Export markets and household business performance: Evidence from Vietnam

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Abstract

Most workers in low-income countries work for a household business or a farm. We examine how export opportunities induced by the 2001 U.S.-Vietnam Bilateral Trade Agreement affect performance of non-farm household businesses in Vietnam. Household businesses in industries with greater declines in U.S. tariffs on Vietnamese exports expand revenue and are more likely to hire non-household members as workers. Moreover, the responses to tariff cuts differ with initial size of a household business. Initially small household businesses experience a contraction of revenue and are less likely to hold a business license in response to tariff cuts, while initially larger businesses account for the observed expansion of revenue within an industry in response to export opportunities. Our results, combined with the findings in McCaig and Pavcnik (2014), suggest that new export opportunities induced a reallocation of workers from informal household businesses to employers in the formal enterprise sector by the relative expansion of employment of firms in the formal sector.

1. Introduction

The effects of international trade on firm performance, allocation of workers across heterogeneous employers (Levinsohn (1999), Menezes-Filho and Muendler (2011)) and compliance of employers with labor market regulation (Goldberg and Pavcnik (2003), Paz (2012), Almeida and Poole (2013)) have mainly been examined among the employers in the formal sector due to data constraints.[1] This paints only a partial picture of how firms and labor markets adjust to trade reform. For example, in Vietnam in 2001 only 36% of manufacturing workers and 15% of workers economy-wide work for employers in the formal registered enterprise sector. Given that household businesses and farms employ the majority of the workforce in low-income countries, it is crucial to understand how they respond to trade liberalization episodes, especially if one is interested in mechanisms of how labor reallocates in response to trade shocks (Brookings Trade Forum 2003, 2004) and how trade affects overall employment in employers covered by labor market regulation.

We examine household business responses to export opportunities in a low-income country setting. In particular, we study the consequences of new export market opportunities induced by the 2001 U.S.-Vietnam Bilateral Trade Agreement (BTA) for the performance of household businesses in Vietnam. The existing theoretical and empirical work clearly establishes that not all firms within an industry are affected equally by expanded export opportunities. Initially larger, more productive firms expand and upgrade technology, quality, and or productivity, while smaller firms contract and potentially exit (Melitz (2003), Verhoogen

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[1] Broadly speaking, the informal sector refers to the sector where firms/employers are not subject to labor market regulation or required to provide social insurance. See Section 2 for a detailed discussion and definition of informality in our context.

(2008), Iacovone and Javorcik (2008), Bustos (2011), Lileeva and Trefler (2010)). The findings of the existing studies are confined to larger, formal firms in manufacturing that usually employ 10 or more individuals and exclude household businesses. Smaller, household businesses are often not well represented in the conventional data sources.

The BTA and the available data provide an excellent setting to study the consequences of new export opportunities for household businesses. We use detailed repeated cross-sections and panel data on household businesses from the Vietnam Household Living Standards Surveys (VHLSS) to overcome this data challenge.[2] Another advantage of the VHLSS data is that they span the period of increased export market demand induced by new export opportunities through the BTA in 2001. As discussed in McCaig (2011) and McCaig and Pavcnik (2014), tariff cuts induced by the BTA were large and plausibly exogenous from Vietnam's perspective and are thus well suited for rigorous empirical analysis to identify the causal effect of trade on informal sector firms. Our research design links these policy changes to micro-level data on household businesses from the VHLSSs to examine the mechanisms through which access to export markets affect the performance of household businesses. The household business data allows us to examine how tariff declines affect household business revenue and the probability that a household hires non-family workers (i.e. outside labor), which enables us to assess how export opportunities affect the size of the informal sector. In our data, we cannot directly examine transitions of these businesses into the formal enterprise sector (see Sections 2 and 3 for details on this process). However, we can examine whether a household business holds a business license, which provides a direct indicator of (a step toward) formality.

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[2] See also related work by Nataraj (2011), Brambilla, Porto, and Tarozzi (2012), and McCaig (2011).

As we discuss in detail in the literature review in Section 2, our empirical analysis is guided by predictions of recent heterogeneous firms and trade models, such as Melitz (2003), which suggest that exporting opportunities will differentially affect the profitability of heterogeneous firms, with initially better performing firms more likely to gain from export opportunities (and thus also be more likely to formalize in response to increased export opportunities). Underlying business heterogeneity also features importantly in the informality literature. This literature suggests that firms optimally choose whether to formalize or not, depending on whether the cost of operating as a formal firm exceed the cost of operating as informal firm. This literature predicts that initially more productive firms are more likely to operate in the formal market or choose to formalize (Maloney (2004), Rogers and Swinnerton (2004), LaPorta and Shleifer (2008), De Mel, McKenzie, and Woodruff (2013)).

We find that household businesses in industries with larger tariff cuts are expanding revenue and more likely to hire outside labor. Household businesses are also less likely to hold a household business license in response to declines in tariff cuts, although these results are not always statistically significant. Interestingly, in addition to the average effect of tariff reductions on revenue, industries with bigger tariff cuts also appear to experience reallocation of revenue from small to larger firms. We find that initially small household businesses experience a contraction of revenue with tariff cuts, while initially larger household businesses appear to be growing relative to small household businesses.

These results highlight the importance of looking at heterogeneous effects of tariff cuts across household businesses for interpretation of observed tariff-induced increase in revenue and decrease in household business license use. For example, the licensing effects appear to be

driven by initially small firms that are contracting revenue in response to tariff cuts and might be moving toward the margin of closing down. Thus, declines in business license use are not indicative of an expanding informal sector. Instead, they are related to reallocation of activity away from small household businesses (which are shrinking in response to tariff cuts) toward larger, probably more productive, household businesses. These licensing patterns are also consistent with cross-sectional correlations in our data, which suggest that initially larger, and likely more productive business, are more likely to hold a business license, or (conditionally on not holding one) obtain one in the future. The evidence in this paper confirms the existing literature on formalization (De Mel, McKenzie, Woodruff (2013), Maloney (2004), Rogers and Swinnerton (2004), La Porta and Shleifer (2008)), which suggests that the initially more successful household businesses are more likely to transition toward formality (in our case this is measured by holding a business license).

Our evidence on expanding revenue and increased hiring of outside labor in industries with larger tariff cuts might be at first surprising given that these household businesses were expected to contract as predicted by Melitz (2003) style models. However, one has to be careful in interpreting our results. The identification of the effects of the BTA on household business performance is based on comparisons of household businesses in industries that received larger tariff cuts to those in industries with lower tariff cuts. Thus, our results suggest that export market opportunities expand revenue and hiring of outside labor toward industries with bigger tariff reductions *within* the informal sector. However, we cannot rule out that household business revenue and hiring of outside labor is declining in response to export opportunities relative to performance of formal firms within the industry. One could examine this claim more

directly for revenue and exit by using data that would simultaneously cover formal firms in the enterprise sector and household businesses, but this is a topic for future work.

Our results combined with evidence from McCaig and Pavcnik (2014) provide insights on the issue of how export opportunities induce reallocation of workers between household businesses and employers in the formal sector in low-income countries. Evidence in McCaig and Pavcnik (2014), based on nationally representative labor force data from the VHLSSs that is representative of employment in household businesses and the enterprise sector, clearly shows that the share of workers working for household businesses in an industry declines in response to tariff cuts. Thus, overall export market opportunities are expanding employment among the formal enterprises more than among the household businesses. While the current paper finds evidence that household businesses are more likely to hire outside labor in response to expanded export market opportunities (perhaps because they subcontract with larger firms that directly export), these effects appear to be dominated by an even greater expansion of employment opportunities among the formal employers in industries with greater export opportunities. Thus it appears that expansion of formal jobs is not occurring because of an absolute contraction of the informal sector, but instead by a relatively greater expansion of the jobs in the formal sector in response to export market opportunities. This suggests that new export opportunities are increasing relative demand for labor in the formal sector through the expansion of existing, larger, formal firms.

The paper proceeds as follows. In Section 2 we first discuss the concept of informality in the context of Vietnam. We subsequently place our study into the broader literature on trade and informality by providing a detailed survey of the existing literature. We discuss various

definitions of informality, trade theory predictions for how export market opportunities should

affect performance of household businesses, and the existing empirical evidence on the

relationship between trade and informality. This literature review also summarizes McCaig and

Pavcnik (2014) on how trade affects the allocation of labor between the formal and informal

sectors in Vietnam. Section 3 describes the data and the BTA. Section 4 discusses

characteristics of household businesses while Section 5 introduces our econometric

methodology. Section 6 presents the results and Section 7 discusses the implications of our

findings and concludes.

2. Literature Review

In this literature review we provide an overview of the link between international trade,

informal employment, and performance of informal household enterprises. We first discuss the

empirical definitions of informality used in the existing literature, overview the definition of

household businesses in Vietnam, and discuss how the definition of informality based on

household businesses relates to other definitions used in the literature. In the second part of

the review we discuss the causal channels through which international trade could affect

informality and the performance of household businesses and the existing evidence on the

relationship. We conclude with a discussion of how our study will contribute to the existing

literature on trade and informality.

2.1. Measuring Informality in Vietnam: Household Businesses

Informality is a multi-dimensional concept (see Goldberg and Pavcnik (2004, 2007) for surveys). In this project we focus on one dimension of informality, namely a distinction on whether a firm is a household business or an enterprise. In Vietnam all state, foreign and collective businesses are legally required to register as enterprises under Vietnam's Enterprise Law.[3] However, private businesses can legally operate in three different modes: a household business without a license, a household business with a license, and a private enterprise.[4] Rules exist describing in which of the three modes the business should be operating, but many household businesses seem unaware of the legal requirements to register their household business despite almost all of them meeting the legal requirements to do so based on their income (Cling et al. (2012)).[5,6] Thus, any private business which is not registered as an enterprise is, broadly speaking, considered to be a household business. This includes licensed and unlicensed household businesses. In Vietnam these are often referred to as formal and

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[3] During our study period the relevant version of the Enterprise Law is the Law on Enterprises passed in 1999.

[4] See Decree No. 02/2000/ND-CP and Decree No. 109/2004/ND-CP.

[5] Household businesses operating without a license are not necessarily doing so to avoid detection by tax or labor authorities as businesses engaged in salt-making, as street vendors, or as service providers with low incomes are not required to register. See Decree No. 109/2004/ND-CP.

[6] Various studies discuss the benefits and costs of a firm being an enterprise as opposed to a household business. For example, Malesky and Taussig (2009) report that enterprises, relative to household businesses, have easier access to export licenses, customs certificates, opportunities to bid on government contracts, the right to open branches and to operate outside their home district. At the same time, running an enterprise (as opposed to a household business) entails the registration cost and more rigorous accounting. Taussig and Hang (2004) reports benefits of being an enterprise (relative to household business) as greater ability to trade beyond home district, ability to expand, value added tax receipts, legal ability to establish branch locations, a stamp for making transactions more official, more predictable, law based interactions with government, ability to access equity for limited and joint stock companies, and greater access to government investment incentives. Costs of formalization include registration costs, annual registration fee, certified chief accountant, greater reporting requirements, potential for increased attention from local authorities, and potential for increased taxes with movement from lump sum to standard tax calculations. They also report that many laws governing household businesses are the same as those for sole proprietorships, the simplest form of a company (CIEM, *Assessment of the Strengths and Weaknesses of the Enterprise Law: Recommendations for Amendments and Additions (Draft)*, 2004, p. 62). The information on the costs of registering as a private enterprise in Vietnam is summarized by the World Bank's Doing Business Survey.

informal household businesses respectively. Our project focuses on household businesses and

relies on data that includes household businesses with and without a license.[7] Information on

the costs of obtaining a business license is not readily available, but costs do not seem to be a

significant barrier. Only a small percentage of household businesses without a license consider

the lack of license being related to expense or complicated nature of the licensing process

(World Bank (2010)) and World Bank (2009) reports that few households experienced difficulty

registering a household business.[8] Among households businesses without a license, the vast

majority reports they are not registered either because it is not compulsory or because they

don't know if they need to register (World Bank (2010)). Household businesses that hold a

license report the main advantage of having a license as less corruption, followed by better

access to market places, and easier loan access (World Bank (2010)). One possible explanation

for not obtaining a business license is that a requirement of being licensed is to pay taxes.

However, Cling et al. (2012) find that some unlicensed businesses report paying taxes and most

household businesses also make additional payments to public officials. Therefore avoiding

taxes by being unlicensed may not lead to an overall decrease in payments to government

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[7] Most of the studies using the 1993 and 1998 Vietnam Living Standards Surveys and the 2002 and 2004 Vietnam Household Living Standards Surveys simply refer to the businesses included in the datasets as non-farm household enterprises (NFHE). In 1993 Vietnam did not distinguish between household businesses and private enterprises. This began sometime later, but the distinction did exist by the 1998 survey. Neither the 2002 nor 2004 survey distinguishes between household businesses and private enterprises. This is probably why researchers use the term non-farm household enterprise since it incorporates both types of businesses covered in the business modules. However, data from the 2006 VHLSS, which distinguishes between household businesses and private enterprises, suggest that even in 2006, a very small share of private businesses, 2.2%, are private enterprises.
[8] World Bank (2010) is based on a survey of licensed and unlicensed household businesses operating in Hanoi and Ho Chi Minh City, while World Bank (2009) is based on data from the 2008 VHLSS. A web site aimed at the business community (http://www.vietnam-briefing.com/news/vietnams-taxes-business.html/) suggests that the fee varies by monthly income of the business from 50,000 to 1,000,000 dong per year, but the site does not list the original source for this information nor the relevant time frame.

agencies. Despite imperfect adherence to the law obtaining a business license is considered as a first move toward formality (Cling et al. (2010, 2012)).

