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Social security and firm performance: The case of Vietnamese SMEs

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Abstract

The relationship between job quality and firm performance has been much debated with mixed evidence, and the evidence is particularly limited in the case of small and medium enterprises (SMEs) in emerging economies. This paper investigates how social security provision as a key determining factor of formality impacts on firm performance in Vietnam. Based on enterprise census data covering all registered firms across the 63 Provinces of Vietnam from 2006 to 2011, we find that, controlling for unobserved time-invariant firm-level characteristics, firms which increase the social security coverage by 10 per cent, experience a per worker revenue gain of between 1.1-2.6 per cent and a profit gain of around 1.3-3.0 per cent, with exact estimates depending on the survival time of the firm. However, there is time-inconsistency between costs (social security contributions) and benefits (firm performance) in that the benefits may not realize in the immediate term. Thus, specific policy measures such as subsidising social insurance contributions for small firms during an initial period until the business becomes viable could potentially encourage active participation in mandatory schemes. A series of robustness check are undertaken which show that the results hold in general.

1. Introduction

Since Vietnam began its transition from a centrally planned system to a socialist-oriented market-economy in 1986 it has witnessed average annual growth rates of more than 7 per cent. Poverty incidence also fell rapidly, for instance, by more than 40 percentage points between 1993 and 2006: the fastest reduction in poverty ever recorded, even surpassing that of neighbouring China. This transformation has meant that Vietnam, in the span of two decades, has upgraded its status from a least developed to a lower-middle-income country, and is today considered one of the most dynamic emerging economies in East Asia. Central to the on-going structural transformation process is the growth of the private sector which explains an

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increasing share of employment and output. During the first seven years of reform, around 10 million private sector jobs were created. In1993 to 1997, the number of registered private firms grew on average by 40 per cent per year. This private sector boom, which has occurred in spite of the general absence of market-supporting institutions, can be attributed almost solely to the entry of newly small and medium enterprises (SMEs), including an abundance of household firms. According to the Vietnam Chamber of Commerce and Industry (VCCI), SMEs account for more than 97 per cent of total enterprises in Vietnam, provide employment for more than 50 per cent of the workforce and contribute to around 50 per cent of GDP (Le, 2011).

Despite their economic importance, SMEs are often characterized by poor working conditions including limited social security coverage. Although this is particularly true for firms operating informally, non-compliance is widespread in formal firms which operate within the legal framework, – not least when it comes to social protection for workers.[2] In fact, in 2010, less than 50 per cent of all registered private enterprises contributed to the Vietnam Social Security Fund (VSS), despite of the government's strong commitment to promoting social protection as an engine of growth and development (MoLISA, 2010).[3] This situation raised concerns that VSS could run into deficit by 2021.[4]

The observed compliance gap may be attributed to a number of factors including lack of regulatory knowledge and weak enforcement mechanisms, which hinder the government from ensuring that the relevant laws are implemented. Moreover, the dynamic environment in which SMEs operate often means that they are tempted to adopt short-sighted strategies as the costs of longer-term investments, such as social security contributions, are perceived to outweigh any potential benefits. This tendency can be compounded by the difficulty in substantiating the magnitude of such possible benefits (in contrast with immediate and clear costs).

Against this backdrop, this paper examines the relation between social security provision and firm level performance among SMEs in Vietnam, based on enterprise survey data from 2006-2011 which covered all formally registered. Our results suggest that firms which increase the social security coverage (share of workers receiving social security) by 10 per cent will see the average revenue per worker increase by between 1.4-2.0 per cent and the average profit per worker by up to 0.2 per cent. Thus, there is evidence which points to firm level gains associated

[2] In addition to firm non-compliance, temporary workers with contracts of less than three months are excluded from social security regulation.
[3] See Bonnet et al. (2012) for an overview and assessment of Vietnam's social protection strategy.
[4] See for instance http://news.xinhuanet.com/english/world/2013-08/23/c_132655032.htm (accessed 29-09-2015).

with the provision of social security. One plausible channel through which this relationship emerges is the enhanced motivation of the work force. Yet there is time-inconsistency between costs (social security contributions) and benefits (firm performance) in that the benefits may not realize in the immediate term. As such inconsistency cannot be easily resolved at an individual firm level, well-targeted policy interventions are critical.

The rest of the paper is structured as follows. Section 2 provides an overview of the scant literature and recent policy developments in Vietnam. Section 3 presents the data and related descriptive statistics and then Section 4 outlines our estimation methods. The main results with a range of robustness checks are provided in Section 5. Section 6 concludes with a summary of key findings and their policy implications.

2. Theory, evidence and policy developments

According to the standard economic theory, policy "shocks" such as new social security laws can create tensions between employers and employees which may lead employers to minimize costs in relation to employment.[5] These policy changes are typically assumed to impact only labour demand but their possible impacts on productivity (hence, labour supply) are not considered. Thus, firms may not perceive the improvements of working conditions as a worthwhile investment. This may be particularly true for SMEs, which generally operate in an environment characterized by high entry and exit rates, and are often faced by more serious internal constraints compared with larger firms. Moreover, in emerging economies in particular, the implementation of working conditions may not necessarily be regulated by law, and even if they are, monitoring of compliance tends to be relatively weak. Therefore, in the presence of positive supply-side impacts, these factors may in turn lead to a suboptimal working environment, which could hinder the performance of firms.

There is indeed a large body of studies on the relationship between working conditions and firm performance (see Coucher et al. 2014 for an overview). For instance, according to the *resource-based view,* superior financial performance may be a result of management treating its employees as valuable assets (Barney, 1991). This view emphasizes the development, use and protection of existing competencies, thus pointing to the potential gains associated with protecting the workforce. Similarly, the *dynamic capabilities* concept highlights the ability of SME firms to "integrate, build and reconfigure internal and external competencies to address

[5] See Kaufman (2004) for a comprehensive historical account of the evolution of the industrial (employment) relations field dating back to the neoclassical theory.

the rapidly changing environments" (Teece et al., 1997). Moreover, within human resource theory, a fair amount of work exists on *bundles of human resource management practices* (HRM bundles). HRM bundles have been shown to positively impact firm performance through the creation of synergies that are substantially greater than those of individual best practices (see for instance Boselie et al., 2005; Ferris et al., 2004; MacDuffie, 1995). Whilst the specific compositions of the bundles may vary, the literature identifies three broad categories of bundles; (i) empowerment-enhancing; (ii) motivation-enhancing; and (iii) skill-enhancing.[6] Motivation-enhancing practices such as the provision of health care and other employee benefits, performance linked pay, incentive plans have been found to affect business outcomes through higher effort levels as employees are adequately rewarded for their performance (Stajkovic & Luthans, 2003).[7] Social security provision thus belongs to the "motivation-enhancing bundle" and may play an important role in terms of improved firm performance. Evidence in this regard has however been limited mostly to industrialized countries (see Subramony, 2009; Coucher et al. 2014).

In light of this, Vietnam provides an interesting case for studying multiple and dynamic impacts of working conditions. The improvement of social protection systems including mandatory social insurance has been the focus of government policies, as specified in the first Social Insurance Law (2007). This law applies to workers on written contracts with three months or more and mandates employers to pay social security contributions to the Vietnam Social Security Fund (VSS).[8] Workers are in turn entitled to sick leave, maternity allowance, pension, mortality allowance and compensation for work related accidents and occupational diseases.[9] Similarly, the Health Insurance Law which came into effect in 2009 mandates coverage of workers on written contracts with three months or more, with the aim of achieving universal health insurance by 2014. However, the coverage of both compulsory social and health insurance remains relatively low: around 30 million people for the latter, and around 9.4 million

[6] Based on a meta-analysis of 65 empirical studies linking HRM bundles to firm performance, Subramony (2009) provides a detailed description of the concept of HRM bundles.

