recall period for employment and expenditure in the VHLSS is the last 12 months, observations in VHLSS 2002 represent households in the pre-BTA period, whereas the VHLSS conducted in 2004 and 2006 is used to represent households in the post-BTA period.²

²As the recall period is 12 months, responses of households who were interviewed in December 2002 pertain to the period just after the BTA came into effect. However, since it is unlikely that the

The panel component for VHLSS 2002 and 2004 will be used to assess the short-term impact of the BTA whereas the panel component for VHLSS 2002 and 2006 will be used to assess the medium-term impact. Throughout the surveys, there are approximately 9,000 households and 40,000 individuals who appear in all three waves of the survey. In addition to restricting my main source of data to those who were interviewed in 2002 and 2006, I also only retain observations who were between the age of 16 and 65 in 2002. This is because compulsory education is until the age of 16 in Vietnam. For my analysis of the spousal contribution gap, I only retain households which are composed of a wife and husband (and their children), effectively eliminating households which contain parents and in-laws. This is an important step since one focus of this paper is how the bargaining power of women change as their outside options improve, independently of other family members.

Another point to note is that although workers who derive income from their own farm do not receive a wage, the VHLSS records the total household income from both agricultural and non-agricultural activities. Thus, if a female worker has a wage-paying job but her husband generates income from the family plot, I am still able to observe her contribution towards the household income and *vice versa*. While I am able to observe the share of each spouses' income if they receive a wage, I am unable to do so if both husband and wife generate income from their own plot. Thus, my sample of analysis for the relative income of wife are women who received a wage in either pre-BTA or post-BTA period.

BTA had an effect on the structural transformation of the labour force and the expenditure patterns of households within a month of its implementation, it is fair to assume that responses belonging to households who were interviewed in December 2022 can be treated in the same way as other observations.

4 Structural Transformation

A difference-in-differences strategy that relies on exploiting provincial heterogeneity in exposure to the BTA will be employed to study whether trade-induced structural transformation improved women’s labour market opportunities and relative income.

4.1 Province-level tariffs

To measure the extent to which the labour market options for women improved as a result of the BTA, I construct an index of province-level exposure to the trade shock analogous to [Topalova \(2010\)](#). Province-level tariffs are calculated using time-invariant employment-weighted sector tariffs, and is constructed in the following way:

$$(1) \quad \textit{Tariff}_{pt} = \sum_j \omega_{jp} \tau_{jt}$$

where τ_{jt} is the tariff applied by the US to Vietnamese goods in sector j at time t . The sector-level tariffs are weighted by pre-BTA employment structure (ω_{jp}) and takes the following form:

$$(2) \quad \omega_{jp} = \frac{L_{jp}}{L_p}$$

where L_{jp} is the number of workers in sector j in province p in the year 2001, and L_p is the total number of workers in province p in 2001. For $\textit{Tariff}_{pt}$, non-traded sectors are given a weight of zero and the underlying assumption is that non-traded industries are not directly affected by the BTA ([Topalova, 2010](#); [McCaig, 2011](#)). As a robustness check, I also construct province-level tariffs which follow the method of [Kovak \(2013\)](#)

and which allows non-traded sectors to be affected by the BTA. Under this method, pre-BTA employment weights have as its denominator the total number of workers in *traded* sectors in each province. Using the method of [Topalova \(2010\)](#) as a measure for province-level tariffs, the mean province-level tariff cut is 7.74 percentage points whereas the method provided by [Kovak \(2013\)](#) gives a mean province-level tariff cut of 10.81 percentage points.

$Tariff_{pt}$ gives the aggregate province-level exposure to the BTA but does not account for the fact that the BTA expanded male and female-intensive industries differentially. Given the fact that the wearing apparel sector was female-intensive at the onset of the BTA, I modify (1) per [Autor et al. \(2019\)](#) and exploit variation in the initial female intensity of each sector as follows:

$$(3) \quad Tariff_{pt}^f = \sum_j \frac{f_{jp}}{L_{jp}} \omega_{jp} \tau_{jt}$$

where f_{jp} is the number of women in sector j in province p , and L_{jp} is the number of workers in sector j in province p in the year 2001. The average province-level tariff cut under this measure is 8.22 percentage points.

4.2 Empirical Strategy

To assess the impact of the BTA on the reallocation of male and female workers into the wearing apparel sector, I employ the following linear probability model (LPM) as my baseline model:

$$(4) \quad Apparel_{it} = \beta_1 Tariff_{pt} + \beta_2 Tariff_{pt} \times Female_i + \alpha_i + \theta_t + \epsilon_{ipt}$$

where $Apparel_{it}$ is an indicator variable which takes the value of 1 if worker i at year t works in the wearing apparel sector, and 0 otherwise. $Tariff_{pt}$ is the province-level tariff of province p at year t as calculated according to equation (1). $Female_i$ is an indicator variable which takes the value of 1 if worker i is female and 0 if male. The specification includes individual (α_i) and year (θ_t) fixed effects. Individual fixed effects control for within-individual differences, whereas time fixed effects account for macroeconomic shocks that occurred between in 2002, 2004 and 2006. The interaction term ($Tariff_{pt} \times Female_i$) was included to ascertain whether the BTA had a larger effect on the structural transformation of the female labour force than the male labour force. Standard errors are clustered at the province-level.

To further assess the effect the expansion of female-intensive sectors under the BTA on the structural transformation of the male and female labour force, I replace the measure of province-level tariff with $Tariff_{pt}^f$ as calculated according to equation (3).

4.2.1 Spousal contribution gap

I then turn to look at the effect of the BTA on women's relative income to her husband with the following two-way fixed effects (TWFE) model:

$$(5) \quad ShareInc_{it} = \pi Tariff_{pt}^k + \alpha_i + \theta_t + \epsilon_{ipt}$$

where $ShareInc_{it}$ is the real annual income of female worker i in year t as a share of her total household income in the same year. All other independent variables are as described in equation (4).

Since the parameters in equations (4) and (5) estimate the one percentage point increase in province-level tariffs, I multiply the coefficients by -1 for ease of interpretation since the primary concern here is the reduction in province-level tariff.

4.3 Results

4.3.1 Structural transformation

The results for the estimates of the effect of the BTA on the probability of working in the wearing apparel sector are reported in Table 4. In all specifications, the coefficients associated with female workers' probability of working in the wearing apparel sector ($\beta_1 + \beta_2$) are statistically significant and notably larger than the coefficients associated with male workers ($Tariff_{pt}$). Furthermore, the interaction term ($Tariff_{pt} \times Female$) are positive and statistically significant across the specifications, indicating that the BTA's enabled women to reallocate into the wearing apparel sector at a faster rate than men. More specifically, the coefficients in column 1 show that the average province-level tariff reduction of 7.74 percentage points correspond to an increase in the probability of working in the wearing apparel sector by 2.99 percentage points for women 2 years after the implementation of the BTA. The coefficients in column 2 are slightly smaller than those in column 1 and translate to an increased probability in working in the wearing apparel sector by 2.11 percentage points for women after 4 years. While the coefficients may seem small, these are substantial changes considering that [McCaig and Pavcnik \(2018\)](#) find an increase in the share of workers in the manufacturing sector by 5 percentage points due to the BTA 4 years after its implementation. When accounting for gender differences in sector composition prior to the trade in the calculation of province-level tariffs, the results are qualitatively similar to those without as can be seen from Models 3 and 4. The results in Table 4 are also robust to the measure of trade exposure following the method of [Kovak \(2013\)](#), and which can be referred to in Table 12 in the Appendix.

To gain a better understanding of the spatial heterogeneity of the effect of the BTA on the structural transformation of workers, I repeat the analysis in equation (4) while only retaining rural and urban observations respectively. The results are represented in Figure 3 and demonstrate that the BTA induced workers to switch to the wearing

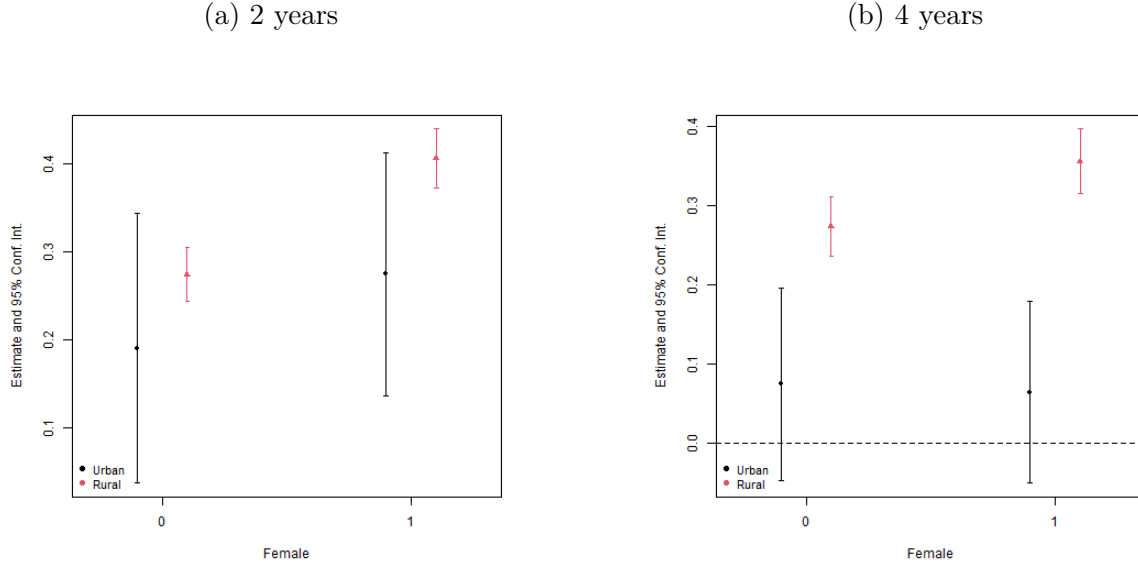
Table 4: Effect of the BTA on working in the wearing apparel sector.

Model:	<i>Work in wearing apparel</i>			
	2 years (1)	4 years (2)	2 years (3)	4 years (4)
<i>Overall trade shock</i>				
$Tariff_{pt}$	0.2571* (0.1339)	0.2024** (0.0980)		
<i>Accounting for share of female workers</i>				
$Tariff_{pt}^f$			0.2101** (0.0857)	0.1637*** (0.0605)
$\times$ Female	0.1278*** (0.0224)	0.0667** (0.0352)	0.1170*** (0.0226)	0.0624** (0.0309)
$\beta_1 + \beta_2$	0.3849*** (0.1421)	0.2691*** (0.0952)	0.3270*** (0.0922)	0.2261*** (0.0579)
Observations	96,205	40,393	96,205	40,393
R ²	0.78042	0.78116	0.78046	0.78119
Within R ²	0.00366	0.00150	0.00384	0.00161

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results using the panel component of VHLSS 2002 and 2004. Models 2 and 4 are results using the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level.