Several earlier studies have focused on this definition of household businesses in Vietnam (see for example Vijverberg et al. (2006)). An alternative definition was used in two studies by Cling et al. (2010, 2012) on the informal sector in Vietnam.[9] Following the official ILO definitions, these two studies define the informal sector "as all private unincorporated enterprises that produce at least some of their goods and services for sale or barter, are not registered (no business license) and are engaged in non-agricultural activities," (Cling et al. (2010), p. 6). Hence, this definition corresponds to unlicensed household businesses. This study further defines informal employment "as employment with no social security (social insurance)" (Cling et al. (2010), p. 6).

Our definition of informality based on household businesses versus firms in the enterprise sector falls somewhere between the two definitions above. It is broader than the concept of the informal sector but likely to be more restrictive than the concept of informal employment, which also includes workers in the enterprise sector who do not receive social insurance.[10] Given the nature of our data, we can perfectly replicate the informal sector definition used in Cling et al. (2010, 2012), but we cannot do so for the informal employment definition.[11]

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[9] Cling et al. (2010) was commissioned by the ILO.
[10] In Vietnam enterprises are required to make social security contributions on behalf of their workers whereas household businesses may voluntarily make such contributions.
[11] Beginning in 2007 the GSO began conducting a nationally representative labor force survey. The questions were designed to be consistent with the concepts of the informal sector and informal employment as defined by the ILO and these surveys were the basis of analysis for Cling et al. (2010).

While the focus on household businesses does not enable us to capture the dimension

of informality related to workers employed by formal enterprises that do not receive social

insurance, the focus on household businesses is informative for several reasons. First, the

performance of household businesses and the allocation of labor between household

businesses and other employers (i.e., enterprises) are usually not observed in conventional

individual- and firm-level data (McCaig and Pavcnik (2014), Pages (2012)). As a result, our study

provides a rare opportunity to examine how household businesses respond to expanded export

opportunities. Second, the distinction between employment in household businesses and other

employers (i.e., enterprises) has potentially important implications for worker earnings. For

example, in Vietnam, workers in household businesses earn 7 to 14 percent less than

observationally equivalent workers in the same industry, province, and occupation working in

the enterprise sector (McCaig and Pavcnik (2014)). Third, the focus on household businesses is

important for the design of informed policy because in low-income countries household

businesses and farms account for a vast majority of employment (Woodruff (2012), Nataraj

(2011), Hsieh and Klenow (2009, 2011), Banerjee and Duflo (2007)). Fourth, the longitudinal

dimension of our data enables us to study the dynamics of household businesses and their

adjustment to trade.

2.2. International trade, informality, and the performance of household businesses

The literature on the effects of international trade on informal employment is small

(Goldberg and Pavcnik (2007)). Most of this literature focuses on the definition of informality

based on compliance with payroll taxes among the formal firms in urban areas of middle-

income countries in Latin America such as Brazil and Colombia (see, for example, Menezes-Filho and Muendler (2011), Goldberg and Pavcnik (2003), Coşar, Guner and Tybout (2010), and Paz (2012)). Furthermore, most of this literature examines the effect of increased import competition (measured by unilateral domestic import-tariff reductions) on the probability that a worker works in the informal sector (Goldberg and Pavcnik (2003), Menezes-Filho and Muendler (2011), Coşar et al. (2010), and Paz (2012)). The studies find that lower import tariffs are not robustly associated with the probability that a worker works in the informal sector (Menezes-Filho and Muendler (2011), Goldberg and Pavcnik (2003), Paz (2012)).

To our knowledge only two studies have examined the response of informality to new export market opportunities. Paz (2012) finds that compliance with payroll taxation increases with new export opportunities in Brazil. The study most closely related to the current project is McCaig and Pavcnik (2014), which examines how trade affects the allocation of employment between informal household businesses and more formal employers using nationally representative worker-level data from Vietnam. They identify the effects of trade on the performance of household businesses by relying on a plausibly exogenous trade policy change to improve our understanding of the causal effects of export opportunities on informality. As discussed in McCaig (2011) and McCaig and Pavcnik (2014), tariff cuts induced by the BTA were large and plausibly exogenous from Vietnam's perspective and are thus well suited for rigorous empirical analysis to identify the causal effect of trade on the informal sector.

Methodologically, McCaig and Pavcnik (2014) follow the recent literature on labor markets in developing countries to relate various outcomes of interest to differential exposure to trade policy changes across industries (Goldberg and Pavcnik (2007)). Their findings suggest

that the probability that a worker works in a household business (as opposed to a more formal employer) has declined in response to export opportunities, so that the aggregate share of informal sector employment has been shrinking in Vietnam in response to the BTA. These effects are particularly pronounced among younger cohorts of workers and in provinces that are more integrated into international markets (as measured by a province's proximity to a major seaport).

The evidence in McCaig and Pavcnik (2014) suggests that export opportunities expand the share of workers working for formal establishments. However, the above analysis does not inform us about the mechanisms through which export opportunities affect workers transition to formal employers. Are individuals obtaining formal jobs because the most successful informal household businesses are expanding and transitioning to the registered, formal sector in response to export opportunities? Or are individuals transitioning to the formal sector because new export opportunities are increasing demand for labor in the formal sector through expansion of existing, larger, formal firms? The current paper in part contributes to this topic by examining the responses of household business to export opportunities.

Household businesses likely differ from enterprises in many dimensions, including that they tend to have lower labor productivity than enterprises (see McCaig and Pavcnik (2014)). Let us for now focus on this dimension of heterogeneity between household businesses and enterprises. The heterogeneous firms and trade literature, such as Melitz (2003), predicts that new exporting opportunities will reallocate employment and market share from less efficient to more efficient firms, thus leading to a relative contraction of household businesses. In Melitz (2003) firms differ in underlying performance and face a fixed cost of accessing export markets.

In this setting, only some firms export, and these tend to be the initially more productive firms that are profitable enough to cover the fixed cost of exporting.

The model generates several predictions for how increased access to an export market (due to a decline in a foreign tariff) affects firm survival, output, and employment. First, an increase in market access will lead to an increase in industry demand. However, only initially better firms benefit from this expansion because they are the ones profitable enough to cover the fixed cost of exporting. Thus, sales and employment in the initially better firms expand due to increased export demand. This expansion occurs by increased output and employment in existing exporters and entry of firms into the export market (i.e. new exporters). Second, the expansion of better firms due to new exporting opportunities increases industry-wide wages and the intensity of competition (Melitz (2003), Melitz and Ottaviano (2008)). Consequently, some less efficient firms that only serve the domestic market observe a contraction in output and employment. In fact, the most inefficient firms no longer earn sufficient profits to cover fixed costs of production, so that increased export opportunities lead the least efficient firms to exit the industry.

These models create clear predictions that within an industry, trade will expand the employment in initially bigger, better performing firms and contract employment in initially less efficient firms. Recent papers using firm-level data show that increased export market access is associated with a reallocation of market share from less to more productive firms as well as increases in wage inequality, quality upgrading and technology upgrading in formal urban manufacturing in middle-income countries (Verhoogen (2008), Iacovone and Javorcik (2008), Bustos (2011)). These benefits are particularly pronounced for initially more productive, larger

firms. However, these studies do not provide any guidance on the effects of exporting on household businesses because household businesses are not observed in their setting. If this channel matters, so that initially smaller, informal firms contract or even exit in this process, while initially larger, more formal firms expand, exporting could contribute to an increase in formal employment through this channel.

The above discussion suggests that it is unlikely that household businesses will be expanding subsequent to new exporting opportunities. The model would predict that export market opportunities should be related to contraction of household business revenue, contraction of employment in household businesses, and increased exit of household businesses. Moreover, one would expect contracting businesses to be less likely to hold a business license.

However, there are several caveats of applying this framework to household businesses. First, a large number of household businesses do not employ outside labor, instead relying on labor supplied by household members. For example, in Vietnam, only about 10 percent of household businesses hire outside labor. Schoar (2010) and Woodruff (2007) suggest that household businesses mainly employ household labor in most less developed countries, including Mexico, Colombia, and Sri Lanka. As such, Melitz-style models, which assume perfectly competitive labor markets and labor mobility, may not accurately depict the opportunity cost of labor for these businesses. If the wage rate is not an accurate reflection of the opportunity cost of labor for the business the predictions of exit from these models may not apply in this context. Furthermore, Schoar (2010) and Woodruff (2007) suggest that the

existing literature finds that very few household businesses create new jobs in the economy through expansion of employment beyond household members.

Second, household businesses may operate as subcontractors for larger, more formal businesses. In Hanoi and Ho Chi Ming City, over 90% of output from household businesses is sold either directly to households or to another household business or small enterprise (World Bank (2010)), although sales to larger enterprises might account for about a quarter of output in manufacturing household businesses (World Bank (2010)).[12] About 10% of household businesses report subcontracting relationships in 2002 (Kokko and Sjöholm (2005)). While these figures suggest subcontracting might not play a large role for non-farm household businesses during our sample period, some household businesses may indirectly benefit from increased demand for products produced by large firms that benefit directly from the export opportunities.

Third, household businesses may not directly compete with products produced by larger, more formal firms. Hence, the expansion of larger, more formal firms in response to increased foreign market access may not increase product competition faced by household businesses. In fact, only 1% of household businesses report exporting and they view other non-state private businesses as their main source of competition (Kokko and Sjoholm (2005)).

While household businesses might not compete directly in the product market with firms in the enterprise sector, they might be indirectly affected by the expansion of these firms through the general equilibrium effects of trade on labor demand (McCaig and Pavcnik (2014)).

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[12] This information is based on household businesses operating in Hanoi and Ho Chi Minh City as covered by the 2007 and 2009 Household Business and Informal Sector surveys conducted by the GSO.

In Melitz (2003) less productive firms exit because these firms are not sufficiently profitable to cover higher wages. Likewise, to the extent that increased export market opportunities increase wages, Lucas (1978) predicts a decline in self-employment and an increase in employment in businesses run by more able entrepreneurs.

Given that the expanded labor market opportunities increased provincial wages in Vietnam in provinces more exposed to new export opportunities (McCaig (2011)), the opportunity cost of working as self-employed in a household business might have increased, thus potentially leading to declines in household business employment, increased exit of household businesses, and expansion of employment in the enterprise sector.

The above discussion of the theoretical predictions on how expanded export opportunities will affect performance of household businesses suggests that how informal household businesses respond to export opportunities is an empirical question.

3. Data

In this section we introduce the two household surveys and tariff data that we rely on for our study. We describe the scope of the surveys, our procedure for matching businesses across the two surveys, and the key business variables used in the analysis. Lastly we introduce the tariff data.

We use two nationally representative household surveys, the 2002 and 2004 Vietnam Household Living Standard Surveys (VHLSS), which were conducted by the General Statistics Office (GSO) of Vietnam. The surveys were conducted throughout 2002 and 2004 and feature a one-year recall period. Each survey contains modules related to household demographics,

education, health, employment, income generating activities, including household businesses,

and expenditures. These surveys are nationally representative, cover rural and urban areas, and

contain individual- and household-level panel datasets that allow one to study employment

transitions and better control for unobserved household business heterogeneity. Of the 74,350

and 45,928 households surveyed in 2002 and 2004 respectively, we can track 22,415

households and their respective members between the two surveys.[13,14] Most importantly for

our purposes, the surveys contain a detailed module on private businesses run by the

household. These include unlicensed household businesses, licensed household businesses, and

private enterprises.[15] Most of these businesses are not covered in the more widely available

firm-level data. This module is the key focus of the current study.

The business module collects information on whether a household operates a business,

the industry in which the business operates, the number of months it operated during the past

12 months, the wage bill, revenue and expenditures, whether the business has a license, and

who is the most knowledgeable person (hereafter referred to as the manager).

Although the household surveys were not directly designed to track businesses over

time, we can do so taking advantage of information on the business that is not likely to change

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[13] The decline in the sample size between the 2002 and 2004 VHLSSs is primarily due to a reduction in the number of households surveyed within an enumeration area. The 2002 VHLSS surveyed households within 3,001 enumeration areas averaging approximately 25 households per enumeration area. The 2004 VHLSS surveyed 3,062 enumeration areas, but only 15 households per enumeration area.

[14] The VHLSSs feature a rotating panel by enumeration area. Thus not all enumerations areas surveyed in 2002 were intended to be resurveyed in 2004. This accounts for why the number of panel households is noticeably lower than the total number of households surveyed in the 2004 VHLSS, as only about half of the enumeration areas surveyed in 2004 were surveyed in 2002.

[15] The business modules do not distinguish whether a business run by the household is a household business or a private enterprise. In 2004 we can use information on whether the business manager/owner reports working in the private sector (as opposed to the household business sector) to gauge the prevalence of businesses that are private enterprises. Only 1.5 percent of panel businesses could be considered private enterprises by this definition. As a result, we do not explore this margin further.

in a short period of time. In particular, we use information on the industry of the business and the manager of the business to match businesses between the 2002 and 2004 surveys. Unfortunately, the 2004 VHLSS did not report the manager of the business and thus before we can match businesses over time we begin by predicting the manager of the business by matching information reported about the business with information reported in the labor module about workers within the household. A full description of the process is available in the Data Appendix. We test the procedure using the 2006 VHLSS which contained the same business information as the 2004 VHLSS but also reported the manager and find that our procedure correctly predicts the manager for 92.4 percent of businesses in the 2006 VHLSS.[16] Thus we feel very confident about our ability to accurately predict the manager for businesses reported in the 2004 VHLSS. With information on the manager and industry of operation in both 2002 and 2004 we construct a business panel by first matching businesses over time within a household by industry and manager. Subsequently, among remaining businesses we match by either manager or industry within the household. Full details of the procedure can be found in the Data Appendix. We match 3,821 businesses by industry and manager, 1,272 businesses by industry only, and 1,038 businesses by manager only leading to a panel of 6,131 businesses. This represents 84.4 percent of all possible businesses that could be matched over time within panel households.