[7] Relatedly, based on the notion of employment as *social exchange* (Blau, 1964) the availability of various inducements, such as pay, benefits, and internal mobility, can lead employees to perceive their organization as valuing their contributions (Allen et al., 2003; Rhoades & Eisenberger, 2002). This may in turn induce a positive attitude among employees (Wayne et al., 2002), subsequently improving firm performance in terms of productivity, and sales (Schneider et al., 2005). Along the same lines, *social equity* theory argues that increased productivity depends not just on individual efforts, but also on effective interaction among workers and between management and workers (Buchele and Christiansen, 1999).

[8] All firms (foreign and domestic) registered under the Enterprise Law (2005) including individual business households are mandated to participate in the compulsory social insurance scheme. Thus, there is no size threshold below which firms are exempt.

[9] In addition to the compulsory component, the Social Insurance Law also encompasses provisions for voluntary social insurance targeted at informal sector workers (since 2008) and unemployment insurance (since 2009).

for the former (out of a population of close to 90 million) (Bonnet el al., 2012; VASS, 2011).[10] Moreover, when contributions *are* paid they generally do not correspond to the rates specified by Law[11]. For instance, Thanh and Castel (2009) found that the average social insurance contribution rate was around 7.6 per cent of the current wages, compared with the legal rate of 23 per cent. This mismatch may be due to various factors including: i) underreporting wages; ii) paying social insurance based on the minimum wages rather than the actual (base) wages; not registering all the employees with the VSS. Interestingly, it was argued that workers actually colluded with employers to evade social insurance contributions, with the aim of receiving a higher net wage (rather than paying into social/health insurance funds). Moreover, insufficient awareness among firms and workers as well as low incentives and complicated regulations are often cited as major reasons for low compliance (Giang, 2010; VASS, 2011).[12]

Overall, existing work on the social security scheme in Vietnam is generally descriptive, and looks mostly at the challenges of the systems, including limited coverage, low level of benefits and longer-term financial sustainability issues. Evidence on the implications of social security for firm level outcomes is generally lacking.

3. Data

Our data originate from the Vietnam Enterprise Survey (VES) which has been undertaken annually since 2000 by the General Statistics Office (GSO). In terms of coverage, it is comprehensive, including all firms with more than 30 employees and a sample of smaller firms operating under the Vietnamese enterprise law (2000) across the 63 Provinces.[13] However, it should be noted that, by the very nature of the survey, it excludes a substantial number of small

[10] In 2008 compulsory social insurance covered 18 per cent of the labour force compared with 10 per cent in 2001 and 14.8 per cent in 2006 (ILO/MoLISA, 2010). Thus, coverage seems to have increased with the introduction of the Social Insurance Law.

[11] From 2007 to 2009, the official social insurance contribution rates were 15 per cent and 5 per cent per cent of the current wage for employers and employees respectively and 2 per cent 1 per cent per cent for health insurance. From 2010 to 2011, the corresponding figures were 16 per cent and 6 per cent for social insurance and 3 per cent and 1.5 per cent per cent for health insurance. Moreover, the employer is mandated to pay 4 per cent of the wage to sickness, maternity and family planning leave and 1 per cent per cent to work injury and professional disease.

[12] Nevertheless, compared to other countries in the region including Malaysia, Singapore and Thailand, Vietnam's social expenditure ratio is quite high reflecting also the continuous dominance of state-owned enterprises in the economy (ADB, 2013).

[13] With the merging of the provinces of Ha Tay and Hanoi in mid-2008, Vietnam currently consists of 63 provinces. Yet since this analysis also covers years prior to the merge the analysis is based on 64 provinces. Household firms are registered at the district level and as such do not enter the census. According to Decree no. 88/2006/ND-CP of 29 August 2006 on business registration, when a firm has more than 10 employees and/or uses more than one business premise, it may no longer operate as a household firm and should be registered as a company under the Enterprise Law (2005).

and medium firms (SMEs) in the informal sector.[14] This is not particularly a matter of concern, as these informal firms are not within the scope of compulsory (formal) social insurance provision. It is also decided that only manufacturing and construction sectors are selected for meaningful analysis with clear policy implications. These firms taken together account for more than 40 per cent of total non-agricultural employment in Vietnam (GSO, 2012).[15] In terms of the time frame, we have chosen data from 2006-2011, since 2006 was the first year that the VES included a question on the number of workers for which the firm provided social security contributions.

Data samples and key variables

Our primary indicator for measuring social security investment is the share of workers receiving social security within a given firm in accordance with the relevant provisions of the Social Insurance Law 2007 as described earlier (henceforth, *social security coverage*). This indicator can be seen as one way of measuring the degree of formalization within (officially registered) firms. Existing evidence on Vietnamese household firms has shown that when firms join the formal sector they earn higher profits and employ more permanent workers (Rand and Torm, 2012). In a sense, our study examines benefits of formalization within formal firms.

As for firm performance - our target variable, we use variables on total revenues and profits per worker. However, given the high entry and exit rates among SMEs, we also look at firms' survival rates, which will be explained below. Throughout the analysis, we control for standard firm characteristics that affect both social security provision and firm performance. Since we are working with panel data we are able to take account of unobserved firm specific features which may bias the results.[16]

The original sample, including agriculture and service sector firms, contains 1,372,105 firm observations during the period 2006 to 2011. After retaining only manufacturing and construction sectors and dropping observations with missing and/or inconsistent information

[14] We use the World Bank definition of SMEs: Micro-enterprises have between 1 and 10 employees, small-scale enterprises between 11 and 50 employees and medium-scale enterprises between 51 and 300 employees. The Vietnamese Government (see Government Decree no. 90/2001/CP-ND on "Support for Development of Small and Medium Enterprises") broadly accepts these definitions. In order to capture firm dynamics we do not exclude firms that are categorized as large (with 300 employees or more) in any one year.

[15] We categorise firms by industrial sector according to the Vietnam standard industrial classification 2007 based on ISIC revision 4 (GSO, 2007).

[16] It should be noted that this study does not aim to examine the direct impact of the Social Insurance Law, since the dataset on which the analysis is based does not provide information on whether firms purposely comply with the law (or not) or are merely providing social security regardless of the law.

on key variables as well as removing outliers (see Appendix A for data cleaning procedure) the number of observations for analysis is reduced (Table 1A: Sample I). As discussed, we follow firms over time and exclude new entries in each round, and as a result, the number of firms decreases over time as also indicated in Table 1. The year-on-year survival rate is relatively stable around the average of 81 per cent, although dropping slightly between 2008 and 2009 presumably as a result of the global financial crisis.[17] The fact that the year-on-year exit rate is between 15-20 per cent is an indication of the highly dynamic environment in which these firms operate.

[TABLE 1 ABOUT HERE]

For the purpose of analysis, we retain only firms with data on the *lagged* number of workers receiving social security (or lagged social security coverage). Since this variable was only introduced in 2006, the time-period considered for the remaining part of the paper is 2007-2011, and the final sample is presented in Table 1B. With such refinement, the total number of observations is reduced significantly, with some notable changes to survival rates for the period of 2008 and 2009 (see Table 1B: Sample II). This sample will be used in our dynamic analysis of the relationship between social security coverage and firm's survival. However, it is not suitable for analyzing our second set of target variables (*i.e.* revenues and profits per worker), as some firms may fail to survive. Thus, further refinement is needed to create a balanced panel which includes only those firms that survive throughout the periods (Table 1C: Sample III).

Descriptive statistics

Table 2 provides summary statistics of all the variables used in the analysis based on firms that have survived in all four periods: 2007-2011 (Table 1C: Sample III).[18] First, the (lagged) share of workers which is the main variable of interest was 52 per cent on average and rising over time. The share is substantially higher than the 18 per cent as reported for national estimate of mandatory social insurance compliance in 2008 (ILO/MoLISA, 2010). Yet the latter includes informal sector workers which are not included in the current analysis.