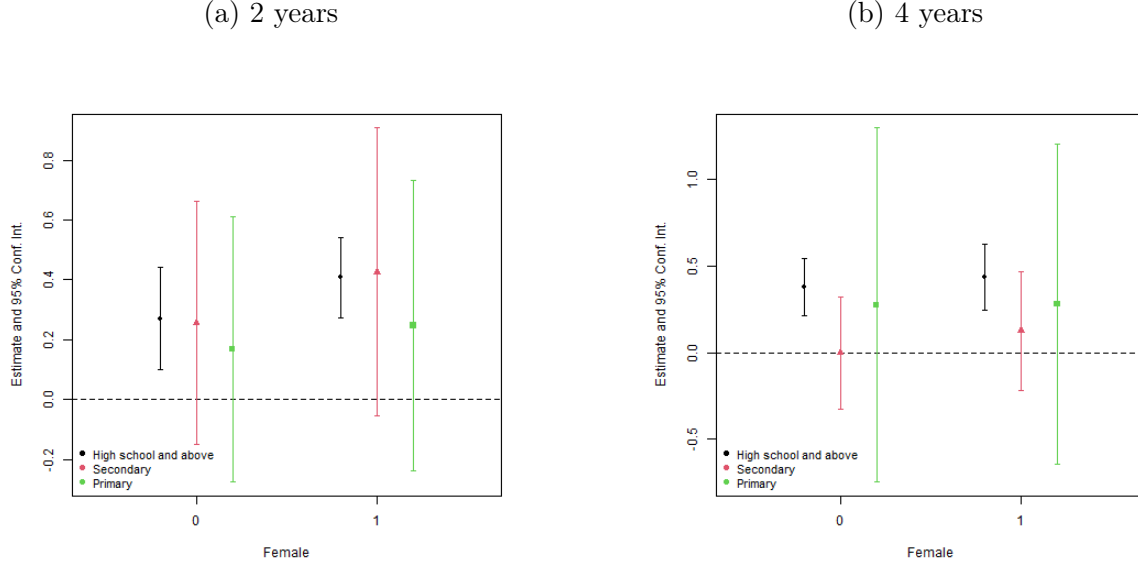
Figure 3: Effect of the BTA on working in the wearing apparel sector, by urban.



apparel sector more than urban workers, with the effect being strongest among rural female workers. This is in line with the findings by [McCaig \(2011\)](#) that the anti-poverty effects of the BTA were concentrated among rural female workers, and also provides evidence that the reallocation of labour into the wearing apparel sector contributed to trade-induced poverty reduction.

Additionally, since jobs within the wearing apparel sector are predominantly low-skilled, it is worthy of further examination the effect of the BTA on workers of different education levels. Thus, I implement equation (4) on three separate subsets of workers: (i) those who had a high school education or above, (ii) those who had a secondary school education, and (iii) those who had a primary school education in 2002. The results reported in Figure 4 show that although jobs in the wearing apparel sector are low-skilled, the BTA had the largest effect on workers who had a high school education or above in terms of reallocating into the wearing apparel sector. This may be due to the fact that compulsory education in Vietnam is until high school and the earliest workers could obtain a job is after they have obtained their high school certificate. Indeed, the average years of education obtained by wearing apparel workers between

Figure 4: Effect of the BTA on working in the wearing apparel sector, by education level.



2002 and 2006 is 9 years.

4.3.2 Women's relative income

The results for the effect of the BTA on women's relative income, as measured by her contribution towards the total household income, is given in Table 5 and shows that although the spousal contribution gap initially decreased after 2 years, this effect was reversed after 4 years. Specifically, the coefficient in column 2 of Table 5 translate to an average increase in women's contribution towards the total household income by 6.65 percentage points in 2006 compared to 2002. Given that at baseline, the average share of women's contribution was 31 percent, the BTA had a substantial effect in equalising the gender pay gap at the household level. The results do not deviate significantly when adopting $Tariff_{pt}^f$ as a measure of provincial exposure to the BTA.

Table 5: Effect of the BTA on women's relative wages.

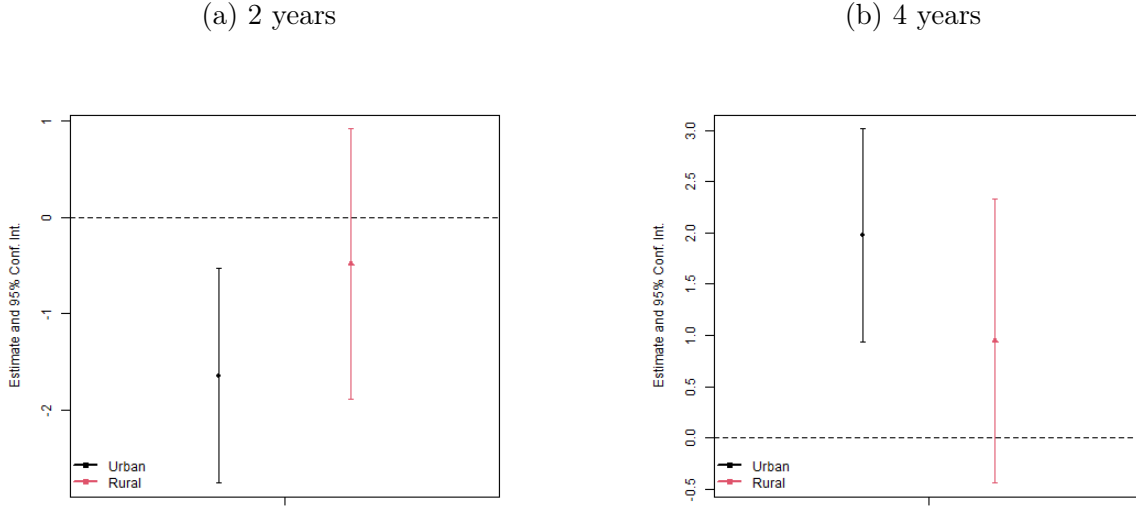
	<i>Contribution towards HH income (%)</i>			
	2 years	4 years	2 years	4 years
Model:	(1)	(2)	(3)	(4)
<i>Overall trade shock</i>				
$Tariff_{pt}$	-1.263*	0.8596*		
	(0.6818)	(0.4827)		
<i>Accounting for share of female workers</i>				
$Tariff_{pt}^f$			-1.063**	0.5862
			(0.4874)	(0.3796)
Observations	6,885	2,966	6,885	2,966
R ²	0.76028	0.76343	0.76052	0.76330
Within R ²	0.00674	0.00223	0.00774	0.00168

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results using the panel component of VHLSS 2002 and 2004. Models 2 and 4 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects. Standard errors are clustered at the province level. Observations are restricted to women who were married at the onset of the BTA, remained married, and who did not reside with their parents or in-laws.

As established above in section 4.3.1, there was large spatial variation within provinces regarding the effect of the BTA on structural transformation. To further understand whether the reallocation of female rural workers into the wearing apparel sector is also associated with an increase in relative wages for rural women, I split the observations by urban-rural status and rerun the TWFE model given by equation (5). Here, the effect of the BTA on rural workers is less clear as the coefficients for rural women's relative income are statistically insignificant. This may be due to the fact that a large number of households in rural Vietnam are made up of spouses who both work on their own farm. Given that I am only able to calculate each worker's contribution towards the household income if they earn a wage, the TWFE model for rural women's relative income may lack statistical power. Conversely, the coefficients for urban women's

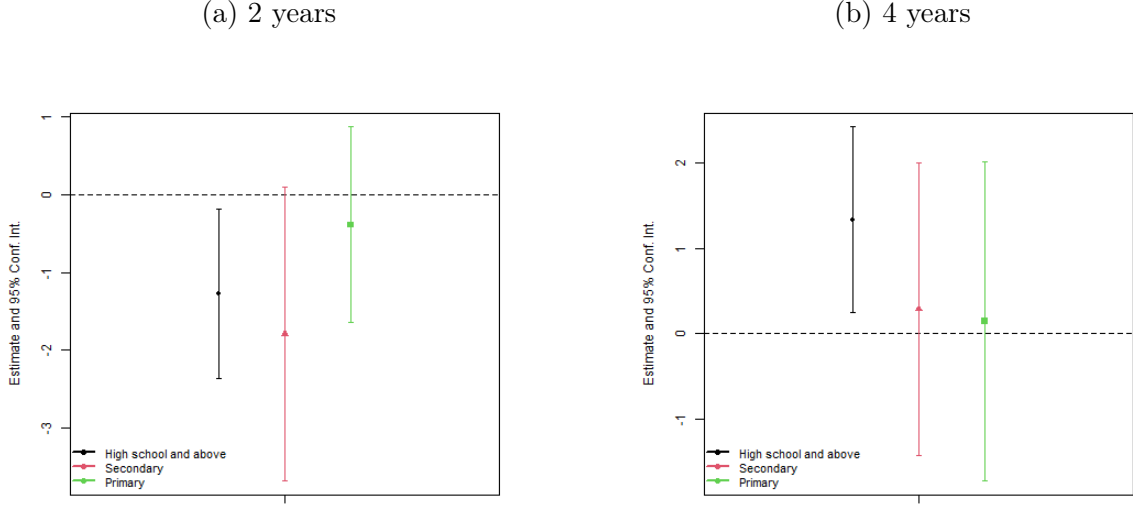
Figure 5: Effect of the BTA on women's relative wages, by urban.



relative income are statistically significant at the 5 percent level and provide evidence that although their relative incomes initially dipped, their contribution to the total household income increased by approximately 14 percentage points after 4 years.

When dis-aggregating the results in Table 5 by educational attainment of female workers, I find that the BTA had no effect on the relative wages of low-educated women who only had either a secondary or primary education. This may be due to the fact that jobs that pay wages tend to require as a minimum completion of high school education (i.e. compulsory education) and low-educated workers thus occupy non-wage jobs. Indeed, the average number of years a worker in a wage-paying job has is 8.6 years while workers who do not earn a wage have on average 7 years of schooling. While I find that the BTA did not bring about greater gender pay parity at the household-level for low-educated workers, women who had 10 years of schooling or more closed the spousal contribution gap by 10.3 percentage points 4 years after the trade shock.

Figure 6: Effect of the BTA on women’s relative wages, by educational attainment.



