The Effect of Foreign Competition on Family and Network Labour Allocation

Margaryta Klymak

University of Oxford*

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Abstract

This paper examines whether foreign competition affects the reallocation of unpaid and family workers from household businesses to working outside of the family firm. Using a rich panel dataset of Vietnamese manufacturing enterprises that went through trade liberalisation, I find that import competition leads to the switching of family and unpaid employees from working at the household firm to working externally. This response to heightening foreign competition is also greater for less financially stable firms, and for the households largely reliant on the income from the household firm. This finding is consistent with income diversification on the part of households who own firms threatened by import competition. We also explore heterogenous effects among entering and exiting firms as well as industry switching firms.

Keywords: household firms, unpaid labour, family workers, foreign competition.

JEL Classification: D22, F16, O12.

*margaryta.klymak@qeh.ox.ac.uk, Department of International Development, University of Oxford. I would like to thank for useful comments Carol Newman, Gaia Narciso, Stuart Baumann, Saurabh Singhal, Kjetil Bjorvatn, Tara Mitchel as well as the participants of various conferences including the European Economic Association Meeting 2018, Royal Economic Society Annual Conference 2018, EARIE conference 2017, XVIII World Congress of the International Economic Association and Irish Economic Association Annual Conference 2017. This work was supported by the UNU-WIDER and the Grattan Scholarship scheme. Notwithstanding the advice I have received from many sources, any errors here are my own.

1 Introduction

More than a half of the 1.45 billion workers in the developing world are either self-employed or are unpaid family workers in a family firm (International Labour Organization, 2014). Given the substantial share of unpaid family labor in developing countries, a number of scholars have highlighted the importance of household labor as well as the factors that lead to more or fewer family workers in a firm (Deolalikar and Vijverberg, 1987; Reardon, 1997; Barrett, Reardon and Webb, 2001; Brookfield and Parsons, 2007). An important related research question is whether increases in foreign competition affect the utilisation of family workers. This paper will show that in the face of foreign competition, less financially stable households adjust their labor supply decisions towards more family members working for wage employment in other firms. This is important to understand from a policy perspective as it has implications for how foreign competition may lead to more efficient resource allocation within households.

There are compelling reasons to believe that foreign competition might be important in explaining family labor supply decisions. On the one hand, the uncertainty created in the market by increasing foreign competition might lead to family workers remaining at the firm in order to help sustain the family business in the face of this competition. A key difficulty faced by small firms in the face of foreign competition is finding labor when the market wage is higher and family workers may be useful in filling this gap. This is consistent with the seminal trade model of Melitz (2003), which predicted that trade liberalisation will lead to low productivity enterprises facing pressure as they cannot afford the labor costs. Having access to family workers can provide a mechanism through which such a firm could cope with increased competition. On the other hand, foreign competition might lead to family workers leaving the family firm in order to exploit higher wages that are available in the general economy as well as to diversify household income given the greater uncertainty around the future of the household firm.

I investigate whether foreign competition affects household labor reallocation using a panel of around 3,000 household manufacturing firms from Vietnam over the period from 2005 to 2013. Vietnam offers a good example of a developing economy, which introduced a number of reforms and enterprise development laws since the 1980s. Vietnam joined the World Trade Organisation (hereafter WTO) in 2007, which led to the country becoming more exposed to the global market. I apply two measures of foreign competition: import

penetration (similar to the measure used by Bloom and Van Reenen (2007)) and the actual level of imports. I use the variation within firms over time and find that when firms face greater foreign competition, they tend to employ fewer unpaid workers.[1] I then use within household variation to find that the proportion of family labourers working at a household firm decreases as that firm faces foreign competition. I find that these results are stronger for less financially stable firms.

Previous studies that examined the relationship between family labor and trade liberalisation primarily focused on the largely informal agricultural economy (i.e. Edmonds and Pavcnik (2006)). This paper's contribution is the provision of a better understanding of the effect of full market trade liberalisation on the reallocation of family labor for formal and informal enterprises. The closest papers to this research are two papers by McCaig and Pavcnik (2014, 2017), which examined the effect of a positive export shock in Vietnam[2] on the allocation of household labor. McCaig and Pavcnik (2017) found that an increase in export market opportunities led to a reallocation of 5% of manufacturing workers from informal firms (primarily household businesses) to employers in the formal enterprise sector. McCaig and Pavcnik (2014) showed that household businesses in industries with greater tariff cuts expanded their revenues and were more likely to hire non-family members as workers.

My results are consistent with the findings of McCaig and Pavcnik (2014, 2017), this paper builds up on them by examining the mechanisms in play as well as linking the results of these two papers. I identify the number of family, non-family, paid and unpaid labor employed at each firm over time and thus can explore the dynamics of hiring inside and outside labor. I present the mechanism that import competition leads household members to leave family firms in order to diversify the income source of the households. The implications of this mechanism are supported when I account for heterogeneity of firms in the sample. In particular, the effect of household workers leaving family firms is

[1]Unpaid labor is likely to consist of household and network labor. There are a number of ways this can be established for the Vietnamese firms in the dataset. Firstly, the correlation between unpaid labor and family labor in the sample used for this analysis is around 80%, which suggests that a large part of unpaid labor consists of household workers. Secondly, when the difference between unpaid and family labor is taken by the firm in this sample, these do not equal zero for a number of cases. This suggests that the remaining part of the workers is likely to consist of other relatives and friends. Nguyen and Nordman (2017) used a sample of household firms in Vietnam and argued that unpaid labor consists of family and kinship labor.

[2]The export shock explored in the paper is the US-Vietnam Bilateral Trade Agreement, which created export opportunities for Vietnamese firms. This is because Vietnam has already applied Most Favoured Nation tariffs and the negotiations were about lowering Vietnam's import tariff to the US

greater for poorer firms as well as for firms that provide the primary income source for their household even when controlling for the market wage.

This paper is also related to the literature that investigates the impacts of trade liberalisation on firm dynamics and in particular on labor allocation. A large body of research examining the impact of trade liberalisation in developing countries focuses on wage changes (Borjas and Ramey, 1995; Feliciano, 2001; Attanasio, Goldberg and Pavcnik, 2004). For example, Fukase (2013) used the US-Vietnam Bilateral Trade Agreement to show that the provinces that were more exposed to export expansion experienced higher unskilled labor wage growth and much smaller growth in the relative wages of skilled labor as compared to other provinces. Other papers in the literature explored the effects of trade policies on hiring patterns and the welfare of workers (Krishna and Senses, 2014; Dix-Carneiro, 2014; Autor et al., 2014; Caliendo, Dvorkin and Parro, 2015). Menezes-Filho and Muendler (2011) used employer-employee linked data from Brazil to examine the effect of tariff cuts on labor allocation. The paper found that trade liberalisation leads to worker displacements and fewer hirings. Autor, Dorn and Hanson (2013) examined the case of United States imports from China with the identification strategy exploiting regional variation in industrial specialisation. The paper found that import competition from China explains a quarter of the decline in the US' employment in manufacturing.[3]

The paper proceeds as follows. The case of Vietnam and the potential mechanisms by which foreign competition can affect family labor are described in section 2. The data is then presented in section 3, while section 4 describes the empirical strategy. Sections 5.1 and 5.2 discuss the empirical results, section 6 provides the robustness checks before section 7 concludes.