We link the business and manager data to detailed information on U.S. tariffs on Vietnamese exports in a given time period based on the business' industry affiliation. This

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[16] We did not use the 2002 VHLSS for testing the algorithm because it did not collect as much information about an individual's secondary job as the 2004 and 2006 VHLSSs did. Since many businesses are run as a second job testing the algorithm using the 2006 VHLSS is more appropriate.

detailed tariff data has been collected and previously used by McCaig (2011). McCaig (2011)

documents the advantage of studying the relationship between market access and employment

in the context of the BTA. The tariff cuts are across all industries, are large (on average a 21.1

percentage point decline across all traded industries and 30.3 percentage points within

manufacturing) and vary widely across industries (the standard deviation of the tariff reduction

is 17.6 percentage points).[17] Another advantage of the BTA is that the concern about the

political economy of protection and the endogeneity of tariff changes are less severe because

tariff changes occurred by the U.S. moving Vietnam from the Column 2 Tariff schedule to

Normal Trade Relations (or Most Favored Nation status). McCaig and Pavcnik (2014) show that

these declines in tariffs were associated with increased industry exports from Vietnam to the

United States and in overall Vietnamese exports. The BTA thus provides an excellent

opportunity to study the causal link between exporting opportunities and the performance of

household businesses.

4**. Household business characteristics**

Household businesses employ the majority of workers in low-income countries, but

substantially less is known about their performance relative to the performance of formal firms

usually captured in conventional firm-level data sources. We therefore examine basic

household business characteristics, how they relate to household business performance, and

compare these patterns to the patterns observed for more formal firms in the existing

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[17] These averages are across 2-digit ISIC revision 3 industries, which are the basis of the industry codes used in the 2002 and 2004 VHLSSs.

literature and to the patterns noted by the existing literature on the topic reviewed above in less developed countries and in Vietnam.

Table 1 provides summary statistics of the household business data. 37% of households own a business, with almost 80% of these households owning only one business, and 19% of these households owning two businesses. Households with more than two businesses are rare. About 70% of businesses operate in services (i.e. tertiary activities), while manufacturing accounts for the vast majority of the remaining household businesses. Within manufacturing, household businesses are most common in food and beverage production, wood processing, clothing and apparel, furniture manufacturing, and the textile industry. 20% of household businesses report having a business license and 11 percent hire outside labor. Household businesses employ on average only 1.7 employees and 0.3 paid workers.[18] The low number of employees per household business is consistent with employment patterns in informal businesses from other less developed countries surveyed in Woodruff (2007) and Schoar (2010).

A large literature on firms operating in the formal sector documents a high degree of heterogeneity in underlying performance (see Melitz and Redding (2013) for a survey). These studies do not capture household businesses. Vietnamese household businesses tend to be smaller (as measured by revenue or employment) and have lower labor productivity than firms in the enterprise sector (McCaig and Pavcnik (2014)). Household businesses also exhibit a large degree of heterogeneity in performance. Figure 1 plots the density of log revenues for household businesses in 2002 and 2004 and shows large differences among household

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[18] The information on number of employed individuals is only available in 2004.

businesses. This heterogeneity in performance motivates the empirical strategy we employ in Section 5, where we explore differential effects of export market opportunities on performance by household business size.

In addition to heterogeneity in revenue, household businesses also exhibit substantial heterogeneity in holding a business license and hiring workers, two business characteristics associated with more formal interactions with government officials and labor markets. Table 2 divides household businesses in 2002 into three size bins, based on whether their revenue lies in the bottom, middle, or the upper third of the industry revenue distribution in 2002. Larger household businesses are more likely to hold a business license (37% of large businesses hold a business license, while 6% of small businesses do) and hire workers from outside of the household (23% of large businesses hire outside labor versus only 3% of small household businesses). Figures 2 and 3 show nonparametrically that the probability that a household business holds a business license or hires outside labor increases with revenue. Low-revenue businesses are very unlikely to hold a business license or hire outside labor, but the probability of holding a license (or hire outside labor) increases rapidly with household business size. Initially more successful household businesses that do not have a license are also more likely to obtain a business license in the future. Figure 4 plots the relationship between obtaining a business license between 2002 and 2004 and revenue in 2002 for household businesses without a business license in 2002 and shows the positive relationship that is particularly steep for large businesses. Similarly, Figure 5 plots the probability of hiring outside labor in 2004 versus initial revenue for businesses that did not hire outside labor in 2002. The relationship is

strongly positive, except among the few businesses with initially high revenues.[19] In sum, initially more successful household businesses display or eventually adapt more of the characteristics associated with firms in the formal enterprise sector.

While we focus on a different dimension of "formalization", namely whether a business holds a business license, our findings of a positive correlation between business performance and the level of formalization are consistent with evidence in World Bank (2010). Their study relies on data that distinguishes between licensed (i.e. formal) and unlicensed (i.e. informal) household businesses based on an alternative survey of Vietnamese household businesses.[20] They find that formal household businesses tend to be bigger (in terms of revenue and employment size) and less likely to exit than informal household businesses. Furthermore, informal household businesses that become formal tend to be bigger and more productive than informal household businesses that remain informal.

The household business sector also appears very dynamic. Table 3 suggests large degrees of entry and exit.[21] 42 percent of firms exited between 2002 and 2004 and 42 percent of businesses operating in 2004 were new since 2002. These rates of entry and exit exceed the rates reported for formal firms (Roberts and Tybout (1996)). High rates of entry and exit of Vietnamese household businesses are also consistent with evidence in Vijverberg et al. (2006) and World Bank (2010). Firm exit is highly correlated with firm performance. Exit rates are substantially higher for smaller firms than larger firms. Figure 6 plots the propensity that a firm

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[19] Almost all household businesses at such high level of revenue hire outside labor (see Figure 3), so the observed decline could simply reflect a low number of observations and measurement error at high levels of revenue.
[20] The Household Business and Informal Sector Survey (HB&IS) used in the study is only available for 2007 and 2009 and only covers Hanoi and Ho Chi Minh City.
[21] Our procedure for defining panel businesses (described in the data appendix) is likely overly cautious. This implies that we somewhat overestimate entry and exit.

exits against household business revenue. Like previous literature on formal firms we find that the probability of exit declines with firm revenue. Low-revenue firms face a high probability of exit, which diminishes with household business size. There is a slight increase in the probability of exit for the largest firms (followed by a decline).[22] Our evidence is consistent with World Bank (2010), which finds that initially better performing household businesses (as measured by initial revenue, value added, profit, and employment) and older businesses are less likely to exit.

Market selection forces would suggest that only the better household businesses should survive over time, yielding a positive relationship between household business age and revenue (Hsieh and Klenow (2011)). Figure 7 plots log revenue in 2004 versus the age of the business.[23] We find a positive relationship between revenue and age only among the recently created businesses: household businesses that have operated for five years tend to have higher revenue than younger ones. However, the revenue age profile of businesses older than five years is fairly flat. This latter pattern is similar to patterns observed among formal firms in countries such as India and Mexico (Hsieh and Klenow (2011)). Overall, this finding suggests that maybe the forces of market selection might be more important for the recently created household businesses, but play a smaller role among older businesses.

5. Empirical Methodology

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[22] Very few household businesses have revenue that exceeds 10^6 million dong so those results might be affected by measurement error.

[23] The average business has operated for 7.7 years. Only 10% of household businesses are more than 20 years old, so we confine the analysis to household businesses that have operated for at most 20 years.

We examine the effect of declines in U.S. tariffs on Vietnamese exports on the

performance of Vietnamese household businesses by linking industry-level tariffs to micro-level

data on household businesses in Vietnam that spans the period of the U.S.-Vietnam BTA. In

particular, we relate various outcomes of interest y of household business i in industry j at time

t to industry tariffs in the following framework:

$$y_{ijt} = \alpha + \beta tariff_{jt} + \delta X_{ijt} + \lambda_j + p_p + \phi_t + \varepsilon_{ijt} \qquad (1)$$

where y is the outcome of interest, $tariff_{jt}$ is the tariff in industry j at time t, and X_{ijt} is a vector of

household business characteristics. These include an indicator for whether a household

business is in an urban area, the gender, age, and education of the manager, an indicator for

whether a manager is an ethnic minority, household size, and variables denoting gender and

age composition of household members.[24] The regression also includes industry, province, and

time fixed effects. We examine the following household business performance measures:

household business revenue, the probability that a business hires outside labor, the probability

that a business has a business license (a first step toward formality), and the probability that a

household business exits.

The above framework abstracts from heterogeneity in responses of household

businesses to export opportunities. The models in Section 2 suggest that the tariff cuts should

affect firms differently depending on their initial performance. We also expand the baseline

specification to consider whether there are differential effects of new export opportunities (as

measured by U.S. tariff cuts) on household business performance measures depending on their

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[24] These include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

initial size (or profitability), as Melitz (2003) would predict. We focus on the panel household

businesses and augment the specification in (1) to allow for the effect of tariffs to differ across

initially small, medium, and large household businesses in a method similar to Bustos (2011):

$$y_{ijt} = \alpha + \sum_{r=2}^{3} \alpha^r D_i^r \phi_t + \beta tariff_{jt} + \sum_{r=2}^{3} \beta^r D_i^r tariff_{jt} + \delta X_{ijt} + \lambda_j + \phi_t + \gamma_i + \varepsilon_{ijt} \qquad (2)$$

where D_i^r is an indicator for whether a firm is in the bottom third (small), middle (medium), or

upper third (large) of the 2002 firm revenue distribution.[25] This specification includes

household business fixed effects γ_i and thus controls for any time-invariant household business

characteristics. In addition, the specification controls for potential differential trends across

small, medium, and large household businesses by inclusion of interactions of year indicator

with the indicators for the initial household business size. Industry tariffs are based on the

tariffs in the industry in which the business operated in 2002. The interaction terms allow for

differential effects within an industry and correspondingly β^2 and β^3 measure the effect of

tariffs on medium and large businesses, respectively, relative to small businesses. Thus, a

negative value for β^3, for example, implies a greater increase in the outcome of interest for

large businesses relative to small businesses in response to the U.S. tariff reductions. The

overall effect for medium and large businesses would then be $\beta + \beta^r$. All standard errors are

clustered at the initial industry level to control for general forms of heteroskedasticity and serial

correlation.

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[25] These indicators are based on the position of a household business in the industry's revenue distribution in 2002. We also construct similar indicators based on initial expenses in 2002.

6.   Results

We estimate each specification separately for traded industries, manufacturing industries, and all industries. In regressions involving all industries businesses in non-traded industries are assigned a tariff of 0 in both periods. In Section 6.1 we report results of estimating equation (1) using the repeated cross sections of businesses and panel businesses. In Section 6.2 we present results of estimates of equation (2) using a panel of businesses and allowing for heterogeneous effects of export market opportunities across businesses of differing initial sizes.

6.1 Effects of the BTA on household business performance

As discussed in Section 2, theory provides ambiguous predictions on whether and how household businesses would be affected by the declines in U.S. tariffs on Vietnamese exports. The specifications that estimate equation (1) and do not allow for differential effects by household business size are reported in Tables 4 and 5.

Table 4 displays results based on estimating equation (1) for repeated cross sections for ln revenue, an indicator for hiring outside labor, and an indicator for having a license as a dependent variable. The table only reports the estimates and standard errors for the coefficient on tariffs, the key coefficient of interest. The results suggest that falling U.S. tariffs are associated with a decrease in revenue for household businesses in traded and manufacturing industries, but these effects are very imprecisely estimated and are not statistically different from zero. Moreover, declines in tariffs do not affect the probability a household business hires outside labor in traded and manufacturing industries. Interestingly, declines in tariffs are

associated with an increase in the probability of hiring outside labor in the sample that includes businesses in all industries.

As noted in the literature review, while household businesses are considered to operate in the informal sector, some of them hold a business license, which can be viewed as a first step by an unregistered household business toward formality (Cling et al. (2010, 2012)). Household businesses obtain a business license by registering with the district authorities and the literature review discusses the costs and benefits of holding the license. The information on the cost of obtaining a business license is not readily available, but the cost is likely not a significant barrier. In our sample approximately 20 percent of household businesses hold a license (Table 1) and more successful businesses are more likely to hold a business license (Figure 2 and Table 2). Interestingly, results in Table 4 suggest that declines in U.S. tariffs are associated with a decrease in the probability that a business holds a business license (albeit the effect for traded industries and manufacturing are not statistically significant).

In Table 5 we report results for the same outcomes but restrict the sample to panel businesses (i.e., those businesses that we observe in both 2002 and 2004). The focus on panel businesses reduces the sample size. The smaller sample size reflects a smaller sample of households that were surveyed in both 2002 and 2004 (as noted in the data section, about 30 and 49 percent of the household in the 2002 and 2004 VHLSSs respectively were part of the panel) and entry and exit of businesses.[26] The panel sample enables us to examine changes in

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[26] While the sample of panel business is smaller, panel businesses have similar baseline (2002) characteristics as the businesses in the repeated cross section. Panel businesses have somewhat higher revenue and a slightly higher probability of holding a business license. This is expected given that panel businesses are businesses that survive both periods and a large literature has documented (including this paper in Figure 6) that larger businesses are less likely to exit. Moreover, larger businesses are more likely to hold a business license (as noted in Figure 2). Importantly, summary statistics suggest that household businesses operated by panel households have similar

performance of household businesses over time and estimate an augmented specification of (1) that controls for time-invariant household business characteristics, which potentially bias the cross-sectional results in Table 4.