5 Intrahousehold Bargaining

Having established that women in provinces that were more exposed to the BTA improved their outside option through having better access to higher-paid jobs in the wearing apparel sector, I turn to look at whether households in more liberalised provinces increased their share of expenditure on goods that have been shown by lab and field experiments to be reflective of female preferences. In line with [Bobonis \(2009\)](#), [Almås et al. \(2018\)](#) and [Armand et al. \(2020\)](#), I examine whether households in more liberalised provinces increased their expenditure on education, food and healthcare. Additionally, I look at whether households who resided in provinces more exposed to tariff cuts reduced their consumption of tobacco, considered to be a ‘male-preferred’ good by [Duflo and Udry \(2004\)](#) and [Bobonis \(2009\)](#). To measure the impact of the BTA on changes in household expenditure and consumption patterns, the following TWFE model is implemented:

$$(6) \quad Share_{ht}^g = \gamma Tariff_{pt} + \delta_h + \theta_t + \epsilon_{hpt}$$

where $Share_{ht}^g$ is the real expenditure on good g as a share of total household expenditure by household h in year t . All other independent variables are as described in equation (5).

Since the VHLSS provides a detailed account of how much households spent on the education of each child, I build on the studies by [Qian \(2008\)](#) and [Heath and Tan \(2020\)](#) to look at whether a reduction in the spousal contribution gap led to an increase in investment in daughters' education using the following TWFE model:

$$(7) \quad Investment_{it} = \phi_1 Tariff_{pt} + \phi_2 Tariff_{pt} \times Daughter_i + \delta_h + \theta_t + \epsilon_{hpt}$$

where $Investment_{ht}$ is the real educational expenditure towards child i in year t . $Daughter_i$ is an indicator variable which takes the value of 1 if child i is female and 0 otherwise. By including household fixed-effects (δ_h) I can control for within-household differences whilst the interaction term $Tariff_{pt} \times Daughter_i$ allows for the determination of whether households in more provinces more exposed to the BTA increased investment into daughters' education relative to sons.

Futhermore, [Brown \(2009\)](#) and [Wang \(2014\)](#) show that high female intrahousehold bargaining power is associated with a reduction in the time spent on household chores by wives. They also show that the inverse is true where an increase in female intrahousehold bargaining power leads to an increase in husbands' participation in household chores. While the VHLSS does not allow me to study the effect of the BTA on the hours spent by each spouse on housework, I am able to look at the extensive margin. Thus, I replace the dependent variable in equation 6 with a dummy variable for whether the husband participates in housework or not.

Again, coefficients for the regression models above have been multiplied by -1 for ease of interpretation.

5.1 Results

Tables 6 provide the results for the effect of the BTA on the allocation of household resources towards female and male-preferred goods. Contrary to [Armand et al. \(2020\)](#), the negative coefficients displayed in Models 2 and 6 of Table 6 show that households located in provinces that were more exposed to the BTA, and where women arguably had better outside options, reduced their expenditure on food as a share of total household expenditure compared to less exposed households.

With regards to the effect of the BTA on household expenditure on education, Model 2 indicate that the share of household expenditure on education decreased in the two years following its implementation, while the coefficients in Model 6 point towards similar results for the effect after 4 years. These results contradict the findings by [Bobonis \(2009\)](#) that increasing women’s relative income entail greater investment in education. However, the coefficients associated with household expenditure on education are statistically insignificant in Model 6 and in both models the estimates are substantively very small with the average provincial exposure to the BTA translating to a 1 percentage point decrease in investment into education. I also find a lack of evidence that in areas where the spousal contribution gap was smaller, expenditure on health increased as a share of total expenditure as can be seen by the statistically insignificant results in Model 3 and 7.

In terms of household expenditure on ‘male-preferred’ goods, Model 4 of Table 6 shows that households in provinces where women had better access to jobs in the wearing apparel sector also reduced their share of total expenditure on tobacco after 2 years. More specifically, households reduced their share of household expenditure by 1.07 percentage points on average – a considerable amount given that households spent on average 1.47 percent of total household expenditure in 2002. However, I fail to reject the null hypothesis that households reduced their share of household expenditure on tobacco after 4 years as given by Model 8.

Table 6: Effect of the BTA on household expenditure on ‘female-preferred’ public goods and ‘male-preferred’ private good as a share of total household expenditure.

Model:	Share of total household expenditure							
	2 Years				4 Years			
	Food (1)	Education (2)	Health (3)	Tobacco (4)	Food (5)	Education (6)	Health (7)	Tobacco (8)
$Tariff_{pt}$	-0.3639 (0.2821)	-0.1796** (0.0808)	-0.0053 (0.1162)	-0.1384** (0.0688)	-0.3927* (0.2324)	-0.0537 (0.0991)	-0.0117 (0.1959)	-0.0348 (0.0653)
Observations	17,846	17,846	17,846	17,846	8,742	8,742	8,742	8,742
R ²	0.88754	0.84242	0.78379	0.79505	0.87493	0.82493	0.75859	0.80197
Within R ²	0.00182	0.00159	5.15×10^{-7}	0.00636	0.00193	0.00011	2.42×10^{-6}	0.00047

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Note: Models 1 to 4 are results from the panel component of VHLSS 2002 and 2004, and Models 5 to 8 are from the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level.

Table 7 presents the differential effect of the BTA on investment into sons and daughters’ education. According to Qian (2008) and Heath and Tan (2020), the economic empowerment of women at the household-level can lead to greater investment into daughters since mothers place more emphasis on investing into daughters’ human capital than fathers do. However, I do not find evidence that the BTA-induced increase in women’s relative income concomitantly led to greater educational investment into daughters. Since primary-school in Vietnam is free to attend, I further assess the extent to which the BTA impacted households’ investment into the education of sons and daughters in secondary and high school only. The results in Model 3 and 4 show that although the BTA had no impact on the educational investment of secondary and high school students after 2 years, households in provinces that experienced the average tariff cut reduced education expenditure by 36.33 and 43.52 percent for sons and daughters respectively. To estimate if greater exposure to the BTA induced households to enroll their children in school, I replace the dependent variable in (7) with an indicator variable which takes the value of 1 if child i is enrolled in school in year t . The results in Table 24 in the Appendix show that the BTA did not lead to greater educational

Table 7: Effect of the BTA on household expenditure on children’s education, by gender

Model:	<i>(log) Expenditure on education</i>			
	2 years (1)	4 years (2)	2 years (3)	4 years (4)
$Tarif_{pt}$	-1.665 (1.996)	-2.338 (2.252)	-2.387 (2.557)	-4.694* (2.629)
$\times$ Daughter	-0.4368* (0.2443)	-0.1824 (0.4639)	-0.4306 (0.3951)	-1.103 (0.7053)
$\phi_1 + \phi_2$	-2.118 (1.953)	-2.596 (2.233)	-2.848 (2.470)	-5.623** (2.614)
Observations	27,961	11,511	13,925	5,381
R ²	0.79291	0.82596	0.82377	0.86310
Within R ²	0.00149	0.00128	0.00194	0.00615

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results from the panel component of VHLSS 2002 and 2004, and Model 2 and 4 are results from the panel component of VHLSS 2002 and 2006. Since primary school is free of charge, Models 3 and 4 assess the impact of the BTA on educational expenditure of children ages 12 to 18 whereas results from Model 1 and 2 include children between the ages of 5 and 18. All specifications include household and year fixed effects, and standard errors are clustered at the province-level.

enrollment for daughters, even for those who had finished compulsory education.

Finally, Table 8 provide the results for the effect of the BTA on husband’s participation in housework. In both models, the coefficients are statistically insignificant and implies that even as women moved out of household businesses or from jobs tied to the family plot, this did not affect the division of housework in a way which would be suggestive of higher female intrahousehold bargaining power.³

6 Discussion

What could explain the results in Table 6? One way to rationalise the reduction in food expenditures is that as households prosper and their total expenditure increases, the share allocated to food decreases per Engel’s law. To test this hypothesis, I replace

³At baseline, 27 percent of husbands were reported to have participated in housework.

Table 8: Effect of the BTA on probability of husband contributing towards housework.

Model:	<i>Husband does housework</i>	
	2 years (1)	4 years (2)
$Tariff_{pt}$	-0.2199 (1.999)	1.041 (1.922)
Observations	24,630	10,743
R ²	0.74125	0.75932
Within R ²	2.42×10^{-5}	0.00055

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 are results from the panel component of VHLSS 2002 and 2004, and Model 2 are results from the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level.

the dependent variable in equation (6) with the (log) real monetary value of household expenditure on the same goods. The results can be viewed in Table 21 in the Appendix and does not lend credence to the explanation that households merely spent a smaller share of their total household expenditure on food as the coefficients in Model 1 and 5, although positive, are statistically insignificant.

While in the above I showed that the share of household expenditure allocated towards education reduced, Model 2 and 6 of Table 21 also yield statistically insignificant results which can be interpreted as that even though the BTA allowed households to increase their total household income, their monetary expenditure on education remained unchanged. These results, while refuting evidence provided by Bobonis (2009) is aligned with those found in Blanchard and Olney (2017) and Leight and Pan (2020) who found that if access to foreign export markets favour low-skilled workers (as was the case with the BTA), the opportunity cost for remaining in school increases and causes a diversion away from investment into education. Thus, even if women's intra-household bargaining power increased as a result of Vietnam's access to US markets, it may not have manifested in household expenditure on education because the BTA concomitantly increased the opportunity-cost for staying in school. I also find that total household expenditure and savings did not increase despite an increase in total

household income in provinces more exposed to the BTA, the results of which are found in Tables 20 and 23 of the Appendix.

Moreover, emphasised within models of noncooperative bargaining between spouses is that a positive shock to the wife’s relative income and an improvement in her labour market opportunities act as transmission mechanisms for women’s household-level empowerment since these factors make her threat of divorce credible when negotiations between the spouses break down (Lundberg and Pollak, 1994; Lim et al., 2007; Wang, 2014; Heath and Tan, 2020). Specifically, even if in equilibrium divorce rates remain low, it is the threat of divorce that affects how household resources are allocated (Wang, 2014). However, women may be prevented from leveraging her threat of divorce if it is not widely practiced due to social norms (Bhalotra et al., 2018; Calvi and Keskar, 2021; Kotsadam and Villanger, 2022). Here, the cost of divorce would outweigh remaining in a noncooperative marriage. Thus, one explanation as to why the BTA did not result in the allocation of household resources that reflect the preferences of wives is that access to foreign export markets did not in practice bolster women’s outside options in the Vietnamese context.