2 Background and mechanisms

2.1 Background

Vietnam is a prominent example of a fast-growing Asian economy. This country has experienced rapid economic growth since the late 1980s, as it moved from a centrally planned to a socialist-oriented market economy. The transition happened through a number of eco-

[3]The literature that examines the effect of China's exports on labor outcomes in destination countries is rapidly growing. See also Autor et al. (2014); Balsvik, Jensen and Salvanes (2015); Acemoglu et al. (n.d.).

nomic and political reforms called the "Doi Moi" reforms. Vietnam applied for accession to the WTO in 1995 and since then the country has gone through several legal reforms and programmes mandated as part of the negotiations. These reforms resulted in Vietnam becoming the 150th WTO member on the 11th of January 2007. This accession accelerated Vietnamese trade liberalisation and increased competitive pressure on the domestic sector. While the domestic sector experienced intense international competition, studies have found that WTO accession had an overall positive effect on the economy of Vietnam (Abbott and Tarp, 2011).

As Vietnam grew, the number of Vietnamese SMEs also increased substantially. The growth rates in SMEs was especially high after the Vietnam Enterprise Law of 1999 was implemented. As of 2012, SMEs constituted 97.7% of all firms and employed 46.8% of the Vietnamese labor force (Asian Development Bank, 2015). The manufacturing sector employed 14.1% of the total population in 2014. Cling, Razafindrakoto and Roubau (2011) estimated that there are 10.3 million household firms operating in Vietnam, with around 82% of these being informal household businesses. According to their estimates, the majority of workers in the Vietnamese informal economy are either self-employed or family workers. For instance, in Hanoi's manufacturing industry unpaid workers account for 23.4% of the total labor and in Ho Chi Minh City this figure was 21.7%.

The effect of WTO accession is arguably an exogenous shock for household firms in Vietnam (i.e. Newman, Rand and Tarp (2013); Baccini, Impullitti and Malesky (2017)). Firstly, Vietnam had low bargaining power during the tariff reduction discussion with the WTO. Secondly, household enterprises do not export or import goods. For example, under 1% of household firms in the sample used in this research sold goods for direct export or to foreign invested companies. The majority of these enterprises exclusively sold goods to the domestic market.[4] Household firms were mostly affected by the international trade through competition in the market for their final goods.

2.2 Mechanisms

There is a large literature that examines how households react to shocks and whether they diversify income in response to these shocks. The drivers of income diversification are characterised as "push" and "pull" factors (Reardon, 1997; Ellis, 2000; Barrett, Reardon

[4]For instance to individuals, households, tourists, non-commercial government authorities as well as state and non-state enterprises

and Webb, 2001; Haggblade, Hazell and Reardon, 2007). Push factors relate to external events that cause income fluctuations in households (i.e. drought, rainfall instability, diseases) and lead them to adopt income diversification strategies to mitigate negative income shock. Pull factors refer to opportunities (i.e. higher payoffs, lower risk) in terms of household incomes. Trade liberalisation of a country provides opportunities for export (a "pull" factor) as well as increases the level of imports (a "push" factor). It is unlikely, however, that export opportunities emerged for small household firms in the short run. The adverse impact of increased imports is likely to outweigh any potential export opportunities for these firms.

The effect of the liberalisation of trade on workers allocation has been examined in several studies. Menezes-Filho and Muendler (2011) showed that import penetration led to worker displacements in Brazil. Wacziarg and Wallack (2004) performed a study of 25 trade liberalisation episodes and showed a weakly negative effect of trade liberalisation on the extent of inter-sectoral labor reallocation. McCaig and Pavcnik (2017) found that workers reallocated from household firms to larger enterprises in response to a positive export shock in Vietnam.

Recent literature has established the heterogeneous effects of trade liberalisation on firm outcomes within an industry. Trade liberalisation leads to export market entry and expansion for highly productive firms, which in turn leads to further improvements in the aggregate productivity of the industry (Melitz, 2003). Thus, trade liberalisation is likely to present opportunities for larger, more productive Vietnamese firms to expand and export. These firms could also be adversely affected by higher wages in the labor market, which could counteract any gains from export access. At the same time, low productivity firms will exit the market due to heightening labor costs. Furthermore, trade liberalisation will lead to a reallocation from less productive firms towards more productive firms. Thus, consistent with Melitz (2003), trade liberalisation in Vietnam should have led to a decline in employment in less productive firms (which are likely to be household enterprises) and a rise in employment in better performing enterprises. Smaller, less productive Vietnamese firms will not generally be able to enter the export market but will face greater competition in their product market from imports and higher costs in the labor market (consistent with the mechanism of McCaig and Pavcnik (2014)). This increased competition for workers in the labor market and competition for buyers in the product market may have implications for labor supply decisions of the household firms.

Firms facing heavy competition and rising market wages may be less likely to survive in the long term. There are a number of ways in which household firms could adjust their family and network labor in response to this possibility. The first mechanism is income diversification. Household workers may decide to leave the firm in order to diversify household income due to increased uncertainty about the future. This effect is likely to be accentuated if the opening up of trade boosts wages available at other firms. On the other hand, the effect of international trade on household labor might be the opposite - increased international trade may lead to more household workers joining their family firms in order to help firms survive. A third possible impact of international trade on household labor is that increased wages might attract previously non-working family members to join the labor force. In the subsequent sections of this paper, these mechanisms will be examined.

3 Data

I use five waves of the Small and Medium Enterprise Survey collected in Vietnam between 2005 and 2013 at biannual frequency. The survey was gathered by the Vietnamese General Statistics Office.[5] Each wave contains information on about 2,500 enterprises operating in the manufacturing sector across ten provinces in Vietnam. As the focus of this paper is on the household response to foreign competition, the analysis is restricted to household-owned firms. The final sample consists of around 1,800 firms operating in each wave.[6] Each enterprise in the survey was asked to report the industry of operation based on the 4-digit International Standard Industrial Classification (hereafter ISIC) code system. I matched these industry codes with import and export data for Vietnam from the World Integrated Trade Solution database (The World Bank, 2017). I then augmented the dataset with the revenue for 4-digit ISIC industries using the Enterprise Census data. All trade and revenue values were then deflated with the annual consumer price index.

I first explore the time patterns of the key variables in Table 1. As expected, imports and exports grew substantially after WTO accession in 2007. Consistent with Vietnamese

[5]The first two waves correspond to the period before WTO accession, and the last three waves represent the post-joining period. The data for each wave was collected the year before it was released. Thus, the 2005 survey corresponds to the 2004 year data. Vietnam joined WTO in January 2007. Therefore the first two waves (2005, 2007) are considered as the pre-WTO period.