Table 5 reports results from estimating equation (1) with OLS and from augmenting the specification in (1) with business fixed effects to control for unobserved time-invariant household business characteristics. Beginning with revenue, the results based on panel businesses suggest that the U.S. tariff cuts induced an increase in revenue. In terms of magnitude, the average tariff cut within manufacturing, 30.3 percentage points, is associated with a 9 percent increase in revenue based on the fixed effects estimate in column 2. Thus, the size of the informal sector in Vietnam (as measured by revenue of household businesses) appears to increase in industries experiencing larger declines in U.S. tariffs on Vietnamese exports. We also find a consistent positive effect of the U.S. tariff cuts on the probability of hiring outside labor in businesses within traded, manufacturing, and all industries. Based upon the business fixed effects estimation for manufacturing in column 2, the average tariff reduction in manufacturing brings about a 3 percentage point increase in the probability that a household business hires outside labor.

The bottom of Table 5 presents results for having a business license. As is the case in Table 4, the U.S. tariff cuts are associated with a decrease in the probability of having a license, but the effects are not statistically significant in all specifications. The magnitude of the OLS and fixed effects coefficients on tariffs in Table 5 is somewhat greater than in the respective

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observable characteristics to those reported for all businesses in Table 1 in 2002. This confirms that slight differences in revenue and the probability of holding a license are related to the focus on surviving business in a panel.

columns in Table 4. The magnitudes of the estimates are suggestive of an economically meaningful association between tariff cuts and business licenses. For example, fixed effects estimate reported in column (2) for manufacturing industries implies that the average tariff reduction in manufacturing induced a 2 percentage point reduction in the probability of having a license. Though this might sound relatively small, but only 12 percent of manufacturing businesses had a license in 2002, so the implied effect represents a 16 percent reduction in manufacturing.

The household-business panel data enable us to examine business survival. We create an indicator for whether a household business exits between 2004 and 2002 and estimate equation (1) for all businesses run by panel households in 2002 where the industry fixed effects have been removed and the change in tariff is based upon the industry of operation in 2002. We present the results in Table 6. On average, within traded industries there is little relationship between the size of U.S. tariff cuts and the probability of exit. Across manufacturing industries and across all industries U.S. tariff cuts are associated with an increased probability of exit, but the result is imprecisely estimated within manufacturing industries.

The heterogeneous firms and trade models discussed in Section 2 would predict that if household businesses are less productive than formal firms, they should contract, hire less labor, and potentially exit with increased export market opportunities. Likewise, contracting businesses would have less incentive to obtain a business license. We do in fact find evidence in some specifications that larger tariff cuts are associated with declines in the propensity for a business to hold a business license. One could interpret this finding as suggesting that export

opportunities have increased informality (as defined by not holding a business license) among household businesses in Vietnam. However, given that the propensity to hold a business license strongly increases with household business revenue (Figure 2) and that conditional on not having a license, the propensity to have a business license in 2004 increases with revenue (Figure 4), this decline potentially reflects declining revenue for some household businesses. We explore heterogeneity in responses of revenue and household business licensing to tariff cuts further in the next section.

Our evidence on revenue and hiring of outside labor based on panel businesses suggest that household businesses in industries with larger tariff cuts are expanding revenue and more likely to hire outside labor. This might at first be surprising given that these household businesses were expected to contract. However, one has to be careful in interpreting our results. The identification of the effects of the BTA on household business performance is based on comparisons of household businesses in industries that received large tariff cuts to those in industries with small tariff cuts. Thus, our results suggest that increased export market opportunities expand revenue and hiring of outside labor toward industries with bigger tariff cuts within the informal sector. However, we cannot rule out that household business revenue and hiring of outside labor is declining in response to export opportunities relative to the performance of formal firms within the industry. One could examine this claim more directly for revenue and exit as outcomes by using data that would simultaneously cover formal firms in the enterprise sector and household businesses, but this is a topic for future work.

Our results combined with evidence from McCaig and Pavcnik (2014) provide insights on the issue of how export opportunities induce the reallocation of workers between household

businesses and employers in the formal sector. Evidence in McCaig and Pavcnik (2014) based on labor force data from the VHLSSs, which is representative of employment in household businesses and the enterprise sector, clearly shows that the share of workers working for household businesses in an industry declines in response to tariff cuts. Thus, for the case of labor, export market opportunities are expanding employment among the formal enterprises more than among the household businesses. While we find evidence that household businesses are more likely to hire outside labor in response to expanded export market opportunities (perhaps because they subcontract with larger firms that directly export), these effects appear to be dominated by an even greater expansion of employment opportunities among the formal employers in industries with greater export opportunities.

Finally, the above analysis does not consider heterogeneity in responses to export opportunities among household businesses. Yet Figure 1 and Table 2 suggest that household businesses differ drastically in their initial performance. Increased export opportunities could, for example, negatively impact small household businesses, but lead to relative expansion of larger household businesses. In our analysis so far, which relies on equation (1), these two effects could attenuate each other, lowering the coefficient on tariffs. We turn to differential effects of tariffs on household businesses depending on their initial size next.

6.2 Heterogeneous effects of the BTA on household business performance

As discussed in Section 2, existing theory and empirical studies among formal firms suggest that the impact of the U.S. tariff cuts might have differential effects on businesses based on observable differences in the size of the business. Household businesses tend to be substantially smaller and less productive than firms in the formal enterprise sector, so they are expected to contract relative to the formal firms. However, in light of the large degree of heterogeneity in initial performance of household businesses noted in Figure 1 and Table 2, we next examine whether there are heterogeneous effects of tariff declines across household businesses of differing initial sizes within industries.

We use three different specifications based on heterogeneity in initial size as in Bustos (2011). Within an industry we divide firms into three equal sized bins of small, medium, and large firms based on initial revenue and separately based on initial expenses. As both values are likely to be reported with error and thus bias the coefficients involving the size dummies towards 0, it is valuable to check our results to both size definitions. Our third specification uses the expense based size bins as instrumental variables for the revenue based size bins. The expense based size variables are highly correlated with revenue based size variables, so the instrumental variable specification does not suffer from weak instrument concerns. If the measurement error in both series is not perfectly correlated then this will help to reduce the bias. Importantly, using the expense based size bins and the instrumental variable approach helps to break the mechanical negative correlation introduced between initial revenue and growth in revenue due to measurement error. As a result, this is our preferred specification and most of the discussion below focuses on the results based on this specification.

We find strong evidence of differential responses in revenue as medium and large

household businesses experienced faster revenue growth than small businesses in high tariff

cut industries. We display the results in Table 7. As in previous tables, we report the results for

traded industries, manufacturing industries, and all industries. The tariffs are based on the

initial industry of operation, as is the sample inclusion into the three industry samples. Across

traded and manufacturing industries we consistently find statistically significant evidence of

heterogeneous responses in revenue to the U.S. tariff reductions. Small businesses experienced

a greater decline in revenue in industries with larger tariff cuts, although these estimates are

not always statistically significant (instrumental variable results reported in the bottom panel

are our preferred specification). Medium sized and large businesses experienced faster revenue

growth in response to the tariff reductions than initially small businesses within their industry.

As predicted by previous discussion of measurement error, the instrumental variable estimates

presented in the bottom panel are consistently larger in magnitude than the OLS estimates with

size based on initial revenue or expenses. For manufacturing businesses the instrumental

variable estimates reported in column 2 of the bottom panel suggest that small businesses

experienced a decrease in revenue of 22 percent in response to the average tariff reduction

whereas medium and large businesses experienced an increase in revenue of 12 and 24 percent

respectively.[27] Finally, the magnitude of the coefficients is larger in traded and manufacturing

industries, which are more directly impacted by trade than in the all industry sample that also

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[27] While tariffs have statistically differential effects on medium and large household businesses relative to small ones, the overall effect of tariffs on revenue of medium and large household businesses in some specifications is not statistically significantly different from zero. It is statistically different from zero for large businesses in our preferred IV specification.

includes household businesses in non-traded industries. A large existing literature has found

evidence of the importance of heterogeneity in responses of firms in the formal sector to

export market opportunities (Melitz and Redding (2013)). Our evidence suggests that

heterogeneity in responses to export market opportunities plays some role even among the

household businesses in the informal sector. So, the increase in revenue in industries with

bigger tariff cuts found in the previous section appears to stem from the reallocation of

revenue from small to larger firms within an industry. Initially small household businesses are

contracting revenue with tariff cuts, while initially larger household business appear to be

growing relative to small household businesses.

Table 8 presents the results from estimating equation (2) for an indicator for hiring

outside labor. The majority of the coefficients are statistically insignificant, suggesting no

heterogeneity in responses to tariff cuts in terms of hiring outside labor across household

businesses of different size, although the overall effect is statistically different than 0 for

medium businesses. Thus, initially medium sized businesses are more likely to hire outside

labor in industries that experienced large tariff reductions whereas there is no discernible

overall effect on small or large businesses. Hence, it is initially medium sized businesses that are

primarily responsible for the average effect documented in Table 5. These results could in part

reflect the data constraints we face. An indicator for whether a household business hires

outside labor is clearly a crude measure of the extent of household business engagement in

labor market. For example, it could be that larger businesses, which are more likely to hire

outside labor than small businesses to begin with (see Table 2 and Figure 3), expand revenue by

offering more hours of work to existing employees or hiring an additional worker. This would

imply no change in propensity to hire outside labor. In order to examine these issues further, we would ideally use more detailed information on the number of employees (both household members and outside labor) in a household business employs and the information on hours worked by employees. Unfortunately, we do not have data to examine these claims in the household business survey directly. In unreported regressions, we have estimated equation (2) using the log(1+labor expenditure) and the ratio of labor expenditure to revenue as an outcome variable and find some suggestive evidence that large firms in fact spend more on labor expenses (or expanding labor expenditures proportionally with revenue) with tariff cuts. However, these results are neither statistically significant nor robust across all specifications.

Table 9 displays the results for household business having a business license. We observe evidence of heterogeneous responses to tariff cuts. Small businesses are consistently less likely to have a license in response to the U.S. tariff cuts. The effects are less strong among medium and large businesses, where the coefficients on tariffs suggest that these businesses are more likely to hold a business license than small firms in response to tariff cuts. The differences for medium and large businesses, relative to small businesses, are not statistically significant, but the implied overall magnitudes suggest potentially non-negligible effects. For example, among small businesses the IV results for manufacturing in column 2 of the bottom panel suggest the average tariff cut decreased the probability of a small business having a license by 4.8 percentage points. The probability only decreased by 2.2 percentage points for large businesses and by 1 percentage point for medium businesses.

These results, combined with the evidence on heterogeneity in revenue responses to tariff cuts between initially small and large household businesses, highlight the importance of

looking at heterogeneous effects of tariff cuts across household business for interpreting the observed tariff-induced increase in revenue and decrease in household business license use noted in the previous section. The licensing effects appear to be driven by initially small firms that are contracting in response to tariff cuts and might be moving toward the margin of closing down. Thus, declines in business license use are not indicative of an expanding informal sector. Instead, the revenue effects suggest that there is likely a reallocation of activity away from small household business, which are shrinking in response to tariff cuts, toward larger, probably more productive, household businesses.

Finally, we explore whether initial business size induced differential exit rates in response to the tariff reductions by estimating a version of equation (2) where the right hand side is differenced over time with the change in tariff being based on the initial industry of operation for the business. We report the results in Table 10a. For traded and manufacturing industries we consistently find that large businesses are more likely to exit in response to tariff reductions than small businesses and mixed evidence for medium businesses. However, the results are not statistically significant in any specification and the implied magnitudes in differential exit rates are relatively small in comparison to the overall rates of exit reported by business size in Table 2. Theory by Melitz (2003) suggests that impacts on exit probabilities should be seen mostly among the smallest household businesses. The exit of the smallest firms would be driven by the general equilibrium effects of raising wages, which would cause the least productive business cease to exist. In fact, Figure 2 suggests that exit is particularly pronounced among the firms with the lowest revenue, then declines, and then slightly increases for the firms with the highest revenue. As discussed in the data section, our sample

includes household businesses that are registered as private enterprises. While we cannot

identify these businesses directly, the discussion in the data section suggests they likely account

for at most 1.5 percent of our sample.[28] Thus, without measurement error in the data, the exit

of most successful businesses noted in Figure 2 should not reflect a move into formality.

Nonetheless, measurement error is a possibility and we therefore examine whether exit is

more pronounced for very small and very large initial businesses.

We replicate the analysis in Table 10a, but distinguish between household businesses

that are in the bottom 10 percent of the industry size distribution (small), middle 80 percent of

size distribution (middle), and in the top 10 percent of the size distribution (large). As in Table

10a, the results presented in Table 10b do not find any statistically significant evidence of

differential exit for the smallest household businesses. We do find an increased probability of

exit for the largest household businesses in manufacturing. However, these results are not

robust to traded sample and sample that includes all industries. Furthermore, as described in

the data appendix, the procedure for matching businesses over time is cautious. This has the

benefit of reducing error due to mismatched businesses in panel regressions of revenue, hiring

outside labor, and hiving a business license, but the drawback is a potential increase in

measurement error in defining entry and exit. The measurement error issue might be

particularly pronounced in the tails of the size distributions, where the number of observations

is substantially smaller. Hence, overall, we view evidence on heterogeneous effects of exit in

Table 10b as non-robust and inconclusive.

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[28] The 2006 VHLSS survey distinguishes between unregistered household businesses and private enterprises and suggests that only 2.2% of the businesses are private enterprises.