To evaluate whether divorce norms hindered women’s empowerment at the household-level, I rely on data from the World Values Survey (WVS). The WVS grew out of the European Values Survey by Ronald Inglehart from the University of Michigan in 1981, and which now covers over 120 countries (Inglehart et al., 2018). The purpose of the WVS is to collect nationally representative cross-sectional data on citizens’ beliefs encompassing a wide range of topics including gender norms, religious and social values. Of particular interest to this paper is that the WVS gauges perceptions on divorce through the following question:

Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between:

1. Divorce

Respondents are able to provide a score ranging from 1 to 10, with 1 indicating that divorce is ‘never justifiable’ and 10 being that divorce is ‘always justifiable’. Since the fourth wave and fifth wave of the WVS were conducted in Vietnam in 2001 and 2005 respectively, the WVS can be employed to examine the perception of divorce in Vietnam prior to the implementation of the BTA, and 4 years after it.

Column 2 of Table 9 provides descriptive statistics on the share of Vietnamese respondents from the WVS who stated that divorce was ‘never justifiable’, and demonstrates that not only was there an initially high level of disapproval regarding divorce, this pattern did not shift as Vietnam underwent structural transformation. Furthermore, the extent to which respondents thought that divorce was justifiable was generally low with a mean score of 2.56 in 2001 and 2.33 in 2005. There was also very little variation in respondents’ view on divorce as can be seen from the low standard deviation values in Column 3, nor was there much heterogeneity by sex as can be seen when comparing Panel A and Panel B of Table 9.

Table 9: Descriptive statistics on norms and values on divorce in Vietnam between 2001 and 2005.

Panel A. All observations

	Never justifiable (%)	Mean	S.D.
2001	51.60	2.56	0.07
2005	54.72	2.33	0.05

Panel B. Female

	Never justifiable (%)	Mean	S.D.
2001	53.1	2.55	0.09
2005	55.1	2.36	0.08

Panel C. Male

	Never justifiable (%)	Mean	S.D.
2001	49.1	2.71	0.09
2005	55	2.32	0.07

Source: Author's own calculations from the Wave 4 and Wave 5 of the World Values Survey.

Taken together, the descriptive statistics in Table 9 suggest that an explanation for why households in provinces that were more exposed to the BTA did not increase their share of total household expenditure on ‘female-preferred’ goods can be found in the anti-divorce nature of Vietnamese social norms. In other words, a plausible reason for why women’s intrahousehold bargaining position did not increase despite the BTA-induced improvement in wives’ relative income and labour market opportunities is that, without a concurrent shift the social acceptance of divorce, women are unable

to credibly raise the threat of divorce in situations of noncooperative bargaining with their husband.

Indeed, Table 26 in the Appendix confirms the hypothesis that the BTA-induced structural transformation did not lead to greater divorce. This is in contrast to [Heath and Tan \(2020\)](#) who found that the Hindu Succession Act, which ameliorated some groups of Indian women’s ability to inherit land, led to greater instances of divorce in India and which also increased women’s intrahousehold bargaining position. Similarly, [Wang \(2014\)](#) finds that privatisation of state-owned housing in China in 1994 coupled with the Marriage Law which states that property acquired during marriage are considered jointly owned, increased divorce rates and women’s intrahousehold bargaining position. While it is unclear whether boosting women’s unearned or earned income has a greater impact on their intrahousehold bargaining power, policy reforms focusing on women’s property rights may enhance their outside option more effectively as the sale of assets (e.g. land) at the point of divorce could result in a larger income shock for women than just earned income alone.

It is also plausible that, contrary to the explanation provided above, improvements in women’s relative wages and labour market opportunities do indeed strengthen women’s outside options; however, this process may take more than the 4 years studied within this paper to manifest itself in the allocation of household resources. Given the data restrictions of this paper, it was not possible to empirically test whether households increased their share of expenditure on ‘female-preferred’ goods after 2005. On the other hand, [Qian \(2008\)](#) and [Majlesi \(2016\)](#) detail that the disproportionate expansion of female-intensive sectors resulted in higher female intrahousehold bargaining power after 3 years. Thus, the medium to long-term effects of the BTA on household inequality is an area for future research.

7 Conclusion

While it is well established that trade can promote gender equality at the firm and sector-level by increasing female labour force participation and wages of women, it is unclear as to whether this effect is mirrored at the household-level. This paper provides further evidence for the effect of access to foreign export markets on household-level gender equality in developing countries. Specifically, I provide evidence that the BTA-induced expansion of the female-intensive wearing apparel sector improved women's labour market opportunities in Vietnam as they had greater access to jobs in the wearing apparel sector. I also show that this process of structural transformation enabled women to improve their income relative to their husbands, and which allowed women to close the spousal contribution gap.

However, contrary to what has been predicted by models of non-cooperative intra-household bargaining, I find a lack of evidence that improvements in women's labour market opportunities and relative income lead to an increase in household expenditure on goods considered to be aligned with female preferences. This is indicative of the fact that improvements in the aforementioned is an important, but not sufficient condition to reinforcing women's outside options; social norms surrounding divorce, male identity and female employment can be persistent in hindering women's household-level empowerment. However, data restrictions meant that I was not able to pinpoint which of the norm(s) played a role in hindering women's intrahousehold bargaining power. Thus, how social norms and female employment interact with each other at the household-level is a promising area for future research.

References

- E. Aguayo-Tellez, J. Airola, C. Juhn, and C. Villegas-Sanchez. Did Trade Liberalization Help Women? the Case of Mexico in the 1990s. In S. W. Polachek and K. Tatsiramos, editors, *Research in Labor Economics*, volume 38, pages 1–35. Emerald Group Publishing Limited, Dec. 2013. ISBN 978-1-78350-056-7 978-1-78350-057-4. doi: 10.1108/S0147-9121(2013)0000038001.
- A. Aizer. The gender wage gap and domestic violence. *American Economic Review*, 100(4):1847–59, 2010.
- I. Almås, A. Armand, O. Attanasio, and P. Carneiro. Measuring and Changing Control: Women’s Empowerment and Targeted Transfers. *The Economic Journal*, 128(612): F609–F639, July 2018. ISSN 0013-0133, 1468-0297. doi: 10.1111/ecoj.12517.
- A. Armand, O. Attanasio, P. Carneiro, and V. Lechene. The effect of gender-targeted conditional cash transfers on household expenditures: Evidence from a randomized experiment. *The Economic Journal*, 130(631):1875–1897, 2020.
- N. Ashraf. Spousal Control and Intra-Household Decision Making: An Experimental Study in the Philippines. *The American Economic Review*, 99(4):1245–1277, 2009.
- D. Autor, D. Dorn, and G. Hanson. When work disappears: Manufacturing decline and the falling marriage market value of young men. *American Economic Review: Insights*, 1(2):161–178, 2019.
- S. R. Bhalotra, U. S. Kambhampati, S. Rawlings, and Z. Siddique. Intimate partner violence and the business cycle. *Available at SSRN 3111147*, 2018.
- S. E. Black and E. Brainerd. Importing equality? the impact of globalization on gender discrimination. *ILR Review*, 57(4):540–559, 2004.
- E. J. Blanchard and W. W. Olney. Globalization and human capital investment: Export

- composition drives educational attainment. *Journal of International Economics*, 106: 165–183, 2017.
- F. Bloch and V. Rao. Terror as a bargaining instrument: A case study of dowry violence in rural india. *American Economic Review*, 92(4):1029–1043, 2002.
- G. J. Bobonis. Is the allocation of resources within the household efficient? new evidence from a randomized experiment. *Journal of political Economy*, 117(3):453–503, 2009.
- G. J. Bobonis, M. González-Brenes, and R. Castro. Public transfers and domestic violence: The roles of private information and spousal control. *American Economic Journal: Economic Policy*, 5(1):179–205, 2013.
- P. H. Brown. Dowry and Intrahousehold Bargaining: Evidence from China. *Journal of Human Resources*, 44(1):25–46, 2009. ISSN 1548-8004. doi: 10.1353/jhr.2009.0016.
- E. Bulte and R. Lensink. Women’s empowerment and domestic abuse: Experimental evidence from vietnam. *European economic review*, 115:172–191, 2019.
- R. Calvi and A. Keskar. ’til dowry do us part: Bargaining and violence in indian families. 2021.
- M. Doepke and M. Tertilt. Does female empowerment promote economic development? *Journal of Economic Growth*, 24(4):309–343, Dec. 2019. ISSN 1381-4338, 1573-7020. doi: 10.1007/s10887-019-09172-4.
- E. Duflo and C. Udry. Intrahousehold Resource Allocation in Cote d’Ivoire: Social Norms, Separate Accounts and Consumption Choices. Technical Report w10498, National Bureau of Economic Research, Cambridge, MA, May 2004.
- B. Erten and P. Keskin. Trade-offs? the impact of wto accession on intimate partner violence in cambodia. *The Review of Economics and Statistics*, pages 1–40, 2021.