[6]In order to maximise the sample size available, I use a sample of firms which reported it was a household establishment at least once. The results are robust to the specifications described by equations 1 and 4 for the sample which reported household business ownership during all waves.

Table 1: Summary statistics by wave

	2005	2007	2009	2011	2013
Exports	199,345	210,998	317,224	433,645	664,450
Imports	235,505	354,353	516,322	599,513	776,483
Tariff	18.77	15.31	13.05	10.89	10.26
Unpaid labor share	0.47	0.49	0.50	0.53	0.54
Total labor	7.54	7.62	7.34	6.67	5.85
Unpaid labor	1.91	2.03	1.90	1.85	1.85
Paid labor	5.63	5.59	5.44	4.82	4.00
Labor hired	0.76	0.93	0.77	0.56	0.40
Labor left	0.57	0.72	0.72	0.48	0.46
HHW ratio	0.51	0.51	0.72	0.71	0.69
HHM working elsewhere	0.73	0.72	1.17	1.10	1.03
HHM working at firm	2.12	2.10	2.08	1.94	1.98
HHM inactive	2.15	2.02	1.63	1.61	1.60

Source: Authors' calculations based on Vietnamese Small and Medium Enterprise surveys. Imports, exports and tariffs are averaged across all industries; all other variables are averaged across all firms. Note, that imports and exports expressed in 1,000 U.S. dollars.

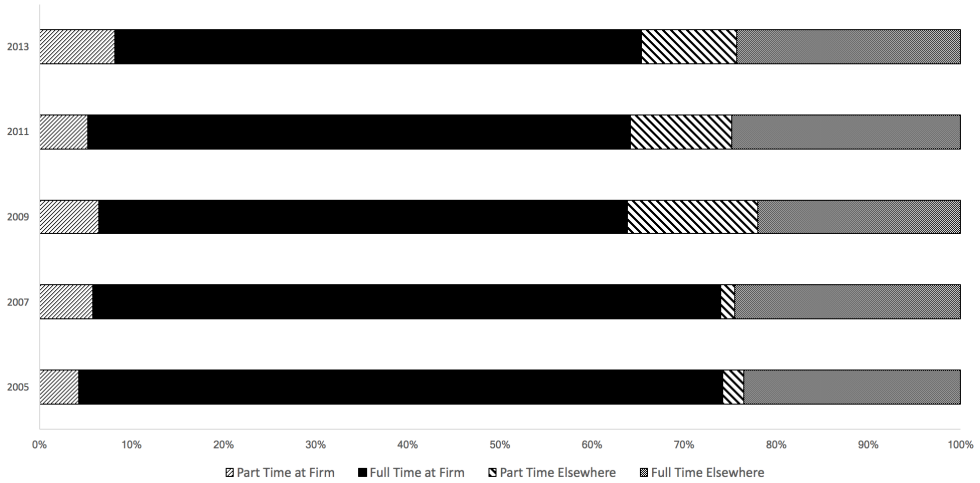
macroeconomic data,[7] the household firms in the SME dataset shrank in size after WTO accession. These household firms also reduced the number of paid and unpaid labor. The share of unpaid labor in firms (unpaid labor share)[8] increased throughout the years, which reflects the fact that firms were losing paid workers at a higher rate than unpaid employees.[9] The SME questionnaire asked each firm representative (either owner or manager) the number of family members that work for the firm, were employed at another firm for a wage at both full-time and part-time levels or were self-employed. The last four variables in Table 1 present the participation of those family members in the labor force. The average number of household members working for the household firm declined from 2.12 to 1.98, while employment outside of the firm increased substantially from 0.73 to 1.03 throughout the years. The ratio of family workers employed at the firm to family workers employed elsewhere, which I will call the HHW ratio,[10] largely increased after the WTO accession. This pattern can also be observed in Figure 1, where I limit the sample to owner families only and separate it by part-time and full-time employment.

[7] Available on request.

[8] The variable is defined in equation 2.

[9] Note that this table is based on the unbalanced sample. There is a stronger declining pattern for unpaid labor in the balanced sample. The number of unpaid labourers decreased from 2.00 to 1.82 between 2005 and 2013.

[10] The variable is defined in equation 5.



Source: Authors' calculations based on Vietnamese Small and Medium Enterprise Surveys. The graph is based on the owners' responses sample.

Figure 1: Household employment structure

Figure 1 presents the composition of family labor working for the household firm and employed somewhere else (either at other firms or are self-employed). Prior to trade liberalisation (waves 2005, 2007), 74% of household members worked at a family firm, however, this share dropped to about 64% after Vietnam joined the WTO. The share of full-time employment at the firm declined from 70% to 57%, while the share of part-time workers at firms elsewhere increased from 2% to 12% between 2005 and 2013. Given these fluctuations, it is likely that some family members reallocated from full-time to part-time jobs at the firm, while at the same time some household members that used to be inactive joined the family business.

The descriptive statistics show that the firms in the sample had different labor compositions before and after WTO accession. Thus, in Table 2 I further explore whether the WTO entry is associated with statistically significant changes in other firm characteristics. Given that I rely on a subsample of the SME survey consisting of household firms, I use the remaining sample of 3,725 observations of other (generally larger) firms in the survey to estimate external wages. I predict external wage based on province, sector and year. Note, in the main analysis I do not use the sample that I used to predict wages in order to avoid double using the data. Consistent with the literature (Feliciano, 2001; Melitz and Ottaviano, 2008), external wages increased after the trade liberalisation. The labor fired to hired ratio[11] rose, which indicates that after 2007 firms were losing more workers than hiring new workers. The enterprises that hired labor experienced more difficulties

[11]I define this measure as the difference between fired and hired regular labor over total regular labor.

with finding workers after trade liberalisation, which could be due to better employment opportunities available in non-household firms (McCaig and Pavcnik, 2017). Finally, the financial performance of firms appeared to improve slightly.

Table 3 provides descriptive statistics by sector in order to explore heterogeneity between industries. I follow the standard ISIC classification and group the data into eight unique categories. The two sectors with the lowest self-reported competition[12] (manufacturers of food products, 33.5% of enterprises, and producers of wood, paper and publishing, 16.4% of firms), had the lowest ratio of family workers leaving the household firm and the highest unpaid labor share. The two sectors with the largest self-reported competition (manufacturers of metals, 20.6% of firms, and producers of machinery and other equipment, 10.1% of firms), had the lowest unpaid labor share and the highest household workers ratio. This suggests a positive link between competition and the ratio of household members leaving the firm as well a negative relationship between competition and share of unpaid workers at these firms.