[17] Note that firms which are not observed in 2009, for instance, may have dropped out between the end of 2009 and mid-2010 when the 2009 survey was carried out. If less productive firms exited the sample to a larger degree following the crisis this may introduce attrition bias in our results. T-tests of the differences between survival and exit firms where the former survived in the 2009 sample show that survival and exit firms do *not* differ significantly along the profit dimension (results available upon request). Thus, attrition bias does not seem to constitute a serious concern in our analysis.

[18] Descriptive statistics for the other samples reveal no major differences in the variable distributions. Results are available upon request.

Turning to the outcome variables, real net revenue per worker is 17,825 USD per annum and shows an increasing trend over time with the exception of the year 2009 following the financial crisis.[19] Second, real gross profit per worker is on average 338 USD per year, but with significant volatility. It suffered a large drop at the end of 2008 when the financial crisis hit Vietnam but recovered soon before witnessing another serious reduction in 2011.[20]

[TABLE 2 ABOUT HERE]

In all the specifications we introduce the following control variables: (i) firm size; (ii) legal status; (iii) firm age; (iv) location; (v) sector; (vi) female share; (vii) average wage; and (viii) previous performance; and (ix) capital-labour ratio.

Firm size: Rauch (1991) extends Lucas' model (1978) of the firm size distribution with heterogeneous workers to show that when larger firms face higher unit input costs the most talented entrepreneurs tend to operate larger firms to exploit their productive advantage in turn generating higher profits. Higher input costs may include, for instance, social security or other nonwage costs.[21] We therefore include the log of the number of regular fulltime employees to ensure that any association between social security contribution and firm performance is not driven by firm size. Moreover, firm size may to some extent capture any ability bias arising if, in accordance with Rauch (1991), the more skilled entrepreneurs are also the ones setting up larger firms. Table 4 shows that the average size of the firms in our sample is 221 full time employees, and this has remained fairly constant over time, with a substantial rise in 2011, which also explains the lower profit margin in that year. In terms of firm size categories, micro (less than 10 employees) and large (more than 300 employees) make up the smallest shares at around 15 per cent each. Small firms (between 10 and 50 employees) constitute around 34 per cent and finally medium firms (between 50 and 300 employees) make up the largest share with around 36 per cent. The shares are relatively constant over time.

Legal categories: We include five legal categories to account for performance differences across different ownership structures. Social security compliance has also been shown to vary

[19] We intentionally avoid using gross value added (GVAPW) as our productivity measure since the social security contribution, in theory, is linked to the wage level (which is part of GVAPW).
[20] The fact that profits picked up already in 2009 although revenue did not could be related to the crisis induced tremendous fall in raw material prices. By contrast, the large drop in the last period is presumably related to the recent increase in raw material prices.
[21] A closer look at the data reveals that the social security share varies substantially by firm size category, with around 28 per cent for micro firms; 47 per cent for small firms; 56 per cent for medium firms and 67 per cent for large firms (results available upon request).

considerably with legal status: domestic private firms, limited liability companies and collectives generally have a substantially lower rate of participation compared with both joint stock and foreign firms (VASS, 2011). Overall, firms which are involved in foreign trade have greater exposure to global initiatives such as corporate social responsibility (CSR) and thus are more likely to comply with related regulations.[22] Table 3 shows that limited liability companies constitute the largest category with around 49 per cent, followed by private firms (13 per cent), joint stock companies (16 per cent), foreign companies (20 per cent), and finally collectives/partnerships (CPs) (2 per cent). The ratios are stable over time.

Age of the firm: The age of the firm has been found to be important in terms of both performance (Tybout, 2000) and social security participation (VASS, 2011). In terms of the latter, newly established firms may be less aware of the regulatory framework or deliberately delay paying social insurance contributions in order to cut down operating costs during start-up. The average firm age is 8 years.

Location: In order to account for the fact that Vietnamese provinces are relatively autonomous, and have implemented centrally planned initiatives with different pace and enthusiasm (Nguyen et al., 2007) – as aspect which is also well documented in the Provincial Competitiveness Index (PCI) (Malesky, 2012), we include 63 province indicators. This also seeks to capture any price differences across regions. Table 3 shows that 90 per cent of firms are located in rural areas.[23]

Sector: In order to account for productive differentials across industries we include sector dummies. Moreover, in Vietnam participation in the social security scheme has been found to be particularly low in the construction sector due to the high proportion of temporary workers (VASS, 2011). The summary statistics show that medium value added manufacturing accounts for about 36 per cent of firms, whilst 25 per cent of operate in construction, low value added represents 24 per cent and high value added 15 per cent.[24] These shares are stable over time, yet within each grouping there is some variation and thus in the empirical analysis we include the full set of 21 sector dummies in all the specifications.

[22] Zhu et al. (2008) also find that ownership structure is an important determinant of human resource practices more generally.
[23] We note that the results remain qualitatively similar if district level indicator variables are introduced instead of province variables.
[24] Low value added sectors includes food and beverages, tobacco, textiles and apparel, leather and wood and paper. Medium value added sectors include publishing and printing, refined petroleum, chemical products and pharmaceuticals, rubber, non-metallic mineral products, basic metals, fabricated metal products, electronic machinery, computers, radio, tv, motor vehicles. High value added sectors includes other transport equipment, furniture, jewellery, music equipment, watches, toys and medical equipment.

Share of female employment: We include the share of female workers in order to account for gender-attributed productivity differentials, which are common particularly in developing countries (Jones, 2001; Hellerstein and Neumark, 1995). Whilst some studies find that the gender wage gap is related to variations in labour market experience across gender (Altonji and Blank, 1999; Blau and Kahn, 2006), others point to gender differences in attitudes towards competition.[25] Yet another interpretation is that the wage gap reflects discrimination against women in the labour market.[26] Moreover, the provision of social security may vary across gender since female owners have been shown to be more generous in the provision of non-wage benefits (Rand and Tarp, 2011). The summary statistics reveal that the proportion of women is 37 per cent and rather stable over time.

Average wages: The average real wage is introduced since social security contributions are linked to the wage level. Given that there is a ceiling on the salary used for calculating contributions this could cause firms to alter the composition of their workforce.[27] Table 2 shows that the average (per worker) real wage is 1,291 USD per year and rising over time. The inclusion of wages should also account for any correlation between the average educational level in the firm (which we do not observe directly) and productivity (see Lucas, 1988). In other words, the average wage acts as a proxy for the general quality of the workforce. In order to reduce multicollinearity caused by the linkage of the wage to both social security provision and firm performance, we use the district average (per worker) wage grouped by industrial sector and firm size category.

Capital-labour ratio: We include the capital-labour ratio since this is a standard determinant of productivity. The capital-labour ratio averages 10,144 USD per year and as with profits, it dropped in 2008 and subsequently picked up again in 2009.

4. Estimation methods: A dynamic approach

[25] For instance, Dohmen and Falk (2010) and Niederle and Vesterlund (2007) find that women generally avoid variable pay schemes (that tend to raise productivity).
[26] Hellerstein et al. (1999) find that the US gender wage gap is not attributed entirely to productivity differences. In the case of Vietnam Liu (2004) finds that the observed gender wage gap during the 1990s was attributable in large part to workplace discrimination against women.
[27] The "maximum contribution salary" is fixed at twenty times the minimum wage beyond which no contribution will be made.