One possible explanation for the lack of differential effect on exit is that exit is driven by a general equilibrium increase in the real wage, which particularly reduces the profitability of the least productive (smaller) firms. If the real wage is increasing approximately uniformly across industries, then we would not expect to see the probability of exit across industries to be related to differential changes in tariffs. Instead, we'd expect to see a strong aggregate relationship between initial revenue and exit, which we document in Section 4. McCaig and Pavcnik (2014) document that among workers moving from the household business sector to the enterprise sector most of them are unskilled laborers and often also change industries at the same time. Thus, the expansion of exporting firms in response to the BTA tariff reductions may be raising the opportunity cost of working for a household business across all industries. Indeed, McCaig (2011) documents increases in average wages for unskilled workers in geographic areas of Vietnam for which employment was more concentrated in large tariff cut industries.

7. Discussion of results and conclusion

Using nationally representative surveys of household businesses in Vietnam, we document large differences in revenue across household businesses in Vietnam and find that initially larger household businesses are more likely to hire outside (i.e. non-household member) labor, hold a business license, and survive. This underlying heterogeneity matters for how household businesses respond to expanded export market opportunities induced by the U.S.-Vietnam Bilateral Trade Agreement. Our results suggest that household businesses in industries with larger tariff cuts are expanding revenue and more likely to hire outside labor.

We also find some evidence that household businesses are less likely to hold a household business license in response to declines in tariff cuts, although these results are not always statistically significant. Interestingly, in addition to the average effect of tariff reductions on revenue, industries with bigger tariff cuts also appear to experience reallocation of revenue from small to larger firms. We find that initially small household businesses are contracting revenue with tariff cuts, while initially larger household businesses appear to be growing relative to small household businesses.

These results highlight the importance of looking at heterogeneous effects of tariff cuts across household businesses for interpretation of the observed tariff-induced increase in revenue and decrease in household business license use. For example, the licensing effects appear to be driven by initially small firms that are further contracting revenue in response to tariff cuts and might be moving toward the margin of closing down. Thus, declines in business license use are not indicative of an expanding informal sector. Instead, they are related to a reallocation of activity away from small household businesses (which are shrinking in response to tariff cuts) toward larger, probably more productive, household businesses. These licensing patters are consistent with cross-sectional correlations in our data, which show that initially larger businesses are more likely to hold a business license, or (conditionally on not holding one) obtain one in the future. These patterns also confirm the existing literature on formalization (De Mel, McKenzie, Woodruff (2013), Maloney (2004), Rogers and Swinnerton (2004), La Porta and Shleifer (2008)), which suggests that the initially more successful household businesses are more likely to transition toward formality (in our case this is measured by holding a business license).

Our evidence on expanding revenue and increased hiring of outside labor in industries with larger tariff cuts might be at first surprising given that Melitz style models would predict that these household businesses should contract. However, one has to be careful in interpreting our results. The identification of the effects of the BTA on household business performance is based on comparisons of performance of household business in industries that received larger tariff cuts to those in industries with lower tariff cuts. Thus, our results suggest that export market opportunities expand revenue and hiring of outside labor toward industries with bigger tariff within the informal sector. However, we cannot rule out that household business revenue and hiring of outside labor is declining in response to export opportunities relative to formal firms within the industry. One could examine this claim more directly for revenue and exit by using data that would simultaneously cover formal firms in the enterprise sector and household businesses, but this is a topic for future work.

However, our results combined with evidence from McCaig and Pavcnik (2014) provide insights on the issue of how export opportunities induce the reallocation of workers between household businesses and employers in the formal sector in low-wage countries. McCaig and Pavcnik (2014) relied on worker-level data and found that expanded export opportunities led to the reallocation of workers from household businesses to employers in the enterprise sector and that these effects were particularly pronounced for younger workers and for workers in provinces proximate to major seaports. While the evidence in the current paper suggests that household businesses in industries with larger tariff cuts are more likely to hire outside labor and increase revenue, the evidence from McCaig and Pavcnik (2014) suggest that new export opportunities increased employment opportunities in the formal sector proportionally more.

Overall, this evidence is in line with La Porta and Shleifer (2008) who show that the level of

informality in an economy generally declines with economic development through the growth

of existing formal firms and the decline of informal firms rather than formalization of firms in

the informal sector. [29]

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[29] McCaig and Pavcnik (2014) note that worker switching from working for a household business to working for an employer in the formal sector often coincides with a change in industry affiliation. In addition, entrants into the labor force are more likely to begin working for a formal employer, while those that exit the labor force are more likely to have previously worked for a household business. All these facts are inconsistent with the aggregate share of informal workers declining due to formalization of previously unregistered household businesses.

Bibliography

Almedia, R. and J. Poole. 2013. "Trade and labor reallocation with heterogeneous enforcement of labor regulations," IZA Discussion Paper No. 7358.

Banerjee, A. and E. Duflo (2007). "The Economic Lives of the Poor," *Journal of Economic Perspectives*, 21(1), 141-167.

Brambilla, I., G. Porto, and A. Tarozzi, 2012. "Adjusting to Trade Policy: Evidence from U.S. Antidumping Duties on Vietnamese Catfish," *The Review of Economics and Statistics*, Vol. 94, No. 1, pp. 304-319.

Brookings Trade Forum (2003). Eds. Dani Rodrik and Susan Collins, Brookings Institution Press.

Bustos, P. (2011). "Trade liberalization, exports, and technology upgrading: Evidence on the Impact of MERCOSUR on Argentinean Firms," *American Economic Review*, 101(1), 304-40.

Cling, Jean Pierre, Mireille Razafindrakoto, and François Roubaud. 2010. "The informal economy in Vietnam."

Cling, Jean-Pierre, Mireille Razafindrakoto, and François Roubaud. 2012. "To be or not to be registered? Explanatory factors behind formalizing non-farm household businesses in Vietnam," *Journal of the Asia Pacific Economy*, 17(4), 632-652.

Coşar, A. K., N. Guner, and J. Tybout (2010). "Firm dynamics, job turnover, and wage distributions in an open economy," NBER Working Paper Series No. 16326.

De Mel, Suresh, D. McKenzie, and C Woodruff (2013). "The Demand for, and Consequences of, Formalization among Informal Firms in Sri Lanka," *American Economic Journal: Applied Economics* 5(2): 122-150.

Goldberg, P. and N. Pavcnik (2003). "The Response of the Informal Sector to Trade Liberalization", *Journal of Development Economics,* 72, 463-496.

Goldberg, P. and N. Pavcnik (2004). "Trade, Inequality, and Poverty: What Do We Know? Evidence from Recent Trade Liberalization Episodes in Developing Countries," *Brookings Trade Forum*, 223-269.

Goldberg, P. and N. Pavcnik (2007). "Distributional Effects of Globalization in Developing Countries", *Journal of Economic Literature* March 2007, 45(1), pp. 39-82.

Hsieh, Chang-Tai and Peter J. Klenow (2009). "Misallocation and manufacturing TFP in China and India," *Quarterly Journal of Economics*, Vol. 124, No. 4, pp. 1403-1448.

Hsieh, Chang-Tai and Peter J. Klenow (2011). "The life cycle of plants in India and Mexico," mimeo.

Iacovone, L. and B. Smarzynska Javorcik (2008). "Shipping Good Tequila Out: Investment, Domestic Unit Values and Entry of Multi-product Plants into Export Markets" *University of Oxford, mimeo*

Kokko and Sjöholm. 2005. "The internationalization of Vietnamese small and medium-sized enterprises," *Asian Economic Papers*, 4(1).

La Porta, R. and A. Shleifer. 2008. "The unofficial economy and economic development," Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, Vol. 39, No. 2, pp. 275-363.

Levinsohn, J. 1999. "Employment responses to international liberalization in Chile," *Journal of International Economics*, Vol. 47, No. 2, pp. 321-344.

Lileeva, A. and D. Trefler. 2010. "Improved Access to Foreign Markets Raises Plant-Level Productivity... for Some Plants," *The Quarterly Journal of Economics*, Vol. 125, No. 3, pp. 1051-1099.

Lucas, Robert (1978). "On the Size Distribution of Business Firms," *The Bell Journal of Economics*, 9(2), pp. 508-523.

Malesky, Edmund and Markus Taussig. 2009. "Out of the gray: The impact of provincial institutions on business formalization in Vietnam," *Journal of East Asian Studies*, 9, 249-290.

Maloney, W. (2004). "Informality Revisited," *World Development* 32 (7), pp. 1159-78.

McCaig, Brian (2011). "Exporting out of poverty: Provincial poverty in Vietnam and U.S. market access." *Journal of International Economics*, 85(1), pp. 102-113.

McCaig, B. and N. Pavcnik (2014). "Export markets and labor allocation in a low-income country," NBER Working Paper No. 20455.

Melitz, M. (2003): "The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity," *Econometrica* 71, 1696-1725.

Melitz, M. J. and G. I. Ottaviano. (2008). "Market size, trade, and productivity," *The Review of Economic Studies*, 75(1), 295-316.

Melitz, M. and S. Redding (2013). "Heterogeneous Firms and Trade," NBER Working Paper 18652.

Menezes-Filho, N. and M. Muendler (2011). "Labor Reallocation in Response to Trade," *NBER Working Paper* 17372.

Nataraj, S. (2011). "The impact of trade liberalization on productivity: Evidence from India's formal and informal manufacturing sectors," *Journal of International Economics*, 85(2), 292-301.

Pages, Carmen. (2012). "What are the most important research questions on the economics of growth and labour market outcomes in low-income countries?" First GLM|LIC workshop: Setting the research agenda.

Paz, L. (2012). "The impacts of trade liberalization on informal labor markets: an evaluation of the Brazilian case," Syracuse mimeo.

Roberts, M. and J. Tybout (1996). *Industrial Evolution in Developing Countries: Micro Patterns of Turnover, Productivity, and Market Structure*. Oxford University Press.

Rogers, C. and K. Swinnerton (2004). "A Model of Informal Sector Labor Market," *U.S. Department of Labor mimeo*.

Schoar, A. (2010). "The Divide between Subsistence and Transformational Entrepreneurship." *Innovation Policy and the Economy*, Volume 10 (pp. 57-81). University of Chicago Press.

Taussig, M. and Hang, P. T. T. (2004). Private enterprise formality and the role of local government. *Asian Development Bank Discussion Paper* No. 2.

Verhoogen, E. (2008). "Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector," *Quarterly Journal of Economics*, vol. 123, no.2, pp. 489-530.

Vijverberg, Wim, Hoang, T. T. H., Nguyen, C.T., Nguyen, N.Q., Nguyen, T.Q., Phung, D.T., and Vu, T.K.M. 2006. "Non-farm household enterprises in Vietnam: A research project using data from VHLSS 2004, VHLSS 2002 and AHBS 2003," Research report. Hanoi: The World Bank.

Woodruff, C. (2007). "Self-employment: Engine of Growth or Self-help Safety Net?" *Employment and Shared Growth: Rethinking the Role of Labor Mobility for Development*. Washington, DC: The World Bank, 53-68.

Woodruff, Christopher. 2012. "The other half: What we do(n't) know about self-employment in LICs?" First GLM|LIC workshop: Setting the research agenda.

World Bank (2009). "Vietnam development report 2010: Modern institutions." Washington, D.C.: The World Bank.

World Bank (2010). "Dynamics of the informal sector in Hanoi and Ho Chi Minh City 2007-2009: Main findings of the Household Business & Informal Sector survey (HB&IS)," Washington, D.C.: The World Bank.

Data Appendix

In this appendix we describe in detail two data preparation steps. First we describe how we predict a manager for all businesses in the 2004 VHLSS. Unlike the 2002 VHLSS, respondents in 2004 were not asked to identify the most knowledgeable individual for the business (hereafter referred to as the manager for brevity). Knowing the manager of the business in 2004 has three advantages: (1) in the employment module the individual reports whether they were self-employed in an enterprise or self-employed in a household business and thus we can use information from the employment module to identify whether a business is a household business or a private enterprise; (2) in the employment module the individual also reports how long they have been doing the job and thus we can infer a possible year of start for the business; and (3) it provides additional information for the business which can be used to help create a panel at the business level. To test the accuracy of the manager prediction algorithm we also run it for the 2006 VHLSS which contains the same individual and business information that we use for the 2004 VHLSS. The algorithm correctly predicts the manager for 91.2% of businesses in the 2006 VHLSS.

Second we explain how we match businesses between the 2002 and 2004 VHLSSs. The surveys were not designed to directly create a panel of businesses however we use a combination of information on the manager and the industry of operation of the business to match them over time within a panel household. In total we match 6,131 businesses out of a maximum possible number of matches of 7,261.

Predicting the manager for businesses in the 2004 VHLSS

In this section we provide a detailed description of the data available in the employment modules and business modules of the 2004 VHLSS which can be used for matching individuals with businesses, the algorithm used for matching, a summary of how the matches were made, and the percentage of successful predictions from using the same algorithm on data from the 2006 VHLSS.

We combine data from the employment and business modules of the 2004 VHLSS which can be matched. In particular, from the employment module we identify individuals that reported being self-employed in a household business for either their primary or secondary job during the past year. For these jobs we use information on the industry, the number of months worked during the past years, the number of days per month usually worked, and the number of years the individual has been doing the job. From the business module we use information on the industry, the number of months operating during the past year, the average number of days per month operating, and the year the business started.[30]

In Table A1 we provide a summary of the matches by the step within the manager prediction algorithm at which the match was made. The table is organized sequentially such that the first step of the algorithm was to identify the manager for businesses in which only one household member reported being self-employed in the industry of the business and then only businesses without a predicted manager would proceed to the next row. The first step of the algorithm matches an individual as the manager for the business for 70.5% of all businesses in the 2004 VHLSS. The corresponding rate of success using the 2006 VHLSS is 99.3%. Thus, for a

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[30] The year the business started is only available for about 1/5th of the sample since this question was not asked of all businesses, but instead was part of an extra module on businesses that only 1/5th of households were asked.

large share of businesses we have a very high degree of confidence in our predicted manager.