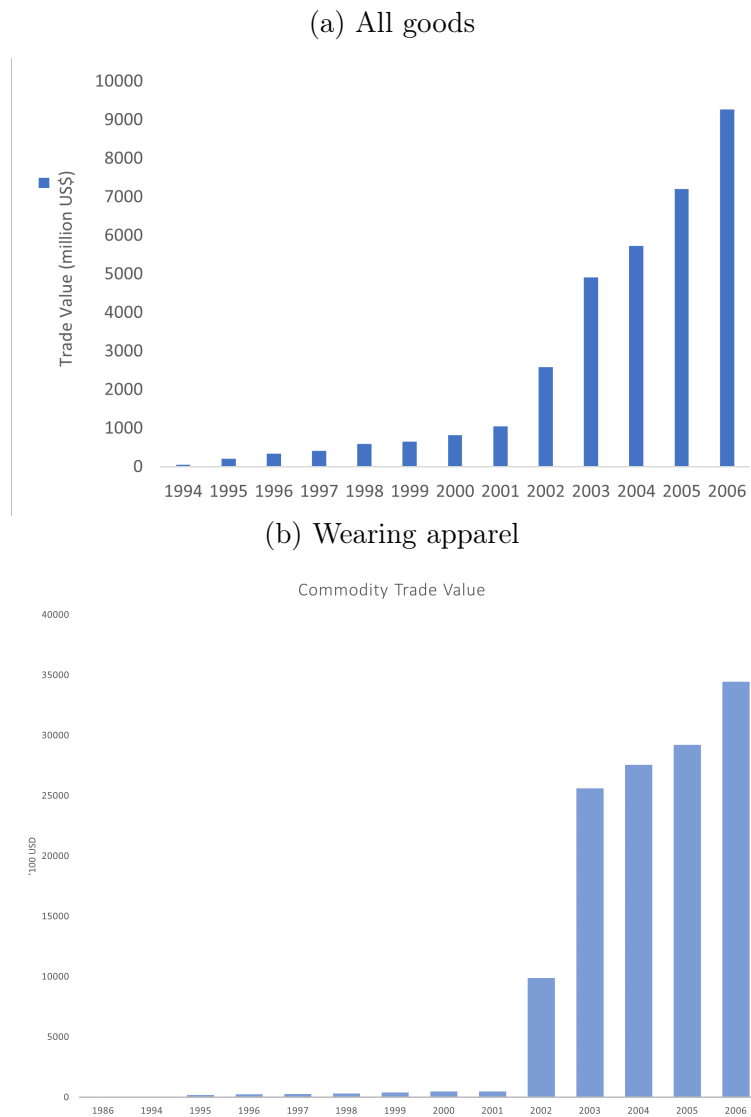
- M. Eswaran and N. Malhotra. Domestic violence and women's autonomy in developing countries: theory and evidence. *Canadian Journal of Economics/Revue canadienne d'économique*, 44(4):1222–1263, 2011.
- E. Fukase. Export liberalization, job creation, and the skill premium: Evidence from the us–vietnam bilateral trade agreement (bta). *World Development*, 41:317–337, 2013.
- E. Fukase. Foreign Wage Premium, Gender and Education: Insights from Vietnam Household Surveys. *The World Economy*, 37(6):834–855, June 2014. ISSN 03785920. doi: 10.1111/twec.12103.
- I. Gaddis and J. Pieters. The Gendered Labor Market Impacts of Trade Liberalization Evidence from Brazil. *Journal of Human Resources*, 52(2):457–490, Mar. 2017. ISSN 0022-166X, 1548-8004. doi: 10.3368/jhr.52.2.1014-6690R1.
- R. Heath. Women's access to labor market opportunities, control of household resources, and domestic violence: Evidence from bangladesh. *World Development*, 57: 32–46, 2014.
- R. Heath and X. Tan. Worth fighting for: Daughters improve their mothers' autonomy in South Asia. *Journal of Development Economics*, 135:255–271, Nov. 2018. ISSN 03043878. doi: 10.1016/j.jdevco.2018.07.003.
- R. Heath and X. Tan. Intrahousehold Bargaining, Female Autonomy, and Labor Supply: Theory and Evidence from India. *Journal of the European Economic Association*, 18(4):1928–1968, Aug. 2020. ISSN 1542-4766, 1542-4774. doi: 10.1093/jeea/jvz026.
- R. Inglehart, C. W. HAERPFER, A. MORENO, C. WELZEL, K. KIZILOVA, J. DIEZ-MEDRANO, M. LAGOS, P. NORRIS, E. PONARIN, B. PURANEN, et al. World values survey: all rounds, country-pooled datafile version: v2015-04-18, 2018.

- C. Juhn, G. Ujhelyi, and C. Villegas-Sanchez. Men, women, and machines: How trade impacts gender inequality. *Journal of Development Economics*, 106:179–193, Jan. 2014. ISSN 03043878. doi: 10.1016/j.jdeveco.2013.09.009.
- A. Kotsadam and E. Villanger. Jobs and intimate partner violence-evidence from a field experiment in ethiopia. *Journal of Human Resources*, pages 0721–11780R2, 2022.
- B. K. Kovak. Regional Effects of Trade Reform: What is the Correct Measure of Liberalization? *The American Economic Review*, 103(5):1960–1976, 2013. ISSN 0002-8282.
- J. Leight and Y. Pan. Export expansion, human capital investment and the urban-rural educational gap: Evidence from china. *Working Paper*, 2020.
- S. S. Lim, A. Winter-Nelson, and M. Arends-Kuenning. Household Bargaining Power and Agricultural Supply Response: Evidence from Ethiopian Coffee Growers. *World Development*, 35(7):1204–1220, July 2007. ISSN 0305750X. doi: 10.1016/j.worlddev.2006.09.016.
- S. Lundberg and R. A. Pollak. Noncooperative Bargaining Models of Marriage. *The American Economic Review*, 84(2):132–137, 1994. ISSN 0002-8282.
- K. Majlesi. Labor market opportunities and women’s decision making power within households. *Journal of Development Economics*, 119:34–47, 2016.
- B. McCaig. Exporting out of poverty: Provincial poverty in Vietnam and U.S. market access. *Journal of International Economics*, 85(1):102–113, Sept. 2011. ISSN 00221996. doi: 10.1016/j.jinteco.2011.05.007.
- B. McCaig and N. Pavcnik. Moving out of agriculture: structural change in vietnam. Technical report, National Bureau of Economic Research, 2013.

- B. McCaig and N. Pavcnik. Informal Employment in a Growing and Globalizing Low-Income Country. *American Economic Review*, 105(5):545–550, May 2015. ISSN 0002-8282. doi: 10.1257/aer.p20151051.
- B. McCaig and N. Pavcnik. Export Markets and Labor Allocation in a Low-Income Country. *American Economic Review*, 108(7):1899–1941, July 2018. ISSN 0002-8282. doi: 10.1257/aer.20141096.
- T. Molina and M. Tanaka. Globalization and female empowerment: Evidence from myanmar. *Economic development and cultural change*, 71(2):519–565, 2023.
- N. Qian. Missing women and the price of tea in china: The effect of sex-specific earnings on sex imbalance. *The Quarterly Journal of Economics*, 123(3):1251–1285, 2008.
- P. Topalova. Factor Immobility and Regional Impacts of Trade Liberalization: Evidence on Poverty from India. *American Economic Journal: Applied Economics*, 2(4):1–41, 2010. ISSN 1945-7782.
- S.-Y. Wang. Property rights and intra-household bargaining. *Journal of Development Economics*, 107:192–201, 2014.

A Appendix

Figure 7: Value of exports of all Vietnamese goods to the US between 1994 and 2006



Source: Author's calculations from COMTRADE data.

Table 10: Top five sectors in terms of male employment composition pre and post BTA.

(a) 2001

Sector	Share (%)
Agriculture	43.54
Construction	7.54
Retail trade	4.89
Fishing, operation of fish farms	4.02
Land transport	3.98

(b) 2005

Sector	Share (%)
Agriculture	37.30
Construction	9.03
Retail trade	5.41
Land transport	4.17
Fishing, operation of fish farms	4.08

Table 11: Top five sectors in terms of female employment composition pre and post BTA.

(a) 2001

Sector	Share (%)
Agriculture	49.80
Retail trade	14.22
Education	10.53
Hotels and restaurants	3.45
Manufacture of wearing apparel	2.33

(b) 2005

Sector	Share (%)
Agriculture	43.37
Retail trade	16.73
Education	4.48
Hotels and restaurants	3.81
Manufacture of wearing apparel	3.50

Figure 8: Change in province-level share of male and female employment in agriculture versus change in province-level share of male and female employment in the manufacturing sector between 2001 and 2005

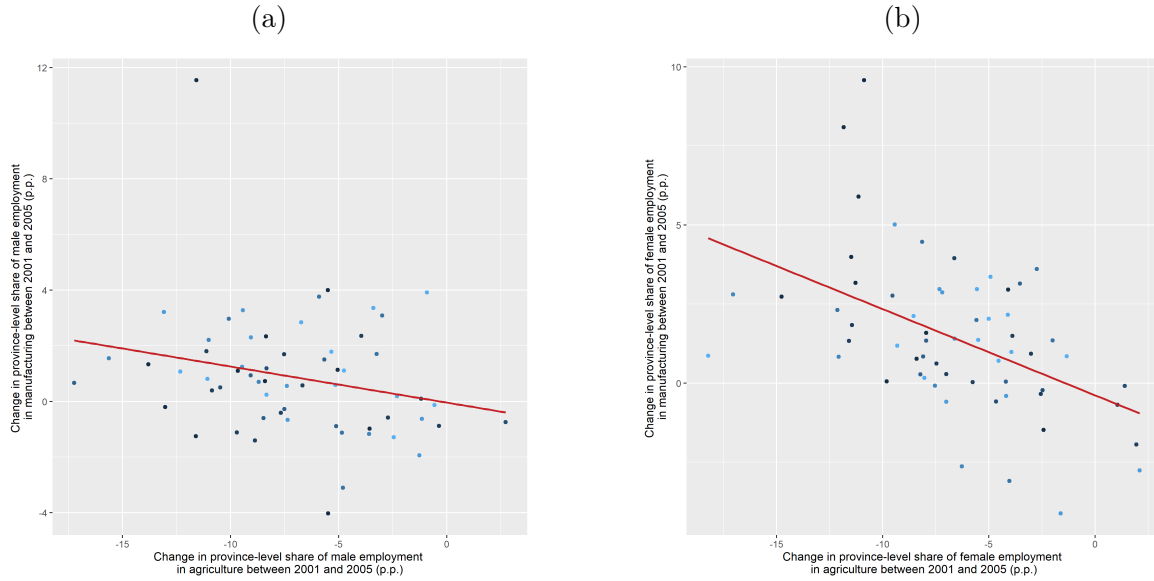


Figure 9: Change in province-level tariff versus change in province-level share of male and female employment in the agricultural sector between 2001 and 2005

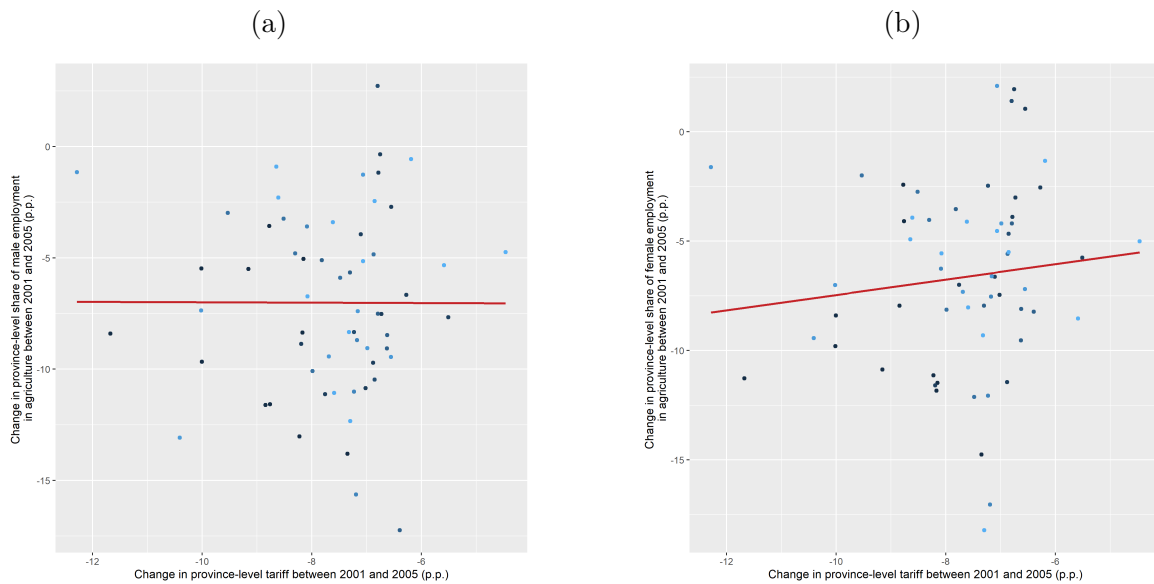


Figure 10: Change in province-level tariff versus change in province-level share of male and female employment in the wearing apparel and leather sector between 2001 and 2005