In order to understand the relationship between social security coverage and firm performance, we apply a dynamic approach, starting from the premise that survival time of the firm may be important in analysing and understanding the relation between social security and firm outcomes. In fact, considering the highly dynamic environment in which SMEs operate, survival may be the first and foremost objective of a small firm rather than for instance profit maximisation. Thus, in the context of weak regulatory enforcement, a newly established firm may be tempted to evade extra labour costs such as social security contributions since any potential benefits are unlikely to be reaped in the short-run. In order to observe such potential patterns, this paper makes use of panel data tracking firms over time as described in the previous section. Given the possibility that social security provision may affect firm's survival, it is important to estimate it empirically before proceeding to analyse the balanced panel which retains only firms that survive throughout the period under consideration. Therefore, we first examine the extent to which social security and other key variables are associated with the survival of the firm, by estimating the following equation:

$$\text{(i)} P\left(Survival_{t,\,t+j} \mid x_{t-1}\right)$$

where *j*=1,2,3 and 4 refers to survival over 1,2,3 and 4 consecutive years having been observed in a previous period. In addition to the main variable of interest - the share of workers receiving social insurance out of the total number of workers - the set x_{t-1} contains variables that affect survival including firm size, legal status, location, sector, workforce characteristics and previous performance.

Second, we then narrow down to the survived firms only and examine the relation between social security provision and labour productivity (defined as net revenue per worker) and profits by estimating the equation:

$$\text{(ii)} \ln Y_{jt} = \alpha + X_{jt-1}\gamma + S_{jt-1}\delta + \varepsilon_{jt} \mid Survival_{t,\,t+j}$$

where the log of (real) net revenue/gross profit per worker at firm *j* ($\ln Y_{jt}$) at time *t* depends on: a vector of firm-level covariates ($X_{jt-1}\gamma$) which affect either firm performance or the provision of social security (or both); the share of the workforce covered by social security contributions ($S_{jt-1}\delta$); and a firm level error component ε_{jt}. All conditional on firm survival in periods *t +j* where *j*=1,2,3,4. In other words, we estimate the equation (ii) using subsequent samples that contain firms, which given existence in the first period, have survived over 1 wave, 2 waves, 3 waves, and 4 waves. Thus, we see how the coefficient associated with ($S_{jt-1}\delta$)

changes with respect to (real) net revenue per worker and (real) gross profit per worker when comparing across samples that survive over subsequently longer time periods. In order to allow for a time lag, we use the lagged value of our variable of interest (workforce share receiving social security at the end of previous survey year), as well as the lagged values of the explanatory variables as outlined in the previous section: firm size, female share, average wages and past performance.[28] In addition to pooled OLS estimation, we also control for fixed effects in order to address the bias that may arise from the presence of unobserved firm heterogeneity such as owner ability, which may influence both performance and social security provision. Moreover, as with any analysis of repeated observations over time, there is the possibility of autocorrelation, which could lead to biased results. In order to address this, the standard errors are throughout the analysis clustered at the firm level, thereby allowing for intragroup (within firm) correlation over time. Finally, year dummies are included in all specifications. [29]

5. Results

Impacts on firms' survival

First, using the sample II (Table 1B),[30] we estimate the probability of firms' survival across four consecutive periods given their existence in all previous years. We use a Probit model where survival takes the value 1 if the firm survives in the subsequent year and 0 otherwise (the firm exits). For simplicity, Table 3 presents the results for firms that survive during the whole period from 2007-2011. Apart from our main variable of interest (social security coverage), it includes a range of control variables as discussed above (e.g., firm size, legal status, location, sector).

[TABLE 3 ABOUT HERE]

[28] Since performance expectations may affect both current performance and whether a firm decides to contribute to social security, we include a variable for previous performance (measured by lagged revenue and profits respectively) in all the specifications.

[29] Appendix Table A shows that older, larger firms with a higher share of female workers, located in rural southern areas and with higher (lagged) average wages are more likely to contribute towards social security. Social protection is also associated with better performing firms, limited liability companies, joint stock and foreign firms (compared with private firms). Moreover, all manufacturing sectors are more likely to contribute to social security compared with the construction industry. This is as expected and in line with VASS (2011).

[30] The slight inconsistency in the number of firm observations between Table 1B (7,542) and the specifications in Table 3 (7,138) is due to multicollinearity in the probit model (dropping of observations).

In the first specification with a limited number of control variables, we first note that the social security coverage is positively correlated with firm survival. In terms of the remaining variables, as expected, firm size is highly correlated with survival in line with Hansen et al. (2009), and supported by the increase in firm size over time in Table 2. Second, in general, private firms are more likely to survive compared with other ownership types, especially CPs and foreign firms, which in the case of the latter may be related to the more competitive environment in which foreign companies operate. Third, also in accordance with Hansen et al. (2009), firms located in rural areas generally have a higher chance of survival due to: (i) competition being more fierce in urban areas; (ii) substantial barriers to entry in rural areas where local governments are generally more protective of existing firms.[31]

Control variables are extended in the second and third specifications. The second specification introduces firm age and the share of female workers, but none of them are significant. Yet, from the sign on the coefficient we see that firms with a higher female share are generally more likely to exit, suggesting that there might be some unobserved gender driven ability difference between surviving and exit firms.[32] The coefficient for social security coverage remains largely unchanged and significant. The third specification adds average wages (our proxy for the general quality of the workforce) and past performance as measured by lagged real net revenue per worker. Both of these have a positive sign as expected, yet only the latter is significantly associated with survival. Most importantly, we note that, once performance and workforce quality is accounted for, the social security coverage is no longer a determinant of survival.

Overall, it is reassuring to observe that social security costs do not seem to be driving firms out of business.[33] Thus, we proceed with the analysis of the relation between social security and firm performance and focus exclusively on those firms that survived in 2007 and the subsequent years.

Impacts on revenues and profits

Now we turn to the balanced panel (Sample III in Table 1C) to examine how the social security coverage impacts firm performance. As discussed, we estimate the equation (ii), with the two

[31] Splitting the samples into firm size categories (micro, small, medium and large) reveals that *larger* rural firms are particularly more likely to survive. For the other size categories, variables are in accordance with the overall sample and location is not well determined in a consistent manner.
[32] Since firms either exit or survive, we are unable to account for such unobserved firm fixed effects over time.
[33] The lagged capital-labour ratio is not well determined and therefore not included.

outcome variables: the log of (real) net revenue per worker and real gross profit per worker. The social security coverage is lagged by one year in order to address the possibility of reverse causality (e.g. better performing firms are simply the ones providing more social security). A set of control variables are included as specified in Section 4.

For each of the outcome variables, we consider three specifications: (1) OLS with the initial set of controls (firm size, legal status indicators, firm age, female share, location and sector indicators and year dummies); (2) OLS with the extended set of controls, which in addition to the above include the average wage and past performance[34]; (3) fixed effect (FE) specification where firm age and location are omitted.[35] Throughout the specifications, the standard errors are clustered at the firm level.

The results are provided in Table 4, focussing on the coefficients for the social security coverage (the full results are provided in Appendix Table A2). As regards the impacts on revenue, it is clear from Table 4A that the coefficient for the social security share is positive and highly significant throughout in all the specifications. The magnitude is much smaller in the FE specifications, which is expected since unobserved firm-specific heterogeneity such as owner ability is accounted for in this specification. The results of the FE specification suggests that firms which increase the social security coverage by 10 per cent would experience a revenue gain of between 1.4-2.0 per cent depending on the duration of survival. It is also interesting to note that, in two types of OLS specifications, the revenue gain associated with the social security coverage tends to increase along with the duration of survival, although it is not the case in the FE specification.