Next, we identified a manager for any remaining businesses when there was only one

household member for whom the number of years in the job, the number of months worked in

the past year, and the number of days per month matched. And so on down the rows of the

table.[31] In sum, the algorithm correctly identified the manager for 92.4% of businesses in the

2006 VHLSS. Thus, our manager prediction algorithm is doing a very good job of identifying the

manager of the business.[32]

Matching businesses between the 2002 and 2004 VHLSSs

Not all businesses run by a panel household should be matched over time. For example,

any household that reports running a different number of businesses across the two years has

experienced net entry or exit of businesses and thus at least one business within the household

should not be matched. Thus, for any given the household the maximum number of matched

businesses is the minimum of the number of businesses run in either year. Table A2

summarizes the number of businesses run by panel households in 2002 and 2004. There are

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[31] Note that the percentage of successfully identified managers in the 2006 VHLSS for "Only household member with matching months and days per month" is likely an underestimate of the rate for the 2004 VHLSS. This is because only about 1/5th of businesses in the 2004 VHLSS have information on the year when the business started whereas all businesses in the 2006 VHLSS have this information. Thus some 2004 businesses for which the year was not reported, but the number of years, months, and days all matched would only be matched in the row "Only household member with matching months and days per month". Indeed, in the 2006 VHLSS 11.3% of businesses are matched in the step "Only household member with matching years, months, and days per month" as compared to only 1.8% in the 2004 VHLSS and 3.2% of 2006 VHLSS businesses were matched to a manager in the step "Only household member with matching months and days per month" as compared to 9.5% in the 2004 VHLSS.

[32] Our algorithm does not predict a manager for 595 out of 21,458 (2.8 percent) businesses. This could be due to the business being managed by an individual as their third job, which our algorithm currently does not include, or due to measurement error either in the industry of the business or the industry of the job.

22,415 panel households in our dataset. A little over half of the households did not operate a

business in 2002 or 2004. The number of businesses that can potentially be matched is 7261.[33]

The most valuable information that we have for matching businesses over time is the

manager and the industry of operation. We begin by matching businesses within a household

by industry-manager and find 3,821 matches. These represent businesses that have a unique

industry-manager combination within the household in both years and the combination existed

in both years (e.g., the same manager operated a business in the same industry in both years

and did not manage any other businesses in the same industry in either year). Note that this

will include instances in which a manager closed one business and opened a new business in

the same industry, but 97.2 percent or predicted managers in 2004 report doing the job for at

least 2 years, suggesting that most of these businesses are indeed continuing businesses.

Next, among the remaining businesses we relax the matching criteria to be (1) matched

just by manager, which allows for industry switching and (2) matched just by industry, which

allows for the manager within the household to change. Table A.3 summarizes the outcomes

from all three steps for matching businesses.

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[33] This is derived by summing over min(i,j)*a_{ij} where i represents the number of businesses run by the household in 2002, j is the number of businesses run by the household in 2004, and a_{ij} is the number of households operating i businesses in 2002 and j businesses in 2004.
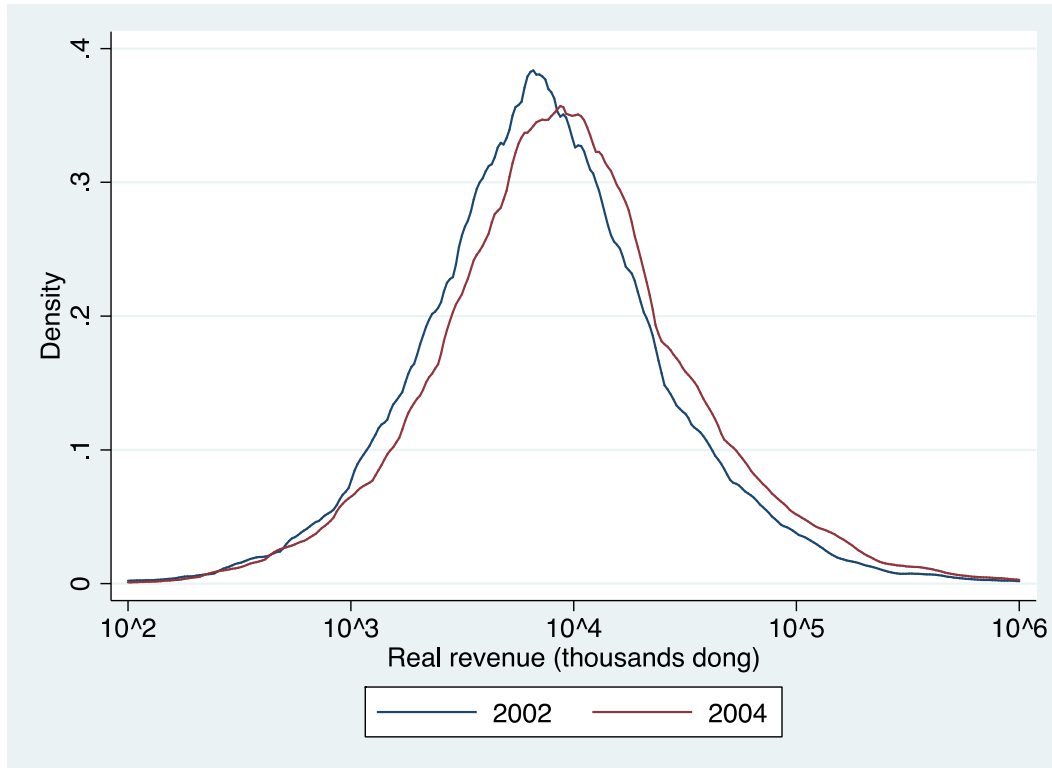
Figure 1 - Density of ln revenue for 2002 and 2004
Notes: All values are expressed in 2004 prices. The sample includes all businesses in the 2002 and 2004
cross sections.
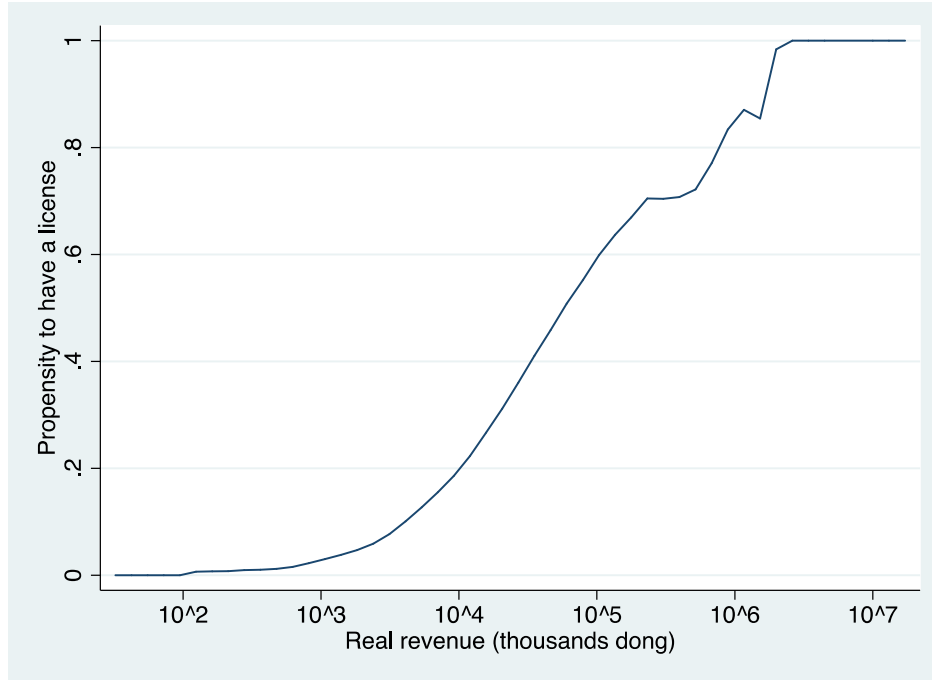
Figure 2 – Probability that a business holds a business license versus revenue
Notes: All values are expressed in 2004 prices. The sample includes all businesses in the 2002 cross
section.
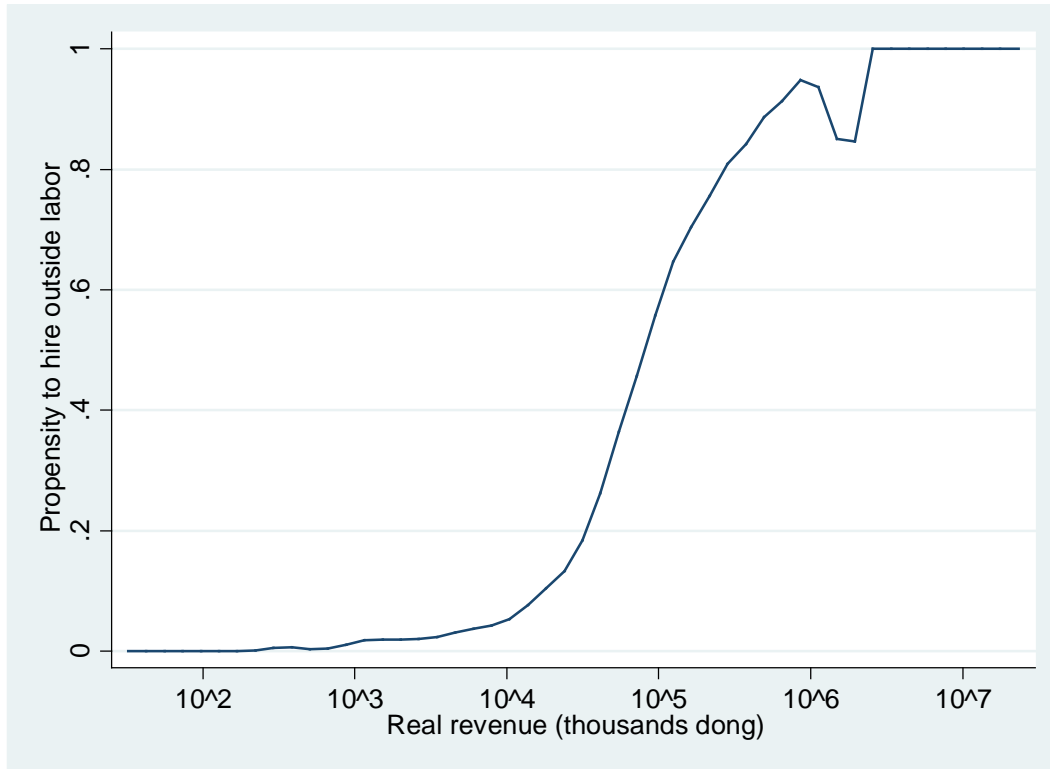
Figure 3 – Probability that a business hires outside labor versus revenue
Notes: All values are expressed in 2004 prices. The sample includes all businesses in the 2002 and 2004 cross sections which are pooled together.
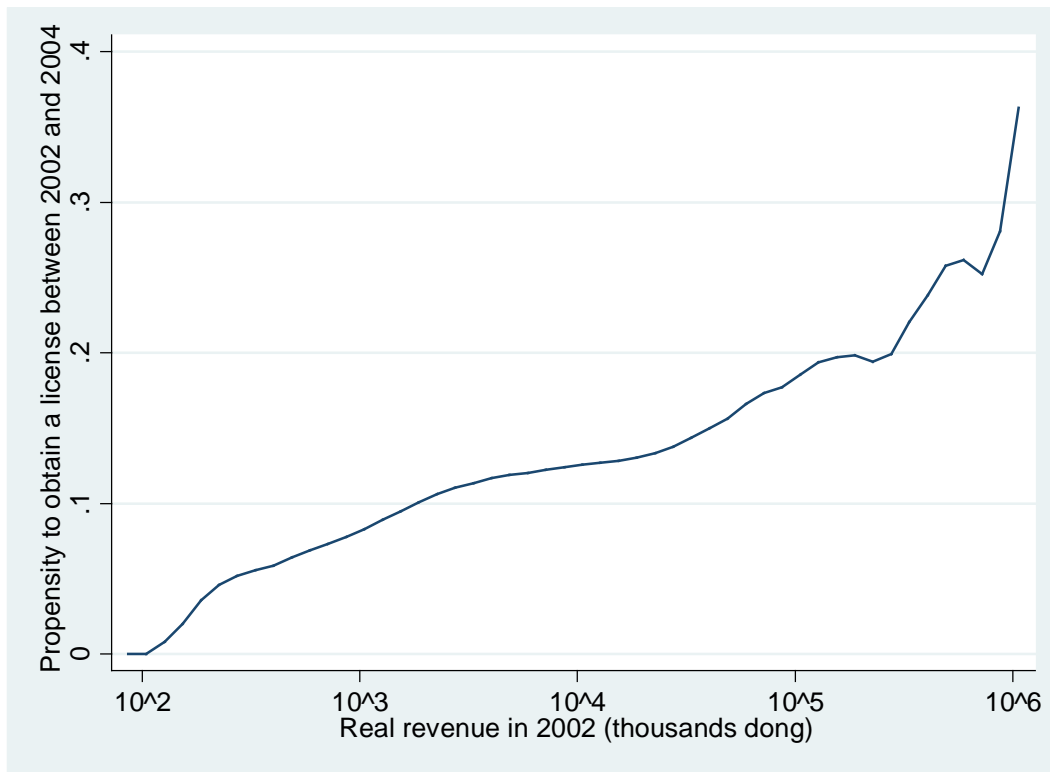
Figure 4 – Probability that a business obtains a license between 2002 and 2004 versus revenue in 2002
Notes: All values are expressed in 2004 prices. The sample includes all panel businesses that did not have a license in 2002.
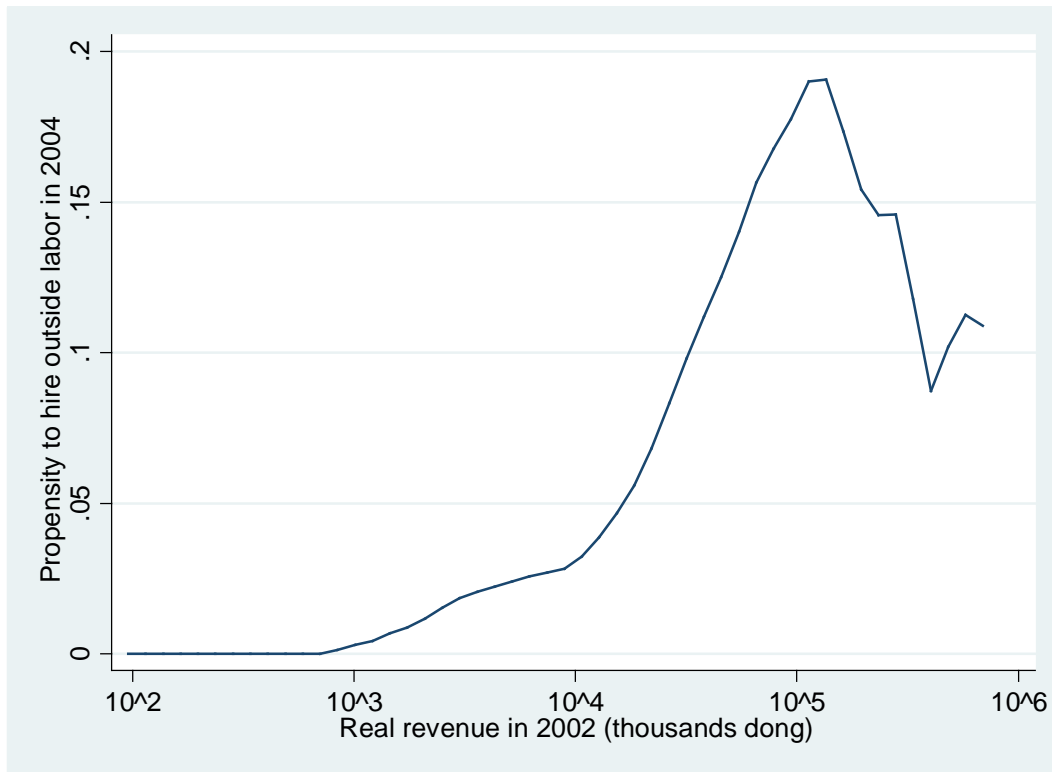
Figure 5 – Probability that a business hires outside labor in 2004 versus revenue in 2002 for businesses that did not hire labor in 2002