Firms that enter or exit the market, as well as firms that switch industries, might cope differently with foreign competition than other firms. For example, Newman, Rand and Tarp (2013) used a sample of Vietnamese manufacturing firms and found that firm switchers tend to follow different behaviour and have distinct characteristics compared to firms that exit and enter the market. In particular, the authors found a positive relationship between trade liberalisation and switching behaviour. Table A2 in the Appendix explores these possible differences using t-tests for the firms that entered, exited the market and switched the industry.[13] This table shows that firm switchers and non-switchers are not statistically significantly different in means for the majority of labor characteristics. The firms that switched industry hired less labor, experienced more difficulties with finding it (likely due to an adjustment to a new industry) and had a higher ratio of household members leaving the firm compared to the firms that stayed in the industry. Firms that left the market (Panel C in Table A2), had lower shares of unpaid and family workers compared to surviving firms. They did not fire labor more than survivors, however, the workers were voluntarily leaving the firm at a much higher rate compared to surviving enterprises.

[12]Every firm was asked about the level of competition it faced on an ordered categorical scale from no competition to severe competition. I use an indicator which is zero if a firm experiences no competition and one if a firm reported at least a "low level" of competition.

[13]Table A1 shows the number of firms entering, switching and exit the market over time.

Table 2: T-tests analysis: WTO accession

	Before WTO no obs.	Before WTO mean	Before WTO SD	After WTO no obs.	After WTO mean	After WTO SD	P-value
Log external wage	3,806	9.769	0.232	5,242	10.081	0.219	***
Fired to hired ratio	3,777	-0.076	0.207	5,245	-0.050	0.208	***
Labor hired	3,807	0.848	3.917	5,246	0.578	3.782	***
Labor fired	3,777	0.046	0.520	5,247	0.096	0.685	***
Labor left	3,777	0.580	2.094	5,247	0.455	1.892	***
Hiring issues	1,955	0.193	0.395	2,428	0.215	0.411	*
Network hiring	2,842	0.880	0.325	3,475	0.894	0.308	*
Revenue	3,807	1,063,894	3,173,281	5,245	1,197,083	4,275,560	*
Profit	3,807	184,826	605,895	5,244	203,215	670,463	
Financial assets	3,807	166,889	836,078	5,245	174,288	868,320	

Table 3: Descriptive statistics by industries

	Percentage of firms	Competition	HHW ratio	Unpaid labor share	Hiring issues	Total labor	Hired labor	Labor left
Manufacture of food products, beverages and tobacco	0.335	0.819	0.541	0.662	0.143	4.978	0.410	0.338
Manufacture of textiles, wearing apparel and accessories	0.110	0.868	0.563	0.398	0.300	12.220	1.583	1.174
Manufacture of wood, paper and publishing	0.164	0.818	0.601	0.591	0.160	6.295	0.444	0.333
Manufacture of petroleum, rubber, chemicals and other non-metallic mineral products	0.253	0.842	0.624	0.443	0.186	8.659	0.819	0.563
Manufacture of metals	0.206	0.896	0.780	0.435	0.224	5.180	0.526	0.429
Manufacture of machinery and other equipment	0.101	0.884	0.657	0.311	0.287	9.762	1.085	0.833
Manufacture of transportation equipment and furniture	0.159	0.876	0.664	0.394	0.228	8.254	0.845	0.471
Total	1	0.851	0.626	0.505	0.205	7.030	0.691	0.508

Source: Authors' calculations based on Vietnamese Small and Medium Enterprise Surveys.

This section showed that imports and exports have a negative relationship with the share of family labor employed at the firm. Self-reported competition has a negative relationship with the share of unpaid labor employed at the firm. It also provides evidence that there was a change in the majority of firm characteristics after trade liberalisation. Furthermore, there is also the potential of heterogeneous effects for firms depending on whether they are industry switchers, exits or entrants into the market.

4 Empirical strategy

This paper uses an unbalanced sample of manufacturing firms in Vietnam and follows two approaches to examine the effect of foreign competition on the allocation of network and family workers. The first approach examines the composition of family and network workers in a firm's labor force using the sample of unpaid workers. The second approach uses a subsample of firm owners and focuses on the allocation of family workers inside and outside of their firm.

4.1 Unpaid labor at firms

Household firms can readjust their family and unpaid labor in response to foreign competition in several ways as discussed in section 2.2. Workers might leave the firm in order to diversify income or to obtain higher wages; they can also remain at the firm in order to help it cope with the increased competition. The aim of the analysis is to explore the impact of foreign competition on the unpaid labor in the firm using the empirical specification in equation 1. I use unpaid workers as a proxy for family and network labor employed at the firm.[14] The identification strategy depends on the changes in unpaid labor utilisation amongst firms that operate in industries facing different levels of foreign competition.

$$\begin{aligned}\text{Unpaid Labor Share}_{ipst} = \alpha_i + \beta_1 \text{Penetration}_{st} + \beta_2 \text{Log External Wage}_{pst} + \\ + \delta \Upsilon_{ipst} + \gamma_s + \vartheta_p + \theta_t + \epsilon_{ipst} \end{aligned} \quad (1)$$

[14] See footnote 1 for justification.

where Unpaid Labor Share$_{ipst}$ measures the proportion of unpaid workers amongst all workers in firm i that operates in industry s in province p at time t and defined as:

$$\text{Unpaid Labor Share}_{ipst} = \left[\frac{\text{Unpaid Workers}_{ipst}}{\text{Total Labor}_{ipst}}\right] \tag{2}$$

where Unpaid Workers$_{ipst}$ is the total number of unpaid workers that work either full-time or part-time and Total Labor$_{ipst}$ is a total number of workers that are employed at the firm either full-time or part-time.

The main measure of foreign competition used in this paper is the import penetration of Vietnamese manufacturing sector at the 4-digit ISIC level s at time t denoted by Penetration$_{st}$. This measures the share of the domestic market demand for a particular good that is satisfied by imports. I define it as a logarithm of imports divided by domestic industry revenue (see equation 3). A negative coefficient will imply that an increase in foreign competition is associated with fewer unpaid workers staying at the firm. My measure is similar to the measure used by Bloom and Van Reenen (2007), who defined import penetration as the logarithm of imports over home sales.[15] I also use the logarithm of imports, Log Imports$_{st}$, to Vietnam at the 4-digit industry level as an alternative measure of foreign competition. I additionally include the logarithm of exports, Log Exports$_{st}$, from Vietnam to other countries.

$$\text{Penetration}_{st} = \text{Log}\left[\frac{\text{Imports}_{st}}{\text{Industry Revenues}_{st}} + 1\right] \tag{3}$$

I also control for the external wage in the economy in order to control whether unpaid workers leave for better wages in other firms, Log External Wage$_{pst}$. Larger firms and firms that export enterprises are more likely to offer higher wages (Borjas and Ramey, 1995; Attanasio, Goldberg and Pavcnik, 2004; Fukase, 2013). For example, Macis and Schivardi (2016) showed that exporters pay a higher wage premium compared to other firms.

The vector Υ includes time variant basic firm characteristics. First, I use an indicator of self-reported competition. This is zero if a firm experiences no competition and one if a firm reported at least a "low level" of competition.[16] This is used both to account for the

[15] In place of home sales, I use sectoral revenues. Given that sectoral revenues might contain some export values, I test for the robustness of the results in section 6. I replace the denominator of Penetration with total industry revenues - exports.