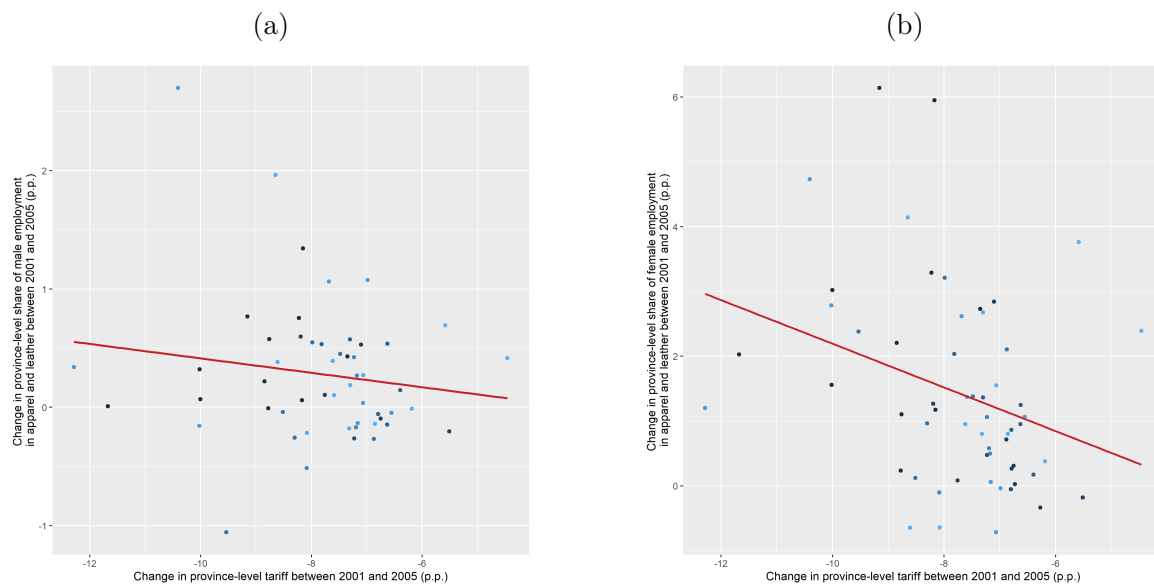


Table 12: Effect of the BTA on working in the wearing apparel sector using alternative measure of exposure to BTA.

Model:	<i>Work in wearing apparel</i>	
	2 years (1)	4 years (2)
$Tarif f_{pt}$	0.0603 (0.0362)	0.0482* (0.0272)
$\times$ Female	-0.0765*** (0.0148)	-0.0297 (0.0238)
$\beta_1 + \beta_2$	0.1368*** (0.0412)	0.0778** (0.0323)
Observations	115,099	48,180
R ²	0.77111	0.76129
Within R ²	0.00342	0.00094

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results using the panel component of VHLSS 2002 and 2004. Modles 2 and 4 are results using the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 13: Effect of the BTA on hours worked per week.

Model:	<i>log(Hours worked per weeks)</i>	
	2 years	4 years
	(1)	(2)
$Tarif_{pt}$	0.2158 (0.5571)	1.103* (0.6546)
$\times Female$	-0.1762 (0.1105)	-0.1918 (0.1586)
$\beta_1 + \beta_2$	0.0396 (0.5735)	0.9111 (0.7323)
Observations	81,807	34,291
R ²	0.73847	0.73224
Within R ²	0.00047	0.00239
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>		

Note: Model 1 are results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 14: Effect of the BTA on days worked per month.

	<i>log(Days worked per month)</i>	
	2 years	4 years
Model:	(1)	(2)
$Tarif_{pt}$	0.2160 (0.5569)	1.103* (0.6547)
$\times Female$	-0.1763 (0.1104)	-0.1918 (0.1586)
$\beta_1 + \beta_2$	0.0398 (0.5734)	0.9112 (0.7324)
Observations	81,798	34,289
R ²	0.73847	0.73224
Within R ²	0.00048	0.00239
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>		

Note: Model 1 are results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 15: Effect of the BTA on working in the manufacturing sector.

Model:	<i>Work in manufacturing</i>			
	2 years (1)	4 years (2)	2 years (3)	4 years (4)
<i>Overall trade shock</i>				
$Tariff_{pt}$	0.1002 (0.2233)	-0.0197 (0.4405)		
<i>Accounting for share of female workers</i>				
$Tariff_{pt}^f$			0.0459 (0.1688)	-0.0154 (0.3479)
$\times$ Female	-0.0329 (0.0685)	0.1871 (0.1183)	0.4957 (0.6897)	0.3928 (0.9696)
$\beta_1 + \beta_2$	0.1331 (0.2641)	-0.2067 (0.5121)	0.0703 (0.2115)	-0.1944 (0.4174)
Observations	96,191	40,389	96,191	40,389
R^2	0.80201	0.79201	0.80200	0.79202
Within R^2	6.95×10^{-5}	0.00068	3.31×10^{-5}	0.00075

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results from the panel component of VHLSS 2002 and 2004. Models 2 and 4 are results from the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 16: Results for the TWFE model on the effect of the BTA on working in the construction sector.

	<i>Work in construction</i>			
	2 years	4 years	2 years	4 years
Model:	(1)	(2)	(3)	(4)
<i>Overall trade shock</i>				
$Tariff_{pt}$	0.1089	0.1706	0.0566	0.1158
	(0.2663)	(0.1789)	(0.2048)	(0.1297)
<i>Accounting for share of female workers</i>				
$Tariff_{pt}^f$			0.0459	-0.0154
			(0.1688)	(0.3479)
$\times$ Female	-0.1451***	-0.2027**	-0.6539*	-0.5518
	(0.0516)	(0.0799)	(0.3849)	(0.5291)
$\beta_1 + \beta_2$	-0.0362	-0.0321	-0.0739	-0.0663
	(0.2335)	(0.1554)	(0.1706)	(0.1054)
Observations	96,191	40,389	96,191	40,389
R ²	0.79198	0.77229	0.79202	0.77230
Within R ²	0.00092	0.00146	0.00112	0.00151

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 and 3 are results from the panel component of VHLSS 2002 and 2004. Model 2 and 4 are results from the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects. Standard errors are clustered at the province level. Coefficients have been multiplied by -1 for ease of interpretation.

Figure 11: Change in province-level tariff versus change in aggregate province-level wages for male and female workers between 2001 and 2005

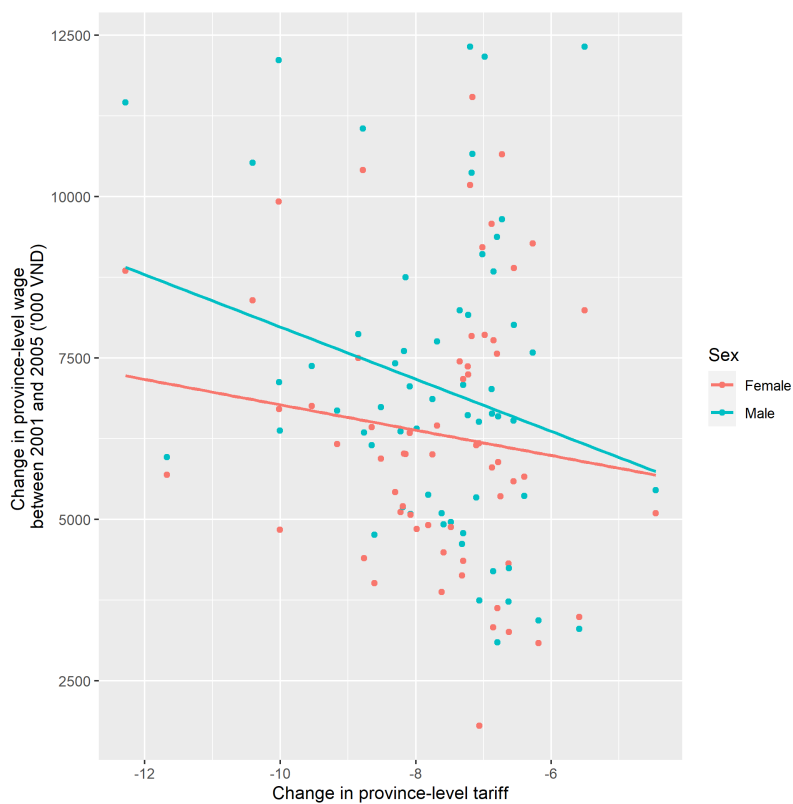


Table 17: Aggregate wages of the agricultural and wearing apparel sector in 2001 and 2005.