[TABLE 4 ABOUT HERE]

Estimation results on control variables are largely as expected (see Table A2). Firm size is significantly negative throughout, indicating the existence of diminishing marginal returns as firms grow larger (recall that revenue is measured per worker). In general, private firms have lower revenue than other firm types (with the exception of PCs), although in the FE specifications the results are less well determined. The female share is negative in the OLS yet positive in the fixed effect specification, pointing to the importance of accounting for

[34] The capital/labour ratio was insignificant and its inclusion did not alter the results, thus we decided to leave it out of the specifications.
[35] Since sector and legal status both have slight variation over time these variables are kept in the fixed effect specifications.

unobserved time-invariant firm specific factors. Moreover, our measure of the average workforce quality (average wage by location, sector and firm size) is positive and highly significant in all periods, but, in the FE specification, the magnitude falls. Finally, past performance, as measured by revenue growth, is well determined and positive, as expected. [36]

Generally, the findings indicate that paying social security contribution is beneficial in terms of firm revenue. However, since this does not take account of the cost of expanding the social security coverage, we turn now to consider how social security provision relates to gross profits. The specifications and control sets are identical to those for revenue, with the exception that we include lagged profit growth as our measure of past performance. Table 4B presents the results along with three specifications. Again, the coefficients for social security share are highly significant in the OLS regressions, but reveal a more mixed picture in the FE specifications with the magnitude of the profit gains generally increase with the duration of survival.[37] The results of the FE specification shows that profit gains range from 0.9-1.7 per cent if firms increase the social security coverage (the number of workers receiving social security) by 10 per cent.

The results for control variables are also similar to what we have seen for revenues (see Appendix Table A2). As in the case of revenues, firm size is significantly negative in terms of profit per worker and lagged profit growth is highly positive. Moreover, in line with the literature (Section 2), older firms are more profitable and joint stock companies and foreign-owned firms display a positive profit outcome compared with private firms. The average wage - our proxy for the workforce quality - is highly positive as expected. Similarly, the female share displays negative coefficients in the OLS specifications, yet is generally not well determined in the fixed effect regressions indicating that gender differences along the profit dimension do not exist once unobserved firm specific factors are accounted for.

Overall, there is a clear positive link between social security provision and firm revenue, whilst the profit returns take somewhat longer to materialize, as would be expected given that social security is an added cost to the firm. Given that the positive performance relation is not attributed to firm specific factors, a plausible channel is through enhanced workforce motivation in accordance with HRM bundles and social equity theory. In other words, firms that contribute to social security may be able to attract more motivated employees/raise the motivation of existing workers. Although our average wage measure to some degree captures

[36] Location, sector and year dummies are as expected, yet for space reasons these results are not presented.
[37] Refer to Appendix Table A2 for the complete set of results. Location, sector and year dummies are as expected, yet for space reasons these results are not presented.

the general quality of the workforce, we are unable to exclude the possibility that firms providing social security also experience an upgrade in the skill level, which in turn has an impact on performance.[38] Moreover, "socially minded" firms may benefit from cooperation with larger and more global companies who value strong commitment to CSR and/or require adherence with labour regulations. Since the dataset does not allow for observing the composition of firms' supplier/customer networks we are unable to investigate this further.

Moreover, Table 4 shows that the social security coefficients generally increase with survival (from period 1 to period 4). In order to facilitate the comparison of the elasticity of social security with respect to firm performance over time, Figure 1A plots the social security coefficients for revenue and profit from columns (3) across all the samples.

[FIGURE 1 ABOUT HERE]

The figure clearly shows how the social security "effect" (elasticity) generally rises with the duration of survival, for both revenue and profit. As expected, the profit effect is lower in magnitude. The slight dip in elasticity between periods 2 (firms surviving from 2007-2009) and 3 (firms surviving from 2007-2010) may be attributed to the rise in social security contribution rates between 2009 and 2010 from 17 to 19 per cent in terms of employers contributions and 6 to 8 per cent for employee contributions. For firms that have survived after 2011 (period 4) profit gains exceed revenue gains, in line with lower real wages as shown in Table 3 (recall that social security contributions are linked to the basic wage level).[39]

Robustness checks

In order to check the robustness of the results we split the samples by different firm size categories. Figures 1B, IC, and ID show the results by micro, small and medium groupings. As for micro sized firms (Figure ID) making up only around 15% of the sample, they initially experience negative profits as a result of mandated social security payments due to the more uncertain environment in which they operate (compared with small and medium firm). With time as they adjust to higher labour costs, they may employ a larger share of casual workers

[38] For instance, the data does not allow for capturing in-house training which could also impact on firm performance.
[39] This is further confirmed by a falling wage share (of revenue) in the last period (results available upon request).

implying a lower share of workers covered by social security contributions[40] and thus a more stable (unaffected) social security elasticity with respect to both revenue and profits. Some micro firms may also not be aware that they fall under the Social Insurance Law. For small sized firms (Figure IC), which constitute around 34% of the sample, the results are more in line with the overall results (not surprisingly given their larger share), although the social security elasticity with respect to profits drops for firms that survive all four periods (2007-2011). This is possibly due to the time lag before firms adjust to the higher social security costs from 2010 onwards. Turning to medium sized firms (Figure IB) representing 36% of the sample, they are likely to be most aware of the legal framework and employ a relatively larger share of workers on a more permanent basis. As such, they experience a substantial drop in profits as contribution rates are enforced and subsequently rise in 2010. As such, the overall drop in profits (Figure 1) between survival periods 2 and 3 is attributed to the performance of medium firms.

In terms of location, one could imagine the results to be more robust among southern-based firms given that firms in Ho Chi Minh City (HCMC) are described as having a higher rate of adoption of modern human resource management (Zhu et al., 2008). As shown in Figure 2 splitting the sample by north-south location of firms reveal a similar trend along the revenue dimension. Regarding profits however Figure 6 reveals that Southern-based firms experience a drop (in line with the results for all firms) as social security contributions increase between 2009 and 2010, whereas Northern firms do not seem to be affected (quite the opposite). However, both Southern and Northern firms that survive during all periods see rising profits as their operations adjust to the higher labour costs.

[FIGURE 2 ABOUT HERE]

Given that the vast majority of firms in our sample are located in rural areas (90 per cent for firms that have survived from 2007 to 2011, as seen in Table 1C), it is not surprising that the results are generally more robust for rural firms, both in terms of revenue and profits (results available upon request).

6. Conclusion

[40] As indicated earlier, detailed summary statistics reveal that the social security share varies substantially by firm size category, with around 10 per cent for micro firms; 19 per cent for small firms; 32 per cent for medium firms and 58 per cent for large firms. Results available upon request.

This study has examined the relationship between social security provision and firm level performance among Vietnamese SMEs. As part of the ongoing transition to becoming a modern economy, the Vietnamese Government has shown a strong commitment to social protection of the workforce as evidenced by the launching of several social programmes and regulations during the past decade. These include the introduction of the social insurance law in 2007, and the subsequent health insurance law in 2008. Compared with other countries in the region, Vietnam's social protection programmes are fairly comprehensive, yet firm level compliance with mandatory social and health insurance remains relative low. This is related to a lack of regulatory awareness on behalf of firms and workers, as well as intentional evasion in order to cut costs, particularly among SMEs operating in a highly dynamic environment. However, evidence from OECD countries suggests that there may be benefits to reap from increased social security coverage. Yet in the context of emerging economies in general, the relation between social security (and working conditions more broadly defined) and firm performance is an area that remains largely unexplored, due to limited access to micro level data that includes information on both working conditions and economic outcomes.

Based on Vietnamese firm level data covering all registered non-state manufacturing sector firms from 2006 to 2011, this study uses a dynamic approach in an attempt to add further insight into this issue, taking account of the various methodological challenges with this kind of exercise. Controlling for relevant firm level characteristics that are associated with either social security provision or firm performance (or both) we find that firms which increase their social protection coverage to 10 per cent of the workforce experience a net revenue per worker gain of between 1.4 to 2.0 per cent (compared to firms which do not provide social security). Moreover, the magnitude of the "effect" increases with survival time of the firm. Since revenue does not take into account the cost implications of social security we also examine the (gross) profit return and find this to be between 0 and 0.2 per cent from a 10 per cent rise in social security coverage, again rising with firm survival time. Thus, it seems that not only workers but also firms stand to gain from increased social protection provision. In line with human resource related theory, the potential channels through which this occurs include a more motivated workforce eliciting higher effort levels. Moreover, improved performance could be a result of access to larger customers who view adherence to labour related regulation as imperative. The results hold when splitting the samples by location, and the findings are particularly robust for small and medium sized firm, compared with micro firms, which operate in a more uncertain environment characterised by more informal employment relations. Thus, in a sense the performance improvement brought on by enhanced working conditions happens through an increased formalization of the workforce, within formal companies.