[16] This dummy variable was used intentionally due to concerns about the consistency of self-reported

level of competition perceived by the firm and as a robustness check. A recent paper by Nguyen and Nordman (2017) investigated differences in productivity for firms with family and hired labor using a sample of Vietnamese household firms. They found that the labor productivity gap for informal firms is around 35%. Also, informal firms are less likely to use formal employment methods (i.e. hiring through government programs) and thus might need to rely on family and network labor. I thus use an indicator of whether the enterprise has a tax code number, which acts as a proxy for whether the firm is formal.

I also include the logarithm of firm revenues to control for firm size. Longer established firms might use different hiring techniques adjusted over the years, thus I include the age of the firm in the specification. Unpaid labor is most likely to consist of family and relatives, which might be hired if the enterprise cannot find labor. I use an indicator for whether firms hired labor and whether they experienced difficulties in finding labor. Firms that highly rely on manual work are more dependent on labor than firms that use machinery and can replace workers with it. I thus control for the level of technological advancement the firm has. I also include an indicator of whether the firm is an exporter. Vietnamese firms reported that finding an appropriate location for business is an issue partially because of poor infrastructure (Carlier and Tran, 2004). The quality of infrastructure can correlate with the performance of an enterprise and influence the labor composition. I account for it by using an indicator for whether an enterprise has access to a road or a rail.

The existing empirical literature established the importance of education in selection into entrepreneurship and performance (i.e. van der Sluis, van Praag and Vijverberg (2005) for the review of studies). In particular, more educated workers are more likely to work in wage employment and prefer non-farm entrepreneurship to farming. I control for the level of basic education of the survey respondent. A larger business network implies that firms can find workers easier and this can influence the decision to select a particular level of unpaid labor. I account for the social capital using the logarithm of the self-reported number of contacts inside and outside of the main line of business. Finally, I control the position of the respondent (either manager or owner).

The terms α_i represent firm fixed effects, γ_s account for differences in unpaid labor

competition intensity. While fixed effects mean that only the relative ratings of a firm at different points in time would be important (i.e. no cross-firm comparisons) it is still likely that the way firms judge competitive intensity may change over time or a different manager/owner may answer the survey. By reducing this measure to this dummy format I only use whether or not competition occurs as this binary distinction is more likely to be readily apparent and consistent through time.

allocation between industries with industry indicator variables and θ_t controls for time component. ϑ_p is the set of dummies for provinces and ϵ_{ipst} is the statistical error term. I cluster standard errors at the three-digit industry level in order to take into account within industry autocorrelation and heteroskedasticity.

While Vietnamese trade liberalisation is considered as an exogenous shock,[17] there are still potential confounders that could affect both the import competition and labor allocation (i.e. regulations that affect the growth of trade and labor demand, FDI could lead to more job creation and better international trade performance). To minimise the impact of endogeneity, I use firm fixed effects, time, province and industry indicators as well as an extensive set of controls. Another concern is that provinces can be disproportionately affected over time through both increased imports and increased hirings of outside labor. I account for this endogeneity concern by using a specification that includes province and time interactions in the robustness section.

4.2 Household labor at firms

The second approach restricts the sample to business owners and examines the effect of foreign competition on family labor responses. This identification strategy relies on exploiting variation in within-household employment choices in family firms, as the industries they operating are exposed to different levels of foreign competition. The following specification will be used:

$$\begin{aligned}\text{HHW Ratio}_{jpst} = \lambda_j + \beta_1 \text{Penetration}_{st} + \beta_2 \text{Log External Wage}_{pst} + \\ + \delta \Upsilon_{jpst} + \rho \Omega_{jpst} + \gamma_s + \vartheta_p + \theta_t + u_{jpst} \end{aligned} \tag{4}$$

where the dependent variable, HHW Ratio$_{jpst}$, measures the rate at which household workers leave the firm for other full or part time employment and it is defined as:

$$\text{HHW Ratio}_{jpst} = \left[\frac{\text{HHM Not Working at Firm}_{jpst}}{\text{HHM Working at Firm}_{jpst}} \right] \tag{5}$$

where HHM Working at Firm$_{jpst}$ is the number of family members that are employed at the firm either full time or part-time. HHM Not Working at Firm$_{jpst}$ is the total number of family members that work either full time, part time elsewhere or are self-employed

[17] See discussion in section 2.

outside of the household firm.

I use the same penetration measure as described earlier. A negative coefficient of penetration implies that an increase in foreign competition is associated with more family labor workers staying at the firm. I also use the same firm controls as described in section 4.1. The decision to use a particular level of family labor also depends on family size and composition, and I control for this with an additional vector of controls Ω_{jpst}. These controls are the number of household members by age group: less than 15 years old, between 15 and 60 years old and over 60 years old. A larger family size might indicate more support from the family and more involvement in the family business. Baines and Wheelock (1998) used a data from the UK and found that for more than 50% of a sample where the owner lived with a spouse, spouses were highly involved in the business in the form of co-ownership, paid or unpaid labor. At the same time, having more dependants in the family also suggests that households are subject to more risk than households with fewer dependents. Brand-Weiner and Francavilla (2015) showed that Vietnamese households with many dependents had low-income mobility.

The terms λ_j, γ_s and θ_t represent the respondent fixed effects as well as industry and time indicator variables respectively. ϑ_p controls for provinces and u_{jpst} is the statistical error term. I again cluster standard errors at three-digit industry level to account for within industry autocorrelation and heteroskedasticity.

I try to minimise the effect of endogenous factors that could affect both the level of foreign competition and the household firm labor composition by using household fixed effects, time, province, industry indicators and a set of controls. I also use province-time interactions in the robustness section to account for the possibility of endogeneity at time and province levels.

5 Results

This section presents the results of estimating equation 1 using the unbalanced sample of firms in section 5.1. In section 5.2 I restrict the unbalanced sample to firm owners and report the results of estimating equation 4. I also test for heterogeneous effects of foreign competition depending on the level of firm and household financial security.

5.1 Firm level analysis

I examine the effect of foreign competition using the penetration measure (defined in equation 3) on the share of unpaid labor at firms in Table 4. This shows a negative and statistically significant coefficient of penetration, which indicates that as import competition increases the firm tends to retain a smaller proportion of unpaid labor.[18] I introduce the logarithm of the external wage in column (2) and add firm control variables in column (3). The coefficient of wage is negative, which suggests that higher wages available at other firms play a significant role in unpaid workers leaving the enterprise.[19]

These results remain consistent when the logarithm of imports is used as an alternative foreign competition measure in Table 5.[20] The logarithm of exports (a "pull" factor) is also controlled for. The negative coefficients for the logarithm of imports suggest that increases in import competition are associated with lower unpaid labor at firms. The increase in exports, which indicates an increase in opportunities in the industry for workers, leads to firms employing a higher share of unpaid workers. Together the results of tables 4 and 5 are consistent with an income diversification argument: as household firms face greater competition, more unpaid workers leave the firm to seek outside employment.