	Agriculture		Wearing Apparel	
	Female	Male	Female	Male
<i>2001</i>				
(’000) VND	2770.5	3208.69	9300.27	7731.13
<i>2005</i>				
(’000) VND	4039.56	5724.20	12468.19	7949.85

Figure 12: 2001 and 2005 kernel density estimates of the (log) wages of male and female workers who did and did not reallocate into the wearing apparel sector

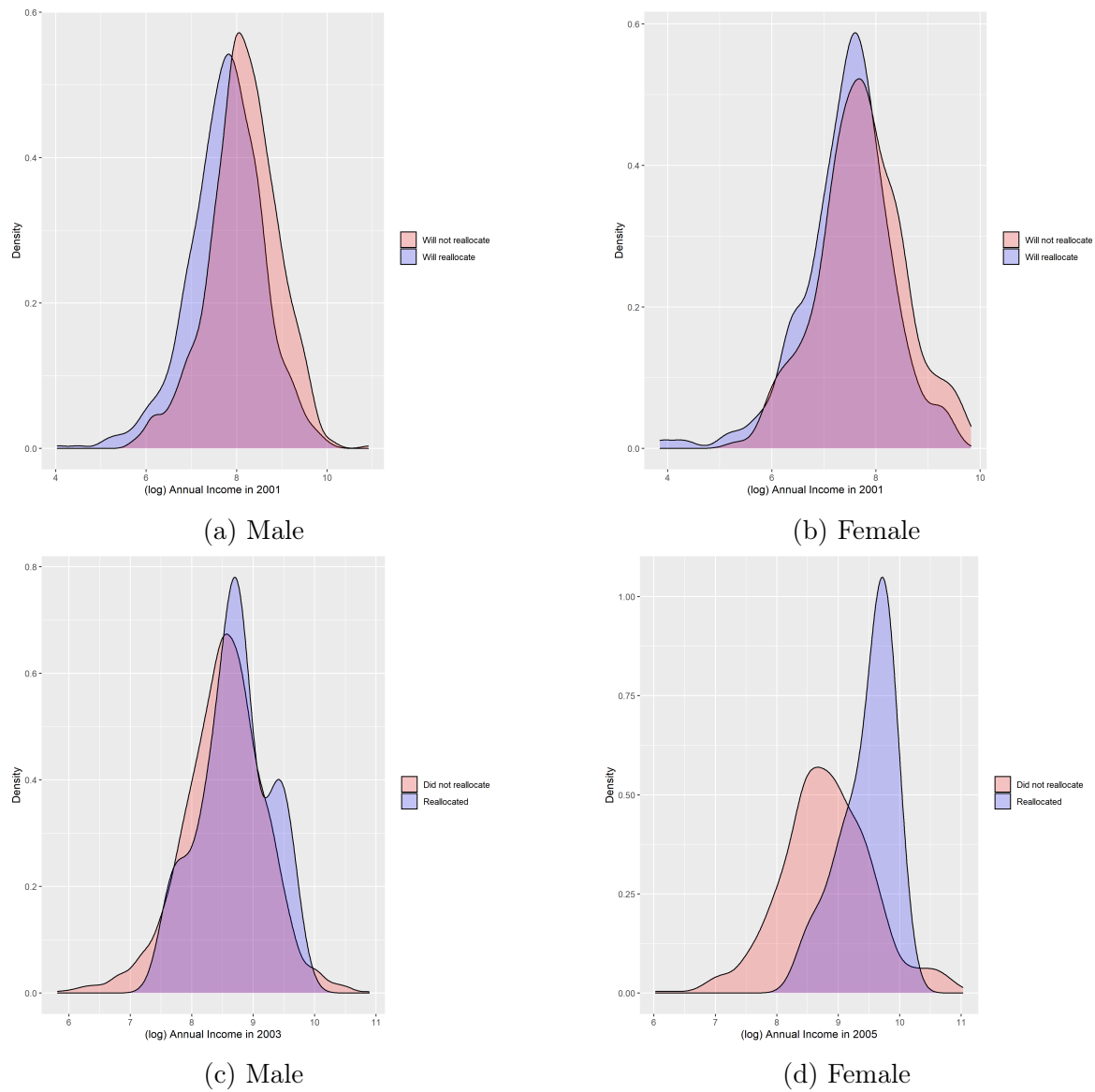


Table 18: Effect of the BTA on women's relative wages using alternative measure of exposure to BTA.

	<i>Contribution towards HH income (%)</i>	
	2 years	4 years
Model:	(1)	(2)
$Tarif_{pt}$	-0.4779*** (0.1401)	0.0770 (0.1338)
Observations	6,885	2,966
R ²	0.76121	0.76295
Within R ²	0.01060	0.00019

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects. Standard errors are clustered at the province level. Observations are restricted to couples who were married at the onset of the BTA, remained married, did not reside with their parents or in-laws, and both spouses had a wage-paying job before and after the BTA. Coefficients have been multiplied by -1 for ease of interpretation.

Table 19: Effect of the BTA on women's relative wages for couples who both earned wages.

Model:	$\log(Wages)$	
	2 years (1)	4 years (2)
$Tariff_{pt}$	-4.713*** (1.727)	-4.707 (2.866)
$\times Female$	2.947*** (0.2842)	2.672*** (0.3496)
$\beta_1 + \beta_2$	-1.765 (1.934)	-2.035 (3.069)
Observations	24,426	10,694
R ²	0.84253	0.84775
Within R ²	0.05004	0.03814

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Note: Model 1 results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects. Standard errors are clustered at the province level. Observations are restricted to couples who were married at the onset of the BTA, remained married, did not reside with their parents or in-laws, and both spouses had a wage-paying job before and after the BTA. Coefficients have been multiplied by -1 for ease of interpretation.

Table 20: Effect of the BTA on total household expenditure.

	<i>log(Total household expenditure)</i>	
	2 years	4 years
Model:	(1)	(2)
<i>Tariff_{pt}</i>	-1.096 (0.9461)	0.4787 (1.668)
Observations	17,846	8,742
R ²	0.94033	0.92778
Within R ²	0.00125	0.00018

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 are results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 21: Effect of the BTA on real monetary household expenditure on ‘female-preferred’ public goods and ‘male-preferred’ private good.

Model:	<i>log(Real monetary expenditure)</i>							
	2 Years				4 Years			
	Food	Education	Health	Tobacco	Food	Education	Health	Tobacco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Tariff_{pt}</i>	0.3551 (0.6215)	2.974 (2.627)	-1.116 (1.544)	0.4696 (1.902)	1.504 (2.065)	1.365 (2.411)	0.7644 (3.623)	-0.3878 (4.378)
Observations	17,846	12,625	17,521	15,033	8,742	6,144	8,554	7,410
R ²	0.90543	0.92576	0.81352	0.86463	0.89725	0.91756	0.80286	0.87552
Within R ²	0.00013	0.00217	0.00010	1.72×10^{-5}	0.00180	0.00038	4.35×10^{-5}	1.07×10^{-5}

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 to 4 are results using the panel component of VHLSS 2002 and 2004. Models 5 to 8 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 22: Effect of the BTA on real monetary household expenditure on weddings and funerals.

	<i>log(Real monetary expenditure)</i>			
	2 Years		4 Years	
	Weddings	Funerals	Weddings	Funerals
<i>Tariff_{pt}</i>	19.36** (8.181)	0.6051 (3.227)	-26.11 (15.83)	0.9387 (15.95)
Observations	2,065	11,949	1,599	4,928
R ²	0.98340	0.88396	0.96296	0.93754
Within R ²	0.02612	5.28×10^{-5}	0.04796	4.44×10^{-5}

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 are results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 23: Effect of the BTA on savings and purchase of gold.

	<i>log(Real monetary expenditure)</i>			
	2 Years		4 Years	
	Savings	Gold	Savings	Gold
Model:	(1)	(2)	(3)	(4)
<i>Tariff_{pt}</i>	14.34 (9.686)	5.718 (9.125)	-58.28 (54.87)	-4.794 (10.34)
Observations	1,026	7,153	555	3,519
R ²	0.97785	0.91249	0.96230	0.92433
Within R ²	0.02934	0.00202	0.09336	0.00109

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Since it is common for Vietnamese women to buy precious metals such as gold as an investment asset, I also assess whether the BTA induced women to buy more gold following the positive income shock. Model 1 are results using the panel component of VHLSS 2002 and 2004. Model 2 are results using the panel component of VHLSS 2002 and 2006. All specifications include household and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.

Figure 13: Effect of the BTA on allocation of household resources after 2 years, by urban.

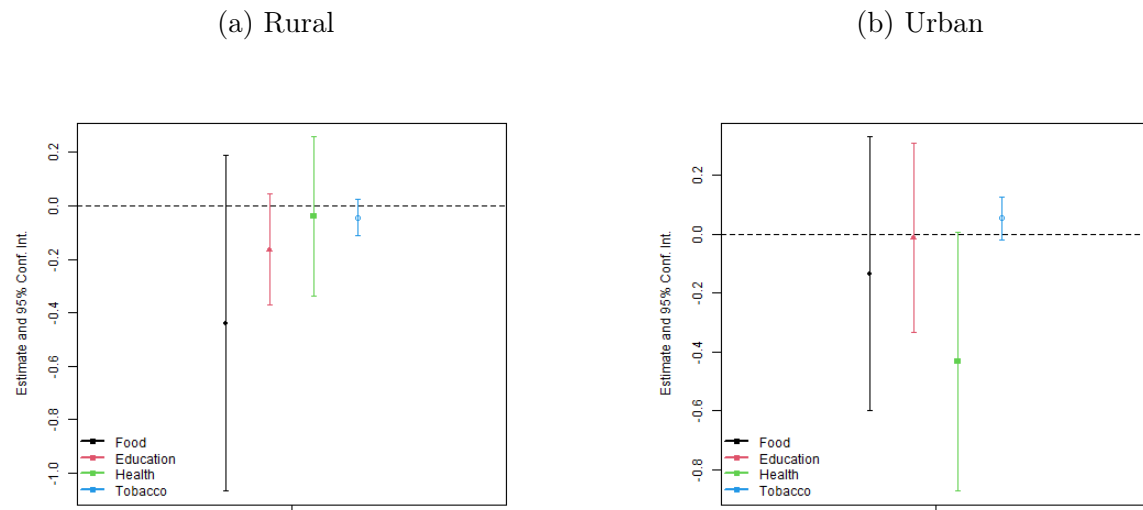


Figure 14: Effect of the BTA on allocation of household resources after 4 years, by urban.

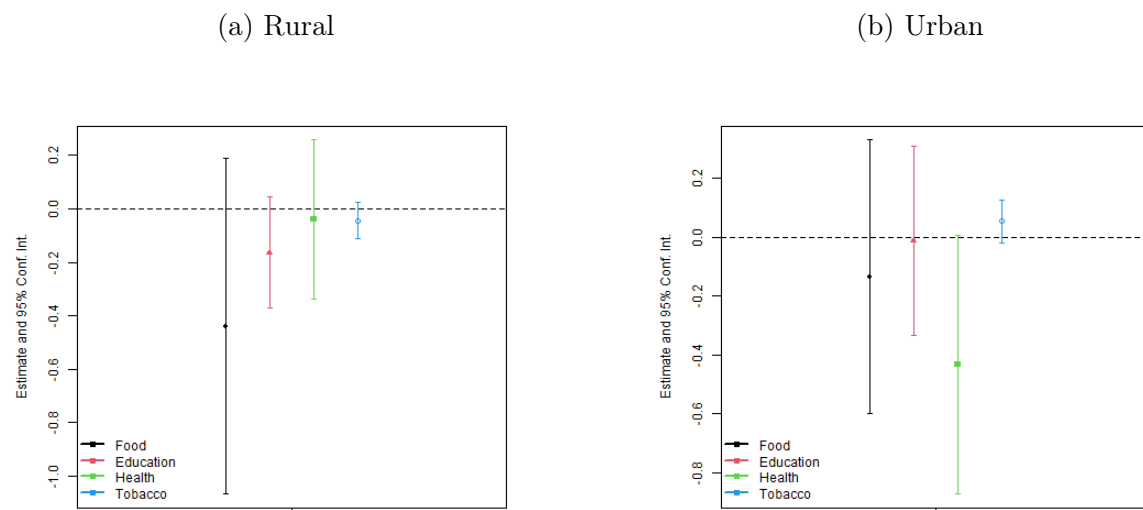


Figure 15: Effect of the BTA on allocation of household resources after 2 years, by education of wife.