Notes: All values are expressed in 2004 prices. The sample includes all panel businesses that did not hire outside labor in 2002.
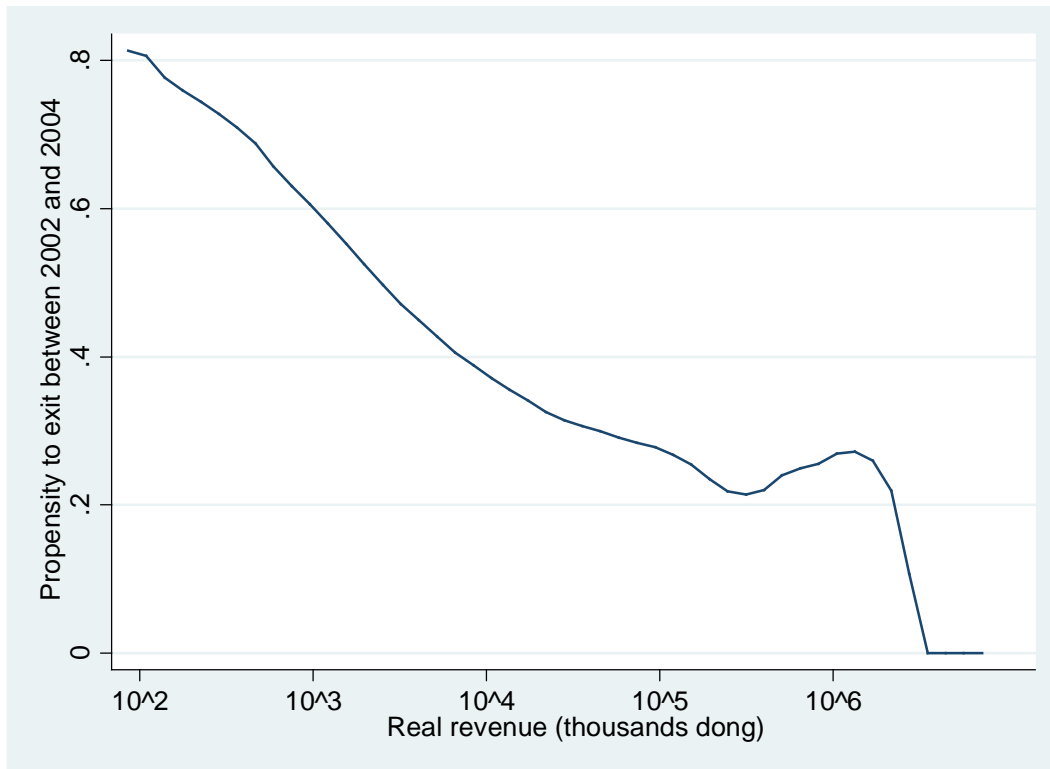
Figure 6 – Probability that a business exits between 2002 and 2004 versus revenue in 2002
Notes: All values are expressed in 2004 prices. The sample includes all businesses operated by panel households in 2002.
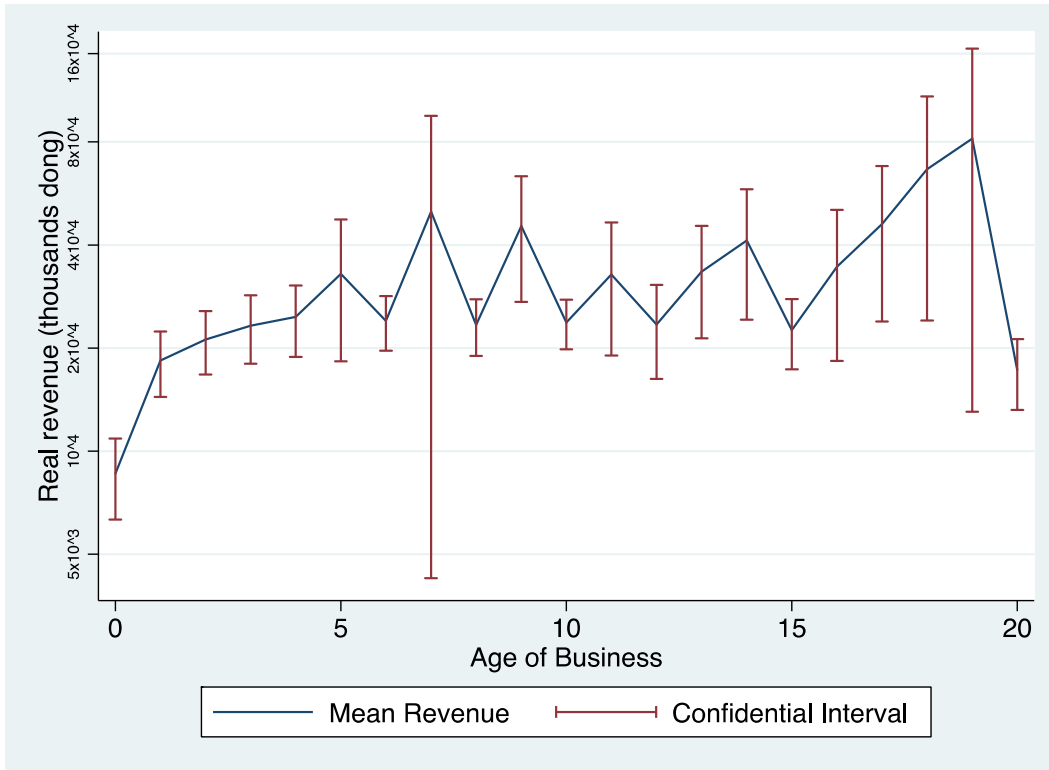
Figure 7 – Mean revenue in 2004 by age of business
Notes: All values are expressed in 2004 prices. The sample includes all 2004 businesses operated by households that were asked the extended business module of the 2004 VHLSS, which is approximately 1/5th of all households in the cross section.

Table 1: Summary statistics on household businesses

	2002	2004
Panel A: Summary of households operating businesses		
Number of households	74,350	45,928
Number of households operating businesses	27,824	17,293
1 business	21,674	13,684
2 businesses	5,376	3,120
3 businesses	671	422
4 businesses	103	67
Number of businesses	34,851	21,458

Panel B: Summary of business characteristics

	Mean	St. Dev.	Mean	St. Dev.
Indicator for primary industry	0.015	0.121	0.009	0.092
Indicator for secondary industry	0.280	0.449	0.284	0.451
Indicator for tertiary industry	0.699	0.459	0.707	0.455
Indicator for urban	0.334	0.471	0.334	0.472
Household size	4.751	1.761	4.682	1.717
By demographics:				
Females age 0-14	0.674	0.837	0.619	0.802
Males age 0-14	0.717	0.808	0.652	0.774
Females age 15-60	1.554	0.907	1.564	0.893
Males age 15-60	1.474	0.937	1.509	0.933
Females age 61 and older	0.196	0.405	0.202	0.409
Males age 61 and older	0.137	0.347	0.135	0.344
Business manager characteristics				
Female	0.571	0.495	0.583	0.493
Head of household	0.449	0.497	0.427	0.495
Age 15-24	0.083	0.276	0.072	0.259
Age 25-34	0.279	0.449	0.236	0.424
Age 35-44	0.345	0.475	0.354	0.478
Age 45-54	0.184	0.387	0.221	0.415
Age 55-64	0.069	0.253	0.073	0.261
Age 65 and older	0.038	0.192	0.040	0.195
Ethnic minority	0.070	0.256	0.078	0.268
Business characteristics				
Indicator for business license	0.195	0.396	0.216	0.412
Indicator for hiring outside labor	0.108	0.310	0.091	0.287
Revenue	18855	122903	30231	283587
Expenses	9755	81175	20008	277671
Share of expenses on labor	0.032	0.118	0.028	0.113
Number of workers			1.67	2.74
Number of paid workers			0.32	2.19
Age of business (years)			7.69	6.90

Note: Authors's calculations based on the VHLSSs. Information on number of workers, paid workers, and age of business is not available in the 2002 VHLSS.

Table 2: Summary statistics of key household business characteristics based on size in 2002

Variable	All businesses		Small businesses		Medium businesses		Large businesses	
	Mean	# obs	Mean	# obs	Mean	# obs	Mean	# obs
Revenue	18855	34851	2625	11769	8112	11592	46316	11490
Indicator for having a license	0.19	34742	0.06	11666	0.15	11592	0.37	11484
Indicator for hiring outside labour	0.11	33545	0.03	11008	0.06	11226	0.23	11311
Labor expenses	1102.3	33545	14.5	11008	108.1	11226	3147.7	11311
Labor expenses conditional on being positive	10231	3614	514	310	1751	693	13636	2611

Notes: Revenue and labor expenses are reported in 000s of dong in 2004 prices. Businesses are defined as small, medium, and large based on whether their revenue lies in the bottom, middle, or the upper third of the revenue distribution within their industry in 2002.

Table 3: Summary of exit, entry and survival

Year	Entry	Surviving	Exiting	Total
	Number of household businesses			
2002	n.a.	6130	4497	10627
2004	4384	6131	n.a.	10515
	Share of household businesses			
2002	n.a.	0.58	0.42	1.00
2004	0.42	0.58	n.a.	1.00

Table 4: Regression results from using all businesses in the repeated cross sections

	(1)	(2)	(3)
		Manufacturing	
	Traded industries	industries	All industries
Dependent variable: ln(revenue)			
Industry tariff	0.244	0.265	-0.0480
	(0.190)	(0.205)	(0.202)
Observations	18,029	14,451	55,114
R-squared	0.336	0.356	0.294
Dependent variable: indicator for hiring outside labor			
Industry tariff	-0.0122	-0.0133	-0.0537*
	(0.0218)	(0.0201)	(0.0312)
Observations	18,252	14,768	54,407
R-squared	0.193	0.215	0.121
Dependent variable: indicator for business license			
Industry tariff	0.0184	0.0238	0.0668***
	(0.0182)	(0.0165)	(0.0241)
Observations	18,502	14,905	55,604
R-squared	0.132	0.146	0.115

Notes: Robust standard errors in parentheses. Clustered by industry. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The industry tariff is based on the contemporary industry of the business as is the sample selection by industry. All regressions also include year fixed effects, industry fixed effects, province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table 5: Regression results from using panel businesses

Estimation method		(1) Traded industries	(2) Manufacturing industries	(3) All industries
		Dependent variable: ln(revenue)		
OLS	Industry tariff	-0.240*	-0.227*	-0.107
		(0.124)	(0.110)	(0.0844)
Fixed effects	Industry tariff	-0.281**	-0.300*	-0.0266
		(0.130)	(0.149)	(0.129)
		Dependent variable: indicator for hiring outside labor		
OLS	Industry tariff	-0.140***	-0.122**	-0.141***
		(0.0455)	(0.0449)	(0.0301)
Fixed effects	Industry tariff	-0.0957***	-0.0993***	-0.0998***
		(0.0294)	(0.0318)	(0.0226)
		Dependent variable: indicator for business license		
OLS	Industry tariff	0.0544	0.0597	0.0964***
		(0.0323)	(0.0395)	(0.0293)
Fixed effects	Industry tariff	0.0588	0.0682	0.131**
		(0.0439)	(0.0491)	(0.0516)