The income diversification mechanism implies that less financially stable firms would also exhibit a greater shift in response to foreign competition. This could be because these households have less wealth and are more sensitive to income changes than more financially stable firms. There may also be less incentive for family members to engage in unpaid work to bolster a lower earning firm. I, therefore, replicate the empirical specification 1 for the samples below and above median profits, revenues and financial assets (table 6).[21] The firms with profit, revenues and financial assets below the median exhibit larger coefficients and show a statistically significant response to penetration. The result for penetration is also statistically significant for the sample above median profit. However, the coefficient is about twenty times lower compared to the results for the sample below the median profit.

In total, the findings of the section are consistent with the income diversification hypothesis. I next test whether this result holds in specification focused on family workers

[18] When the external wage is excluded from the regressions, the results remain robust.

[19] A concern can be raised that this specification does not take into account factors that vary by province and time and can potentially affect the results. In order to account for the possibility that some provinces can be disproportionately affected over time I use the specification with the combined province and time dummies in the robustness section.

[20] When the external wage is excluded from the regressions, the results remain robust.

[21] When the external wage is excluded from the regressions, the results remain robust.

Table 4: The effect of foreign competition on unpaid labor allocation

	(1) Unpaid labor share	(2) Unpaid labor share	(3) Unpaid labor share
Penetration	-0.0532**	-0.0583*	-0.0962**
	(0.0256)	(0.0303)	(0.0418)
Competition		-0.0187**	-0.00894
		(0.00716)	(0.00571)
Log external wage		-0.0301	-0.0319*
		(0.0203)	(0.0180)
Wave 2 - before WTO	0.0197***	0.0209***	-0.00907
	(0.00730)	(0.00727)	(0.0116)
Wave 3 - after WTO	0.00816	0.0131*	-0.00325
	(0.00833)	(0.00714)	(0.0129)
Wave 4 - after WTO	0.0232***	0.0358***	0.0165
	(0.00735)	(0.0130)	(0.0143)
Wave 5 - after WTO	0.0331***	0.0462***	0.00256
	(0.0103)	(0.0116)	(0.0190)
Constant	0.204	0.508*	1.382***
	(0.151)	(0.268)	(0.223)
Observations	8,891	8,888	8,668
R^2 (within)	0.0140	0.0155	0.131
Industry controls	Yes	Yes	Yes
Province controls	Yes	Yes	Yes
Firm controls	No	No	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported.

Table 5: The effect of imports and exports on unpaid labor allocation

	(1) Unpaid labor share	(2) Unpaid labor share	(3) Unpaid labor share
Log imports	-0.00785**	-0.00795**	-0.00812**
	(0.00302)	(0.00308)	(0.00358)
Log exports	0.00718**	0.00735**	0.00714*
	(0.00336)	(0.00345)	(0.00396)
Competition		-0.0191***	-0.00867
		(0.00712)	(0.00564)
Log external wage		-0.0352*	-0.0346*
		(0.0198)	(0.0176)
Wave 2 - before WTO	0.0197***	0.0212***	-0.00957
	(0.00743)	(0.00728)	(0.0121)
Wave 3 - after WTO	0.00692	0.0128*	-0.00421
	(0.00867)	(0.00768)	(0.0135)
Wave 4 - after WTO	0.0239***	0.0385***	0.0178
	(0.00773)	(0.0130)	(0.0145)
Wave 5 - after WTO	0.0304***	0.0457***	-0.000278
	(0.00986)	(0.0117)	(0.0194)
Constant	0.217	0.569**	1.411***
	(0.140)	(0.257)	(0.216)
Observations	9,045	9,042	8,814
R^2 (within)	0.0214	0.0230	0.138
Province controls	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes
Firm controls	No	No	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported.

leaving the firm at the household level rather than unpaid labor at the firm level.

5.2 Household level analysis

This section tests whether an increase of foreign competition affects the ratio of household members leaving the household firm for other wage employment. I limit the sample to business owners responses, so I can explore the internal variation within a household over time. Table 7[22] presents the results that rely on the empirical specification defined in equation 4. Positive and statistically significant coefficients for penetration across all specifications suggest that as foreign competition increases family workers leave the firm for other employment. These results further show that the external wage available in other industries is an important factor in the decision to leave the firm.

If the income diversification mechanism is present, then the effect of heightening foreign competition would be more pronounced in households that highly depend on the firm as their main income source. Thus, I interact penetration with the categories representing the number of income generation jobs a household has. The baseline category is one income generating job in a household. The results are available in the last column of table 7. The effect of penetration is still statistically significant. As the household has more income generating jobs, the effect of foreign competition is lower. This suggests that the results of the paper are mainly driven by less financially stable households.

This section further confirmed the results which are consistent with the income diversification mechanism, where household members leave the firm to find a job elsewhere as foreign competition increases.

6 Robustness

To check robustness, I first use different penetration measures (the results are in Table 8). Penetration (1) follows the method used by Nickell (1996) and is the ratio of imports over domestic sales. The second measure, Penetration (2), is similar to the utilised by Konings, Cayseele and Warzynski (2005). This is the share of imports over the total of imports and domestic sales. Finally, Penetration (3) is the logarithm of the share of imports over the difference between domestic sales and exports. This measure is similar to the main

[22]When the external wage is excluded from the regressions, the results remain robust.

Table 6: The effect of foreign competition on unpaid labor allocation depending on firms' financial performance

	(1) Below median profit	(2) Above median profit	(3) Below median revenue	(4) Above median revenue	(5) Below median fin. assets	(6) Above median fin. assets
Penetration	-0.365***	-0.0841**	-0.454**	0.00752	-0.160*	-0.0503
	(0.0836)	(0.0410)	(0.184)	(0.0351)	(0.0834)	(0.0786)
Competition	-0.0149*	0.00505	-0.0144***	0.00383	-0.0103	-0.0142
	(0.00874)	(0.0123)	(0.00510)	(0.0126)	(0.00642)	(0.0103)
Log external wage	0.0284	-0.0536*	-0.0174	-0.0499*	-0.0193	-0.0308
	(0.0245)	(0.0284)	(0.0231)	(0.0264)	(0.0305)	(0.0208)
Observations	4,365	4,187	4,356	4,196	4,369	4,183
R^2 (within)	0.156	0.0952	0.183	0.0679	0.148	0.0952
Time controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Province controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported. Above implies - greater or equal ($\geqslant$) to median profit, revenue or financial assets.