In sum, the results point to the importance of exposing firms to the potential benefits associated with social security provision, whilst recognising that such benefits may not materialize in the immediate term. Thus, in the case of SMEs, which often operate according to a short-term perspective, specific measures that seek to facilitate their participation in social insurance schemes, such as subsidised initial contribution, could potentially encourage participation of those firms/workers already eligible. Moreover, a more progressive system could serve to incentivise informal firms to become formally registered. This in turn would broaden coverage and help towards ensuring future sustainability of the social protection system. Finally, improved labour inspections systems would also help ensure enhanced regulatory compliance.

References

ADB (2013). *The Social Protection Index. Assessing Results for Asia and the Pacific*. ADB: Manila.

Allen, D. G., Shore, L. M., & Griffeth, R. W. (2003). The role of perceived organizational support and supportive human resource practices in the turnover process. Journal of Management, 29(1), 99–118.

Altonji, J. G. and Blank, R. M. (1999). "Race and Gender in the Labor Market." In Ashenfelter O. and Card D., eds., *Handbook of Labor Economics*, Volume 3, pp. 3143–3259. Amsterdam: Elsevier.

Barney, J.B. (1991). "Firm resources and sustained competitive advantage," *Journal of Management*, 17: 99-120.

Blau, F. D. & Lawrence K. M. (2006), "The U.S. Gender Pay Gap in the 1990s: Slowing Convergence." *Industrial and Labor Relations Review*, Vol. 60, No. 1, pp. 45–66.

Blau, P. M. (1964). *Exchange and power in social life*. New York: John Wiley.

Buchele, R. and Christensen, J. (1999). "Labor relations and productivity growth in advanced capitalist economies," *Review of Radical Political Economies*, 31(1): 87–110.

Bonnet, F., Cichon, M., Galian C., Mazelkaite, G., and Schmitt, V. (2012). "Analysis of the Viet Nam National Social Protection Strategy (2011-2020) in the context of Social Protection Floor objectives: A rapid assessment". Extension of Social Security Paper N° 32. ILO: Geneva.

Boselie, P., Dietz, G., & Boone, C. (2005). "Commonalities and contradictions in HRM and performance research". *Human Resource Management Journal*, 15 (3): 67–94.

Coucher, R., Stumbitz, B., Quinlan M., and Vickers, I. (2014). *Can Better Working Conditions Improve the Performance of SMEs? An international literature review.* Geneva:ILO

Dohmen, T. and Falk A. (2010). "Performance Pay and Multi-Dimensional Sorting: Productivity, Preferences and Gender." *American Economic Review,* 101(2): 556-90.

Ferris, G. R., Hall, A. T., Royle, M. T., & Martocchio, J. J. (2004). "Theoretical development in the field of human resource management: Issues and challenges". *Organizational Analysis*, 12: 231–254.

Kaufman, B. (2004). *The global evolution of industrial relations: Events, ideas and the IIRA*. ILO: Geneva.

Giang, T. L. (2010), "Social Protection in Vietnam: Current State and Challenges", in Asher, M. G., S. Oum and F. Parulian (eds.), *Social Protection in East Asia – Current State and Challenges*. ERIA Research Project Report 2009-9, Jakarta: ERIA. pp. 292-315.

GSO (General Statistics Office) (2012). Report on the 2011 Labour Force Survey. Hanoi.

GSO (2007). List of Viet Nam standard industrial classification 2007. Available online: http://www.hsx.vn/hsx_en/Uploaded/2013/02/05/VSIC%202007.pdf
Hansen et al. (2009). "Enterprise Growth and Survival in Vietnam: Does Government Support Matter?" *Journal of Development Studies*, 45 (7):1048–1069.

Hellerstein, J.K., Neumark, D., (1999). Sex, wages, and productivity: an empirical analysis of firm-level data. *International Economic Review*. 40 (1): 95–124.

Hellerstein, J.K., Neumark, D., Troske, K.R., 1999. Wages, productivity, and worker characteristics: evidence from plant-level production functions and wage equations. Journal of Labor Economics 17(3): 409–446.

ILO/MoLISA (2010). *Labour and Social Trends in Vietnam 2009/2010*. Hanio: ILO

Jones, P. (2001). "Are Educated Workers Really More Productive?" *Journal of Development Economics* 64, pp. 57–79.

Le, T. (2011, January 14). Vietnam Association of Small and Medium Enterprises: Confidential Support of Businesses. http://www.vccinews.com/news_detail.asp?news_id=22471 (accessed 1/11/ 2013).

Liu AYC. (2004). "Changes in the gender wage gap in Vietnam". *Journal of Comparative Economics* 32(3): 586–596.

Lucas Robert E. (1988). "On the Mechanics of Economic Development". *Journal of Monetary Economics,* 22: 3–39.

MacDuffie, J. (1995). "Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry". *Industrial and Labor Relations Review*, 48:197–221.

Malesky, E. (2012). *The Vietnam provincial competitiveness index: Measuring economic governance for business development*. Ha Noi, Vietnam: Vietnam Chamber of Commerce and Industry (VCCI) and United States Agency for International Development's Vietnam Competitiveness Inititative (VNCI).

Ministry of Labour, Invalids and Social Affairs (MOLISA). 2010. *Social Protection Strategy, 2011–2020* (Hanoi).

Nguyen, B. T., Albrecht, J., Vroman, S., & Westbrook, M. D. (2007). "A quantile regression decomposition of urban–rural inequality in Vietnam". *Journal of Development Economics*, 83(2): 466–490.

Niederle, M. and Vesterlund, L. (2007). "Do Women Shy Away From Competition?" *Quarterly Journal of Economics*, Vol. 122, No. 3: 1067–1101.

Rand, J. and Torm, N. (2012). The Benefits of Formalization: Evidence from Vietnamese SMEs *World Development*, 40 (5).

Rand J. and Tarp F. (2011). Does gender influence fringe benefits provision? Evidence from Vietnamese SMEs. *Feminist Economics* 17(1): 59–87.

Rauch, James E. 1991. "Modeling the Informal Sector Formally," *Journal of Development Economics,* 35, pp. 33–47.

Rhoades, L., & Eisenberger, R. (2002). "Perceived organizational support: A review of the literature". *Journal of Applied Psychology*, 87(4), 698–714.

Schneider, B., Ehrhart, M., Mayer, D., Saltz, J., & Niles-Jolly, K. (2005). "Understanding organization- customer links in service settings". *Academy of Management Journal*, 48(6): 1017–1032.

Stajkovic, A. D., & Luthans, F. (2003). "Behavioral management and task performance in organizations: Conceptual background, meta-analysis, and test of alternative models". *Personnel Psychology*, 56, 155–194.

Subramony, M. (2009). "A Meta-Analytic investigation of the relationship between HRM bundles and firm performance," *Human Resource Management*, 48(5): 745-68.

Teece. D.J., Pisano, G. and Shuen, A. (1997). "Dynamic capabilities and strategic management," *Strategic Management Journal,* 18(7): 509–533.

Thanh and Castel (2009). *Compulsory Social Security Participation, Revealed preferences*. Poverty assessment, Social Protection Chapter. Vietnamese Academy of Social Sciences: Hanoi.

Tybout, J. R. (2000). "Manufacturing firms in developing countries: How well do they do, and why?". *Journal of Economic Literature*, 38(1). 11–44.

VASS, (2011). Employment and Social Protection in Vietnam. ILO. Hanoi.

Wayne, S. J., Shore, L. M., Bommer, W. H., & Tetrick, L. E. (2002). "The role of fair treatment and rewards in perceptions of organizational support and leader-member exchange". *Journal of Applied Psychology*, 87(3): 590–598.