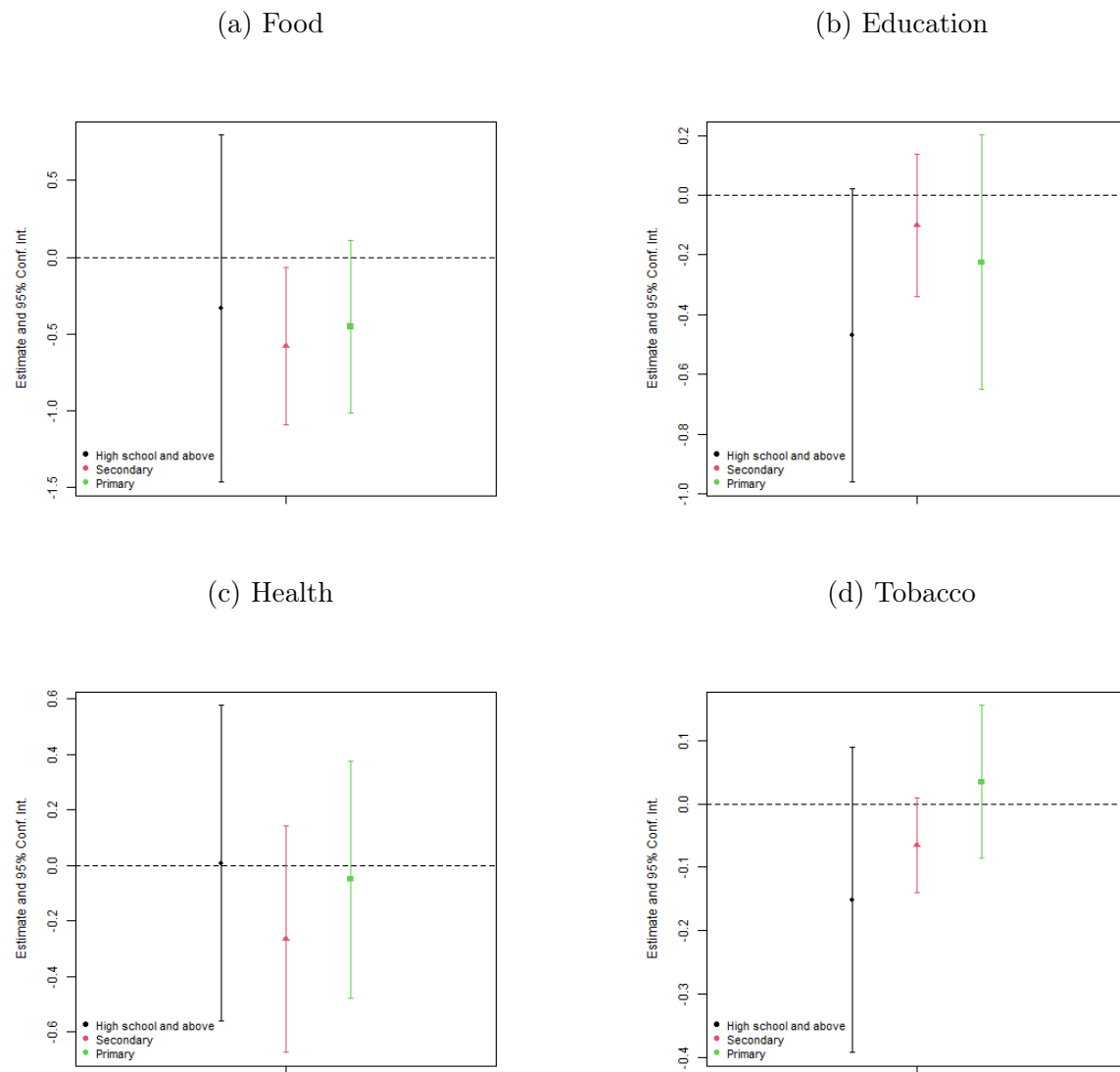


Figure 16: Effect of the BTA on allocation of household resources after 4 years, by education of wife.

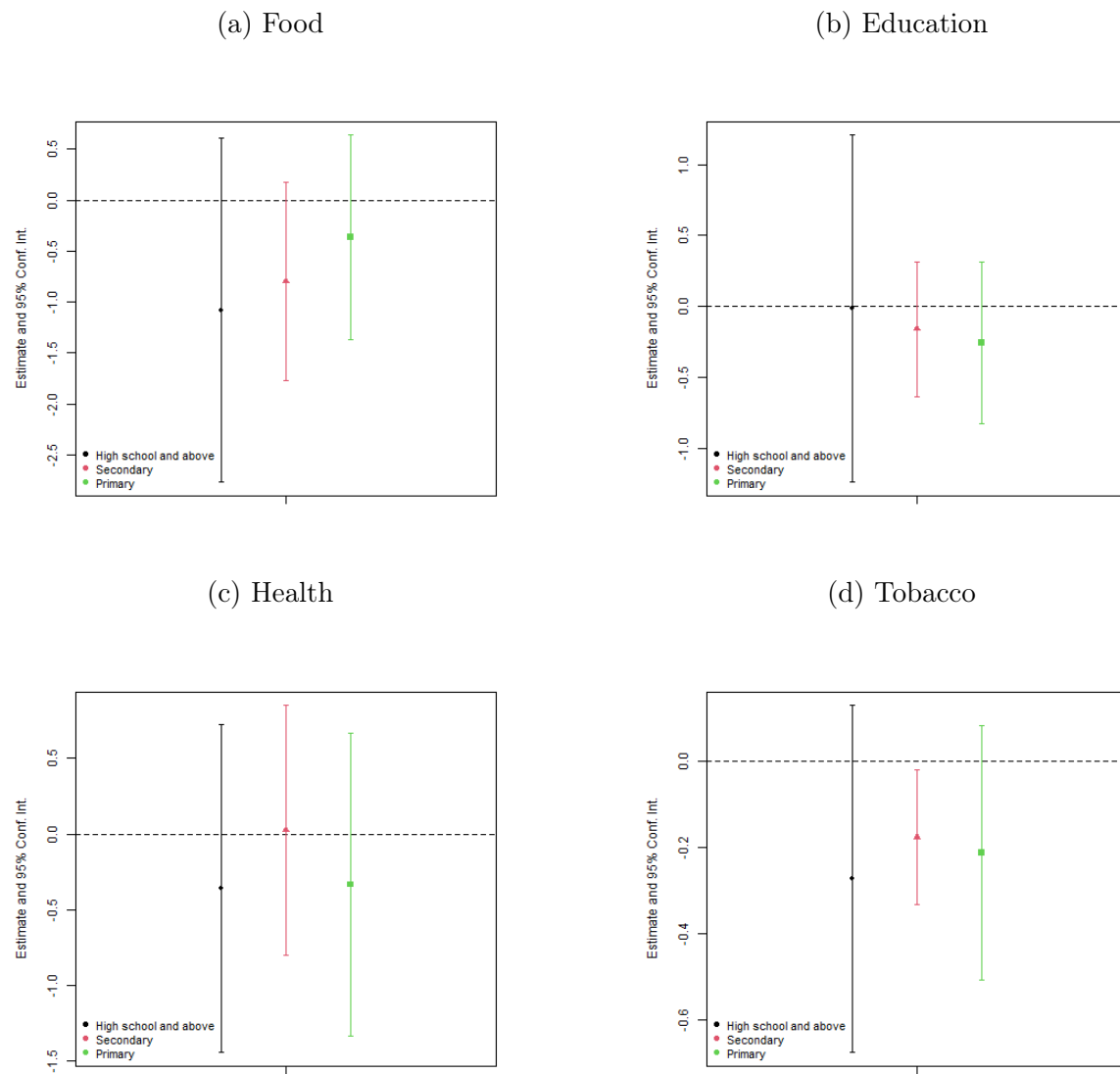


Table 24: Effect of the BTA on school enrollment.

Model:	<i>Enrolled in school</i>			
	2 years	4 years	2 years	4 years
	(1)	(2)	(3)	(4)
$Tariff_{pt}$	-0.6116** (0.3000)	0.1778 (0.4743)	0.2707 (2.011)	-3.193 (1.965)
$\times Daughter$	-0.0184 (0.0832)	-0.3266** (0.1330)	-0.2646 (0.7704)	-1.787 (1.235)
$\phi_1 + \phi_2$	-0.3924 (0.3089)	0.3155 (0.4798)	0.9178 (1.967)	-3.129 (1.996)
Observations	27,961	11,511	13,925	5,381
R ²	0.79291	0.82596	0.82377	0.86310
Within R ²	0.00149	0.00128	0.00194	0.00615

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Models 1 and 3 are results from the panel component of VHLSS 2002 and 2004, and Model 2 and 4 are results from the panel component of VHLSS 2002 and 2006. Since primary school is free of charge, Models 3 and 4 assess the impact of the BTA on educational expenditure of children ages 12 to 18 whereas results from Model 1 and 2 include children between the ages of 5 and 18. All specifications include household and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.

Table 25: Share of people who were divorced in Vietnam between 2001 and 2005.

Divorced (%)	
2001	0.57
2005	0.81

Source: Author's calculations using VHLSS 2002 and 2006.

Table 26: Effect of the BTA on divorce.

	<i>Divorce</i>	
	2 years	4 years
Model:	(1)	(2)
$Tariff_{pt}$	0.0866 (0.3600)	-0.0718 (0.0500)
Observations	88,520	40,393
R ²	0.62947	0.76761
Within R ²	7.66×10^{-5}	0.00014

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Model 1 are results from the panel component of VHLSS 2002 and 2004. Model 2 are from the panel component of VHLSS 2002 and 2006. All specifications include individual and year fixed effects, and standard errors are clustered at the province-level. Coefficients have been multiplied by -1 for ease of interpretation.