Table 7: The effect of foreign competition on household labor allocation

	(1) HHW ratio	(2) HHW ratio	(3) HHW ratio	(4) HHW ratio	(5) HHW ratio
Penetration	0.509***	0.578***	0.546***	0.535***	0.648***
	(0.101)	(0.139)	(0.129)	(0.110)	(0.113)
Competition		0.0951***	0.108***	0.103***	0.101***
		(0.0303)	(0.0334)	(0.0300)	(0.0284)
Log external wage		0.380***	0.371***	0.322***	0.308***
		(0.0749)	(0.0828)	(0.0761)	(0.0759)
Wave 2 - before WTO	-0.0101	-0.0278	0.00194	0.0158	0.0196
	(0.0350)	(0.0317)	(0.0402)	(0.0511)	(0.0517)
Wave 3 - after WTO	0.224***	0.156***	0.194***	0.219***	0.233***
	(0.0354)	(0.0319)	(0.0596)	(0.0696)	(0.0699)
Wave 4 - after WTO	0.206***	0.0405	0.0839	0.128*	0.172**
	(0.0370)	(0.0433)	(0.0649)	(0.0685)	(0.0686)
Wave 5 - after WTO	0.200***	0.0328	0.0408	0.0966	0.141*
	(0.0373)	(0.0460)	(0.0772)	(0.0809)	(0.0805)
Two income jobs					0.246***
					(0.0271)
Over three income jobs					0.446***
					(0.0972)
Two income jobs × Penetration					-0.534**
					(0.215)
Over three income jobs × Penetration					-1.213
					(2.315)
Constant	0.493***	-3.281***	-2.811***	-2.868***	-2.905***
	(0.147)	(0.786)	(0.842)	(0.797)	(0.818)
Observations	7,466	7,463	7,328	7,327	7,327
R^2 (within)	0.0409	0.0464	0.0536	0.127	0.143
Industry controls	Yes	Yes	Yes	Yes	Yes
Province controls	Yes	Yes	Yes	Yes	Yes
Firm controls	No	No	Yes	Yes	Yes
Household controls	No	No	No	Yes	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is household working ratio. Within R^2 are reported.

penetration measure used in this paper. However, given that I use sectoral revenues as a proxy for domestic sales, these might contain some revenues from exports. Therefore in penetration (3), I subtract the exports from the industry level revenues. The results in Table 8 are consistent with the findings presented in the previous section for both measures of family and network labor across all specifications.

I further replace the unpaid labor share with a ratio of unpaid over paid labor in Table 9. This measures the replacement ratio of unpaid workers with paid employees. The results imply that increases in the foreign competition are associated with lower unpaid labor remaining at the firm compared to paid employees.

Previous studies have found that severe competition might drive firms out of their main business activity and make them choose to produce different products (i.e. Newman, Rand and Tarp (2013) for Vietnam). If a firm decided to switch industry, then it might be a logical time to adjust staffing. The model of Melitz (2003) predicted that unproductive firms exit the market in response to trade liberalisation. The firms that exit might have a different family hiring composition compared to the firms that survived. I explore whether the firms that exit, enter the market and switch the industry had different hiring family hiring approaches in response to foreign competition. I, therefore, interact both measures of foreign competition with an indicator variable for whether the firm entered the market, exited the market or switched the industry since previous wave in Table 10. The coefficients for penetration and imports exhibited a negative sign and are statistically significant as in the previous section, however, the interaction terms for exit, entry and switchers are not statistically significant. This suggests that competition drives changes in labor utilisation independent of switching, entry or exit.

The robustness of the results to the balanced sample is then tested in Table 11. I use the empirical specifications 1 and 4. All of the results remain robust. Finally, I examine whether the potential for endogeneity at the provincial and time level potentially bias the results. Vietnam's growth and WTO accession could have attracted more imports, exports and FDI into particular provinces. At the same time, household members of the firms operating in these expanding provinces could have left the family firm. The external wage may not be able to perfectly control for the change in the opportunities available at other firms in this case. To avert this, I use combined time and province dummies to control for the factors that vary at both time and province levels in Table 12. Although the magnitude of coefficients declined slightly, the results are consistent with the previous

Table 8: The effect of foreign competition on household labor allocation (with alternative penetration measures)

	(1) Unpaid labor share	(2) Unpaid labor share	(3) Unpaid labor share	(4) HHW ratio	(5) HHW ratio	(6) HHW ratio
Penetration (1)	-0.0667**			0.368***		
	(0.0263)			(0.102)		
Penetration (2)		-0.130**			0.709***	
		(0.0605)			(0.147)	
Penetration (3)			-0.0852**			0.486***
			(0.0352)			(0.134)
Competition	-0.00895	-0.00893	-0.00895	0.104***	0.104***	0.110***
	(0.00572)	(0.00571)	(0.00571)	(0.0292)	(0.0292)	(0.0327)
Log external wage	-0.0318*	-0.0319*	-0.0318*	0.327***	0.327***	0.382***
	(0.0180)	(0.0181)	(0.0181)	(0.0745)	(0.0747)	(0.0794)
Constant	1.381***	1.382***	1.381***	-3.980***	-3.990***	-3.984***
	(0.223)	(0.223)	(0.223)	(1.183)	(1.188)	(1.187)
Observations	8,668	8,668	8,668	7,330	7,330	7,331
R^2 (within)	0.131	0.131	0.131	0.127	0.127	0.0531
Time controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Province controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	No	No	No	Yes	Yes	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. Within R^2 are reported.

Table 9: Unpaid workers, competition and wages with alternative dependent variable

	(1) Unpaid replacement	(2) Unpaid replacement
Penetration	-0.242*	
	(0.125)	
Log imports		-0.0135***
		(0.00478)
Log exports		0.0128***
		(0.00476)
Competition	0.0150	0.00758
	(0.0183)	(0.0192)
Log external wage	-0.253***	-0.254***
	(0.0738)	(0.0723)
Constant	2.981***	3.021***
	(0.724)	(0.722)
Observations	8,668	8,814
R^2 (within)	0.0284	0.0310
Time controls	Yes	Yes
Industry controls	Yes	Yes
Province controls	Yes	Yes
Firm controls	Yes	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported.

Table 10: The effect of foreign competition on unpaid labor allocation for entering, switching and exiting firms

	(1) Unpaid labor share	(2) Unpaid labor share	(3) Unpaid labor share	(4) Unpaid labor share	(5) Unpaid labor share	(6) Unpaid labor share
Penetration	-0.103**	-0.110**	-0.0869*			
	(0.0451)	(0.0447)	(0.0440)			
Entry	-0.00685			0.0134		
	(0.0129)			(0.0218)		
Entry× Penetration	0.0896					
	(0.0728)					
Switcher		-0.0101			-0.0116	
		(0.0101)			(0.00950)	
Switcher × Penetration		0.0547				
		(0.0829)				
Exit			0.00269			0.00356
			(0.0119)			(0.0227)
Exit × Penetration			-0.0842			
			(0.0599)			
Ln imports				-0.00799**	-0.00850**	-0.00810**
				(0.00360)	(0.00355)	(0.00358)
Entry× Ln imports				-0.00200		
				(0.00228)		
Switcher × Ln imports					0.000242	
					(0.000788)	
Exit × Ln imports						-0.000336
						(0.00172)
Ln exports				0.00710*	0.00730*	0.00715*
				(0.00396)	(0.00398)	(0.00394)
Observations	8,668	8,814	8,668	8,814	8,668	8,814
R^2 (within)	0.131	0.139	0.132	0.139	0.131	0.138
Time controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Province controls	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported.