Zhu Y, Collins N, Webber M, Benson J. (2008). "New forms of ownership and human resource practices in Vietnam". *Human Resource Management* 47(1): 157–175.

Appendix

Cleaning procedure

In order to arrive at the final samples used in the analysis we drop observations according to the following criteria:

1. Firms that have missing or incorrect location (Province) information.
2. Duplication of firm IDs.
3. Firm that are owned/managed by the local government or is linked to the public sector.
4. Firms belonging to the primary or tertiary sector or which have operated in these sectors previously i.e. we include only firms that during the whole time period are categorised as manufacturing or business service firms (including construction).
5. Firms where data are inconsistent from basic accounting principles i.e. where the figures for wages, net revenue of sales and services, total assets, fixed assets and investment and profit are recorded as below 0/equal to 0/missing. Moreover, we only include firms with complete financial data along *all* the dimensions of wages, net revenue of sales and services, total assets, fixed assets and investment and profit.
6. Firms where the figures for employment/employees receiving social security are recorded as below 0/equal to 0/missing.
7. Firms that in all waves have missing information on establishment year (In the 2006 and 2011 rounds there is no information on establishment year, thus establishment year is imputed based on information in other survey years).
8. Finally, outliers are removed using the profit variable. The trimming is done by dividing the sample into sub-sets by location (64 provinces), industrial sectors (7) and size categories (4) and eliminating observations that fall below the 1st percentile or above the 99th percentile.
9. Firms with large inconsistencies in size (total employment) between beginning-year (1. January) and (lag) end-year (31. December) are dropped, as are firms that have missing information on the (lag) number of workers receiving social security. Moreover, firms must report year of establishment and have complete information on (lag) revenue, employment, female share, average wage and revenue growth.

Appendix tables

[TABLE A1 HERE]

[TABLE A2 HERE]

Tables and figures

Table 1. Sample selection and firm's survival

(A) Sample I: All manufacturing and construction sectors							
Periods	2006	2007	2008	2009	2010	2011	Total
1	39,113	30,413					69,526
2	30,413	30,413	24,561				85,387
3	24,561	24,561	24,561	19,259			92,942
4	19,259	19,259	19,259	19,259	16,434		93,470
5	16,434	16,434	16,434	16,434	16,434	13,953	96,123
Survival rate	-	78%	81%	78%	85%	85%	81%

(B) Sample II: Firms with social security information						
Periods	2007	2008	2009	2010	2011	Total
1	17,370	12,341	-	-	-	29,711
2	12,341	12,341	9,122			33,804
3	9,122	9,122	9,122	7,542		34,908
4	7,542	6,300	6,300	6,300	6,300	36,468
Survival rate	-	71%	74%	83%	84%	

(C)Sample III: Balanced panel (firms which survive throughout the periods)						
Periods	2007	2008	2009	2010	2011	Total
1	12,341	12,341				24,682
2	9,122	9,122	9,122			27,366
3	7,542	7,542	7,542	7,542		30,168
4	6,300	6,300	6,300	6,300	6,300	31,500

Note: Figures are based on the cleaning steps as outlined in Appendix A

Table 2: Summary Statistics

	All		2007		2008		2009		2010		2011	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
Social security coverage (lagged)	0,52	(0,34)	0,42	(0,359)	0,47	(0,36)	0,51	(0,34)	0,51	(0,34)	0,56	(0,33)
Revenue (real USD)	17.825	(40.415)	17.328	(32.539)	18.188	(31.369)	16.497	(29.799)	18.297	(36.859)	19.024	(65.680)
Profits (real USD)	338	(1815,61)	337	(1.632)	236	(1.540)	361	(2.068)	390	(1.965)	274	(1.565)
Firm size	221	(803)	207	(943)	208	(1.061)	201	(994)	208	(1.137)	224	(899)
Size categories (pct. shares)												
Micro	0,15	(0,36)	0,20	(0,40)	0,19	(0,39)	0,20	(0,40)	0,20	(0,40)	0,16	(0,37)
Small	0,34	(0,47)	0,33	(0,47)	0,34	(0,47)	0,34	(0,47)	0,33	(0,47)	0,34	(0,48)
Medium	0,36	(0,48)	0,33	(0,47)	0,33	(0,47)	0,33	(0,47)	0,32	(0,47)	0,35	(0,48)
Large	0,15	(0,36)	0,14	(0,35)	0,14	(0,34)	0,14	(0,34)	0,14	(0,35)	0,15	(0,36)
Legal status (pct. shares):												
Private company	0,13	(0,34)	0,15	(0,36)	0,15	(0,36)	0,15	(0,36)	0,15	(0,36)	0,13	(0,33)
Collective/Partnership (CP)	0,02	(0,16)	0,03	(0,17)	0,03	(0,17)	0,03	(0,17)	0,03	(0,17)	0,03	(0,16)
Limited liability	0,49	(0,50)	0,49	(0,50)	0,49	(0,50)	0,49	(0,50)	0,49	(0,50)	0,48	(0,50)
Joint Stock	0,16	(0,36)	0,14	(0,35)	0,15	(0,36)	0,15	(0,36)	0,16	(0,36)	0,16	(0,37)
Foreign	0,20	(0,40)	0,18	(0,38)	0,18	(0,38)	0,18	(0,38)	0,18	(0,38)	0,20	(0,40)
Firm age	8	(6)	6	(5)	7	(5)	8	(5)	9	(5)	10	(5)
Location (pct. shares):												
Urban	0,10	(0,31)	0,11	(0,31)	0,11	(0,31)	0,11	(0,31)	0,11	(0,31)	0,10	(0,31)
Rural	0,90	(0,31)	0,89	(0,31)	0,89	(0,31)	0,89	(0,31)	0,89	(0,31)	0,90	(0,31)
North	0,29	(0,45)	0,29	(0,46)	0,29	(0,46)	0,29	(0,46)	0,29	(0,46)	0,29	(0,45)
South	0,71	(0,45)	0,71	(0,46)	0,71	(0,46)	0,71	(0,46)	0,71	(0,46)	0,71	(0,45)
Sectors (pct. shares):												
Manufacturing - low VA	0,24	(0,43)	0,23	(0,42)	0,23	(0,42)	0,23	(0,42)	0,23	(0,42)	0,24	(0,43)
Manufacturing - medium VA	0,36	(0,48)	0,35	(0,48)	0,34	(0,48)	0,34	(0,47)	0,34	(0,47)	0,35	(0,48)
Manufacturing - high VA	0,15	(0,36)	0,14	(0,35)	0,14	(0,35)	0,14	(0,35)	0,14	(0,35)	0,16	(0,36)
Construction	0,25	(0,44)	0,28	(0,45)	0,28	(0,45)	0,28	(0,45)	0,28	(0,45)	0,25	(0,44)
Females (pct. share)	0,37	(0,25)	0,36	(0,25)	0,35	(0,25)	0,36	(0,24)	0,36	(0,24)	0,38	(0,24)
Average wage	1.291	(945)	1.157	(850)	1.183	(879)	1.253	(728)	1.382	(1.116)	1.407	(1.117)
Capital-labour ratio	10.144	(42.737)	9.533	(14.648)	9.476	(14.853)	10.453	(16.139)	11.031	(22.135)	11.100	(90.395)
Observations	31,500		6300		6300		6300		6300		6300	

Notes: SD = Standard Deviation; Real financial variables deflated with national GDP deflator (base year 2005) and converted into constant 2005 USD.