Notes: Robust standard errors in parentheses. Clustered by industry. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The industry tariff is based on the contemporary industry of the business as is the sample selection by industry. All regressions also include year fixed effects, industry fixed effects, province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table 6: Exit regression results for all businesses operated by panel households in 2002

	(1)	(2)	(3)
	Traded industries	Manufacturing industries	All industries
	Dependent variable: indicator for exit		
Change in	-0.00187	-0.183	-0.122**
industry tariff	(0.112)	(0.118)	(0.0551)
Observations	3,617	2,846	10,588
R-squared	0.070	0.088	0.054

Notes: Robust standard errors in parentheses. Clustered by industry. *** p<0.01, ** p<0.05, * p<0.1. The change in industry tariff is based on the 2002 industry of the business as is the sample selection by industry. All regressions also include province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table 7: Revenue heterogeneity regression results

Dependent variable is ln(revenue)

	(1)	(2)	(3)
		Manufacturing	
	Traded industries	industries	All industries
	Fixed effects; size base on initial revenue		
Industry tariff	0.395	0.418	0.0821
	(0.294)	(0.364)	(0.208)
Industry tariff * medium	-0.551	-0.631*	-0.0875
	(0.341)	(0.346)	(0.315)
Industry tariff * large	-0.952**	-1.015**	-0.241
	(0.353)	(0.382)	(0.308)
Observations	3,740	3,071	12,148
R-squared	0.893	0.895	0.876
	Fixed effects; size base on initial expenses		
Industry tariff	0.437	0.601	-0.00250
	(0.420)	(0.475)	(0.311)
Industry tariff * medium	-0.666	-0.897**	-0.0721
	(0.403)	(0.387)	(0.400)
Industry tariff * large	-1.103**	-1.324***	-0.170
	(0.422)	(0.416)	(0.446)
Observations	3,703	3,050	11,839
R-squared	0.890	0.893	0.870
	Fixed effects IV; size base on initial revenue		
Industry tariff	0.787**	0.833*	0.230
	(0.362)	(0.431)	(0.236)
Industry tariff * medium	-1.106**	-1.205**	-0.284
	(0.506)	(0.526)	(0.465)
Industry tariff * large	-1.437***	-1.539***	-0.450
	(0.362)	(0.400)	(0.293)
Observations	3,662	3,012	11,774
R-squared	0.166	0.155	0.186
	F-statistic of excluded instruments		
Endogenous regressor			
Industry tariff * medium	56.89	41.53	30.42
Industry tariff * large	183.0	137.7	72.71
2004*medium	234.0	1358	393.4
2004*large	107.4	231.7	39.49

Notes: Robust standard errors in parentheses. Clustered by industry. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
The industry tariff is based on the 2002 industry of the business as is the sample selection by industry.
All regressions also include year fixed effects, year effects interacted with household business size
indicator, industry fixed effects, province fixed effects, and controls for household business
characteristics. These include an indicator for whether a household business is in an urban area, gender,
age, and education of the manager, an indicator for whether a manager is an ethnic minority, household
size, and variables denoting gender and age composition of household members. The latter include
variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by
gender.

Table 8: Hiring outside labor heterogeneity regression results
Dependent variable is an indicator for hiring outside labor

	(1)	(2)	(3)
		Manufacturing	
	Traded industries	industries	All industries
Fixed effects; size based on initial revenue			
Industry tariff	-0.0291	-0.0511*	-0.0430
	(0.0406)	(0.0291)	(0.0412)
Industry tariff * medium	-0.124	-0.0909	-0.0637
	(0.101)	(0.102)	(0.0629)
Industry tariff * large	-0.0408	-0.0149	-0.0928*
	(0.0448)	(0.0395)	(0.0512)
Observations	3,769	3,107	12,042
R-squared	0.814	0.824	0.763
Fixed effects; size based on initial expenses			
Industry tariff	-0.0632	-0.0742	-0.0765
	(0.0791)	(0.0781)	(0.0706)
Industry tariff * medium	-0.0658	-0.0818	-0.0304
	(0.0933)	(0.0949)	(0.0722)
Industry tariff * large	-0.000197	0.0422	-0.0450
	(0.107)	(0.0926)	(0.0809)
Observations	3,750	3,096	11,887
R-squared	0.813	0.823	0.762
Fixed effects IV; size based on initial revenue			
Industry tariff	-0.0331	-0.0459	-0.0492
	(0.0874)	(0.0828)	(0.0744)
Industry tariff * medium	-0.135	-0.166	-0.0592
	(0.137)	(0.135)	(0.109)
Industry tariff * large	-0.000199	0.0542	-0.0785
	(0.0957)	(0.0792)	(0.0771)
Observations	3,708	3,056	11,822
R-squared	0.046	0.049	0.031
F-statistic of excluded instruments			
Endogenous regressor			
Industry tariff * medium	60.61	52.42	40.03
Industry tariff * large	177.8	130.8	72.43
2004*medium	235.4	1235	386.5
2004*large	156.9	247.9	47.07

Notes: Robust standard errors in parentheses. Clustered by industry *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The industry tariff is based on the 2002 industry of the business as is the sample selection by industry. All regressions also include year fixed effects, year effects interacted with household business size indicator, industry fixed effects, province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table 9: Business license heterogeneity regression results

Dependent variable is an indicator for having a business license

	(1)	(2) Manufacturing	(3)
	Traded industries	industries	All industries
Fixed effects; size based on initial revenue			
Industry tariff	0.1000*	0.0778	0.148***
	(0.0533)	(0.0528)	(0.0537)
Industry tariff * medium	0.00646	0.0539	-0.00762
	(0.0680)	(0.0700)	(0.0737)
Industry tariff * large	-0.0651	-0.0503	-0.0396
	(0.0604)	(0.0767)	(0.0704)
Observations	3,788	3,118	12,195
R-squared	0.792	0.803	0.762
Fixed effects; size based on initial expenses			
Industry tariff	0.103	0.141**	0.157***
	(0.0730)	(0.0648)	(0.0440)
Industry tariff * medium	-0.0541	-0.0854	-0.0526
	(0.0949)	(0.105)	(0.0870)
Industry tariff * large	-0.0187	-0.0833	-0.0322
	(0.107)	(0.103)	(0.0532)
Observations	3,750	3,096	11,885
R-squared	0.793	0.805	0.764
Fixed effects IV; size based on initial revenue			
Industry tariff	0.125*	0.159**	0.215***
	(0.0706)	(0.0688)	(0.0492)
Industry tariff * medium	-0.0963	-0.123	-0.138
	(0.135)	(0.151)	(0.130)
Industry tariff * large	-0.0134	-0.0826	-0.0819
	(0.0915)	(0.0898)	(0.0522)
Observations	3,708	3,056	11,818
R-squared	0.039	0.039	0.019
F-statistic of excluded instruments			
Endogenous regressor			
Industry tariff * medium	60.61	52.42	40.03
Industry tariff * large	177.8	130.8	72.44
2004*medium	235.4	1235	386.6
2004*large	156.9	247.9	46.73

Notes: Robust standard errors in parentheses. Clustered by industry *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
The industry tariff is based on the 2002 industry of the business as is the sample selection by industry.
All regressions also include year fixed effects, year effects interacted with household business size
indicator, industry fixed effects, province fixed effects and controls for household business
characteristics. These include an indicator for whether a household business is in an urban area, gender,
age, and education of the manager, an indicator for whether a manager is an ethnic minority, household
size, and variables denoting gender and age composition of household members. The latter include
variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by
gender.

Table 10a: Exit heterogeneity regression results

Dependent variable is an indicator for exiting between 2002 and 2004

	(1)	(2)	(3)
		Manufacturing	
	Traded industries	industries	All industries
Size based on initial revenue			
Change in industry tariff	0.120	0.0289	-0.138
	(0.124)	(0.160)	(0.101)
Change in industry tariff * medium	0.0161	0.0173	0.00482
	(0.0552)	(0.0503)	(0.0485)
Change in industry tariff * large	-0.107	-0.232	0.0357
	(0.146)	(0.145)	(0.132)
Observations	3,617	2,846	10,588
R-squared	0.120	0.140	0.089
Size based on initial expenses			
Change in industry tariff	0.0938	0.0213	-0.202**
	(0.109)	(0.141)	(0.0902)
Change in industry tariff * medium	-0.0617	-0.109	0.0715
	(0.0924)	(0.0640)	(0.0688)
Change in industry tariff * large	-0.00824	-0.115	0.189
	(0.125)	(0.114)	(0.120)
Observations	3,537	2,807	10,199
R-squared	0.115	0.141	0.076
IV; size based on initial revenue			
Change in industry tariff	0.127	0.00719	-0.191**
	(0.112)	(0.112)	(0.0869)
Change in industry tariff * medium	-0.0579	0.0360	0.0118
	(0.202)	(0.135)	(0.143)
Change in industry tariff * large	0.0137	-0.0595	0.193*
	(0.119)	(0.104)	(0.107)
Observations	3,537	2,807	10,199
R-squared	0.112	0.137	0.081
F-statistic of excluded instruments			
Endogenous regressor			
Industry tariff * medium	50.75	89.81	35.91
Industry tariff * large	276.4	350.8	194.6
2004*medium	321.5	1339	591.0
2004*large	47.10	281.2	28.53

Notes: Robust standard errors in parentheses. Clustered by industry *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The industry tariff is based on the 2002 industry of the business as is the sample selection by industry. All regressions also include year fixed effects, year effects interacted with household business size indicator, industry fixed effects, province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table 10b: Exit heterogeneity regression results

Dependent variable is an indicator for exiting between 2002 and 2004

	(1)	(2)	(3)
		Manufacturing	
	Traded industries	industries	All industries
Size based on initial revenue			
Change in industry tariff	0.284	0.215	-0.0519
	(0.174)	(0.195)	(0.151)
Change in industry tariff * medium	-0.237	-0.292*	-0.0879
	(0.155)	(0.161)	(0.147)
Change in industry tariff * large	-0.314	-0.553***	0.0585
	(0.229)	(0.171)	(0.219)
Observations	3,617	2,846	10,588
R-squared	0.105	0.123	0.078
Size based on initial expenses			
Change in industry tariff	0.183	0.182	-0.307
	(0.224)	(0.255)	(0.195)
Change in industry tariff * medium	-0.148	-0.291	0.191
	(0.187)	(0.188)	(0.176)
Change in industry tariff * large	-0.247	-0.513***	0.298
	(0.238)	(0.177)	(0.238)
Observations	3,537	2,807	10,199
R-squared	0.097	0.121	0.065
IV; size based on initial revenue			
Change in industry tariff	0.214	0.255	-0.241
	(0.344)	(0.365)	(0.272)
Change in industry tariff * medium	-0.135	-0.287	0.124
	(0.338)	(0.340)	(0.262)
Change in industry tariff * large	-0.188	-0.506**	0.289
	(0.280)	(0.225)	(0.271)
Observations	3,537	2,807	10,199
R-squared	0.101	0.122	0.072
F-statistic of excluded instruments			
Endogenous regressor			
Industry tariff * medium	227.8	323.0	137.8
Industry tariff * large	240.5	197.9	303.4
2004*medium	158.5	482.9	180.1
2004*large	120.6	568.5	63.62

Notes: Robust standard errors in parentheses. Clustered by industry *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The industry tariff is based on the 2002 industry of the business as is the sample selection by industry. All regressions also include year fixed effects, year effects interacted with household business size indicator, industry fixed effects, province fixed effects and controls for household business characteristics. These include an indicator for whether a household business is in an urban area, gender, age, and education of the manager, an indicator for whether a manager is an ethnic minority, household size, and variables denoting gender and age composition of household members. The latter include variables that indicate the number of family members ages 0-14, ages 15-60, and ages 61 and older by gender.

Table A1 - Summary of how the manager was predicted for 2004 businesses

How manager prediction was made	# of businesses in 2004	share of businesses in 2004	Share of correct predictions in 2006
Only household member matched by industry to the business	14701	0.705	0.993
Only household member with matching years, months, and days per month	384	0.018	0.918
Only household member matched by industry to the business	31	0.001	0.912
Only household member with matching months and days per month	1979	0.095	0.802
Only household member matched by industry to the business	44	0.002	0.833
Only household member with matching months	250	0.012	0.749
Only household member matched by industry to the business	4	0.000	0.667
Worked most years out of matched household members	1026	0.049	0.751
Worked most days out of matched household members	307	0.015	0.663
Worked most hours per day out of matched household members	556	0.027	0.685
Only head or spouse working in the business	175	0.008	0.852
Head working in the business	1108	0.053	0.691
Highest ranked child working in the business	278	0.013	0.710
Highest ranked individual working in the business	16	0.001	0.875
Highest ranked individual-job working in the business	4	0.000	0.000
Total	**20863**	**1.000**	**0.924**

Table A2 - Number of households by number of businesses run in 2002 and 2004

		Number of businesses operated by the household in 2004					
		0	**1**	**2**	**3**	**4**	**Total**
Number of businesses operated by the household in 2002	**0**	11801	1960	171	6	1	13939
	1	1934	3932	645	74	7	6592
	2	205	712	629	94	8	1648
	3	12	53	102	32	6	205
	4	1	12	10	6	2	31
	Total	13953	6669	1557	212	24	22415

Table A3 - Number of businesses by method of matching

	Number of businesses …	Share of businesses …
… that can potentially be matched	7261	1.000
… matched by industry and manager	3821	0.526
… only matched by industry	1272	0.175
… only matched by manager	1038	0.143
… unmatched by industry or manager	1130	0.156