Table 11: The effect of foreign competition on unpaid and household labor allocation for balanced sample

	(1) Unpaid labor share	(2) HHW ratio
Penetration	-0.102**	0.701***
	(0.0465)	(0.145)
Competition	-0.0111	0.101**
	(0.00814)	(0.0469)
Log external wage	-0.0420**	0.472***
	(0.0185)	(0.155)
Observations	4,384	3,213
R^2 (within)	0.134	0.131
Time controls	Yes	Yes
Industry controls	Yes	Yes
Province controls	Yes	Yes
Firm controls	Yes	Yes
Household controls	No	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Balanced sample. Within R^2 are reported.

section highlighting that household and network labor leaves the firm in response to foreign competition.

Table 12: The effect of foreign competition on unpaid labor allocation (with time × province controls)

	(1) Unpaid labor share	(2) HHW ratio
Penetration	-0.0651**	0.354***
	(0.0261)	(0.0995)
Competition	-0.0121**	0.0782**
	(0.00556)	(0.0364)
Log external wage	-0.0511	0.284**
	(0.0306)	(0.134)
Constant	1.530***	-2.498*
	(0.327)	(1.349)
Observations	8,668	7,330
R^2 (within)	0.145	0.130
Time × Province controls	Yes	Yes
Industry controls	Yes	Yes
Firm controls	Yes	Yes
Household controls	No	Yes

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at three digit industry level. Unbalanced sample. The dependent variable is unpaid labor share. Within R^2 are reported.

7 Conclusion

Household businesses employ a significant proportion of the workforce in developing countries and as such the reallocation of workers from unpaid labor roles in household firms to other roles is important to understand. As a result, the impact of international trade on the performance of firms in developing countries and the related employment outcomes has been an area of intense research (Hoekman, 2005; Menezes-Filho and Muendler, 2011; McCaig and Pavcnik, 2014, 2017).

This paper contributes to this literature and is focused on the impact of import competition for household firms on the labor supply decisions of these households. A large panel dataset of household manufacturing firms operating in Vietnam was used to identify these relationships. In this analysis, I found that unpaid labor at household firms are more likely to leave the firm as the level of foreign competition in the industry increases. The results are mainly driven by less financially stable firms. The results are reduced but still statistically significant when the external wages are controlled for. The findings are consistent with an income diversification mechanism on the part of households: family workers leave family firms to diversify the households income source away from the household firm as a result of increased uncertainty about the firm's future. The empirical results are robust to a number of alternate specifications.

This paper finds how foreign competition affects the employment structure in small firms. Given that a large share of workers in developing economies are still employed at household firms, this finding has implications for understanding how workers and firms are affected by increased economic integration. One key implication is this paper's finding that poorer households are more likely to change employment patterns than wealthier households.

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Appendices

Table A1: The number of firms that entered, exited the market and switched industries

	2005	2007	2009	2011	2013
Entered	-	208	258	277	256
Switched	-	1,017	1,143	1,348	1,216
Exited	343	301	324	291	-

Table A2: T-tests analysis: entering, exiting and industry switching firms

Panel A: Entring and non-entring firms

	Firm entrant no obs.	Firm entrant mean	Firm entrant SD	Firm non-entrant no obs.	Firm non-entrant mean	Firm non-entrant SD	P-value
Unpaid labor share	998	0.542	0.341	8,053	0.500	0.350	***
Unpaid labor	998	1.921	0.940	8,053	1.909	1.091	
Total labor	999	5.569	6.287	8,054	7.212	12.520	***
HHW ratio	997	0.636	0.891	8,032	0.624	0.886	
Hiring issues	416	0.260	0.439	3,967	0.200	0.400	***
Network hiring	647	0.921	0.270	5,670	0.884	0.320	***
Hired to hired ratio	998	-0.051	0.151	8,024	-0.062	0.214	**
Labor hired	998	0.466	1.677	8,055	0.719	4.029	***
Labor fired	999	0.052	0.549	8,025	0.078	0.630	
Labor left	999	0.425	2.780	8,025	0.518	1.857	
Revenue	999	987,603	3,267,876	8,053	1,160,106	3,917,030	
Profit	999	161,644	319,985	8,052	199,678	673,442	***
Financial assets	999	115,330	240,228	8,053	178,104	902,155	***
Physical assets	999	1,422,303	4,203,884	8,053	1,680,209	4,599,510	*

Panel B: Switcher and non-switcher firms

	Firm switcher no obs.	Firm switcher mean	Firm switcher SD	Firm non-switcher no obs.	Firm non-switcher mean	Firm non-switcher SD	P-value
Unpaid labor share	4,723	0.515	0.349	4,328	0.493	0.349	***
Unpaid labor	4,723	1.911	1.066	4,328	1.909	1.086	
Total labor	4,724	6.921	10.828	4,329	7.149	13.167	
HHW ratio	4,708	0.668	0.910	4,321	0.580	0.857	***
Hiring Issues	2,246	0.224	0.417	2,137	0.186	0.389	***
Hired to hired ratio	4,724	-0.059	0.230	4,298	-0.064	0.180	
Labor hired	4,724	0.598	2.101	4,329	0.793	5.102	**
Labor fired	4,724	0.084	0.615	4,300	0.065	0.629	
Labor left	4,724	0.489	1.611	4,300	0.528	2.319	
Revenue	4,723	1,171,123	4,338,928	4,329	1,108,278	3,235,955	
Profit	4,723	207,155	725,617	4,328	182,740	541,170	*
Financial assets	4,723	182,744	1,024,451	4,329	158,556	618,832	
Physical assets	4,723	1,837,327	5,143,464	4,329	1,449,274	3,808,577	***

Panel C: Exited the market and survived firms

	Firm exits no obs.	Firm exits mean	Firm exits SD	Firm survivor no obs.	Firm survivor mean	Firm survivor SD	P-value
Unpaid labor share	1,259	0.465	0.339	7,792	0.511	0.351	***
Unpaid labor	1,259	1.797	1.019	7,792	1.928	1.083	***
Total labor	1,259	7.632	16.519	7,794	6.933	11.101	
HHW ratio	1,255	0.696	0.970	7,774	0.614	0.871	***
Hiring Issues	669	0.197	0.398	3,714	0.207	0.405	
Hired to hired ratio	1,253	-0.071	0.237	7,769	-0.060	0.203	
Labor hired	1,259	0.922	5.024	7,794	0.654	3.613	*
Labor fired	1,253	0.096	0.737	7,771	0.072	0.601	
Labor left	1,253	0.709	2.891	7,771	0.475	1.788	***
Revenue	1,259	1,232,378	4,670,640	7,793	1,126,316	3,701,719	
Profit	1,259	210,274	729,238	7,792	193,090	629,311	
Financial assets	1,259	161,482	510,953	7,793	172,743	898,173	
Physical assets	1,259	1,785,667	4,869,598	7,793	1,630,110	4,505,633	

Source: Authors' calculations based on Vietnamese Small and Medium Enterprise Surveys. Significance is denoted by: * 10% level, ** 5% level, *** 1% level.