Table 3: Determinants of firm survival

	(1)	(2)	(3)
Social security	0.143*	0.147*	0.105
	(0.074)	(0.075)	(0.076)
Firm size (logged)	0.242***	0.243***	0.247***
	(0.020)	(0.021)	(0.021)
Collective/Partnership	-0.251**	-0.255**	-0.183
	(0.126)	(0.127)	(0.131)
Limited liability	0.110*	0.110*	0.091
	(0.064)	(0.064)	(0.065)
Joint Stock	0.027	0.024	-0.015
	(0.088)	(0.088)	(0.090)
Foreign	-0.043	-0.032	-0.087
	(0.098)	(0.100)	(0.103)
Rural	0.369**	0.369**	0.429**
	(0.179)	(0.179)	(0.185)
Firm age		0.003	-0.009
		(0.054)	(0.053)
Female share		-0.109	-0.041
		(0.133)	(0.134)
Average wage (logged)			0.062
			(0.108)
Revenue (logged)			0.081***
			(0.023)
Observations	7,138	7,138	7,138

Notes: Dependent variable is binary (firm survival=1). Probit estimates, marginal effects. Given existence in all previous years. Robust standard errors clustered at the firm level (in parenthesis). Lagged values of revenue and capital-labour ratio and are in real constant USD (base year 2005). For legal status the reference category is private enterprise. Province, sector and year dummies included in all specifications. ***p<0.01, **p<0.05, *p<0.1.

Table 4: The impacts of social security

(A) Revenues

Periods	(1) OLS	(2) OLS (extended)	(3) Fixed effect
1	0.285***	0.360***	0.140***
	(0.024)	(0.023)	(0.017)
2	0.320***	0.402***	0.203***
	(0.026)	(0.025)	(0.015)
3	0.355***	0.434***	0.175***
	(0.027)	(0.026)	(0.015)
4	0.379***	0.450***	0.167***
	(0.028)	(0.027)	(0.014)

Notes: Dependent variable: real net revenue per worker. Robust standard errors clustered at the firm level (in parenthesis). ***p<0.01, **p<0.05, *p<0.1. See Appendix 2A for more detail

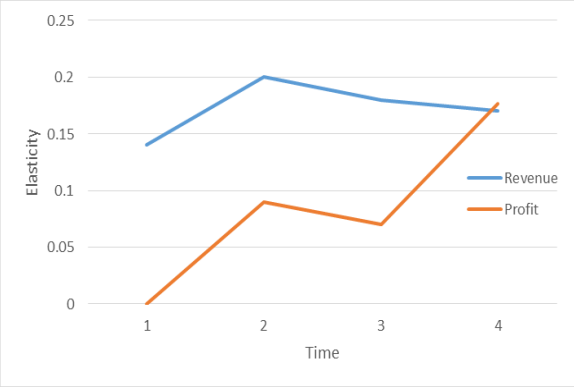
(B) Profits

Periods	(1) OLS	(2) OLS (extended)	(3) Fixed effect
1	0.638***	0.654***	-0.000
	(0.045)	(0.041)	(0.035)
2	0.808***	0.811***	0.090**
	(0.051)	(0.047)	(0.037)
3	0.921***	0.840***	0.070
	(0.055)	(0.054)	(0.054)
4	1.023***	1.045***	0.177***
	(0.061)	(0.058)	(0.041)

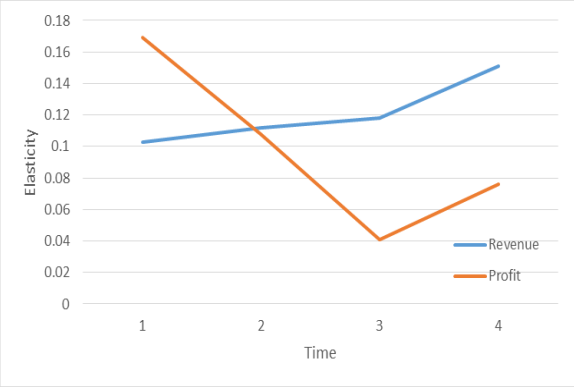
Notes: Dependent variable: real gross profit per worker. Robust standard errors clustered at the firm level (in parenthesis). ***p<0.01, **p<0.05, *p<0.1. See Appendix Table 2B for more detail

Figure 1. Impacts of social security on revenues and profits per worker (by firm size)

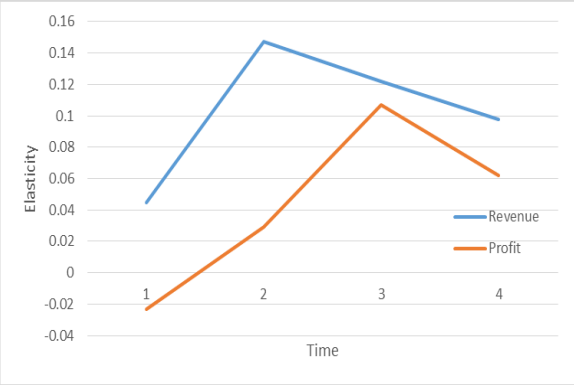
A. All firms



B. Medium firms (50-300 employees)



C. Small firms (10-50 employees)



D. Micro firms (less than 10 employees)

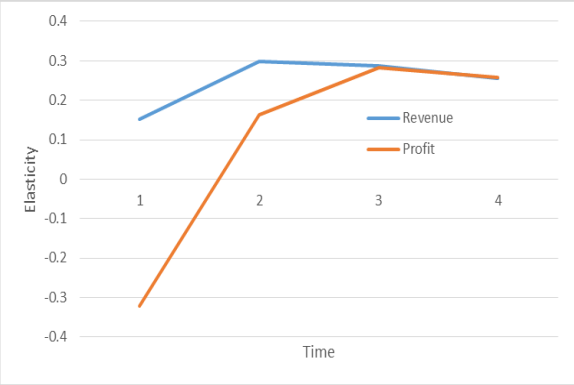
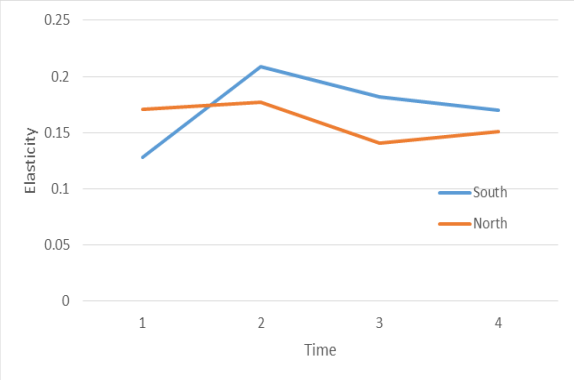
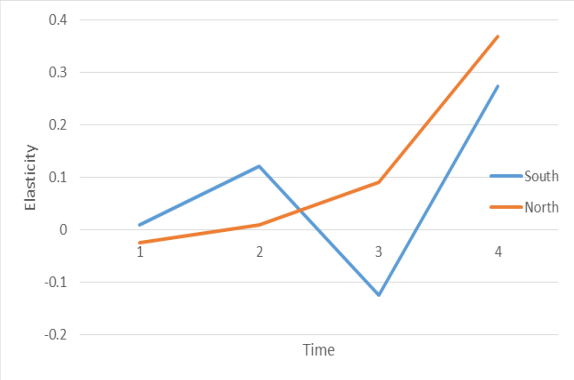


Figure 2. Impacts of social security on revenues and profits per worker (by location)

A. Revenue (per worker)



B. Profit (per worker)



Appendix tables

Table A1: Determinants of social security coverage

Firm size (logged)	0.009*
	(0.005)
CPs	0.055*
	(0.030)
Limited liability	0.070***
	(0.012)
Joint Stock	0.193***
	(0.017)
Foreign	0.279***
	(0.019)
Rural	0.146***
	(0.024)
South	0.400***
	(0.149)
Firm age	0.098***
	(0.006)
Female share	0.144***
	(0.022)
Average wage (lagged)	0.090***
	(0.015)
Performance (lagged)	0.048***
	(0.003)
Food and beverages	0.158***
	(0.016)
Tobacco	0.506***
	(0.013)
Textiles	0.254***
	(0.022)
Apparel	0.159***
	(0.023)
Leather	0.212***
	(0.022)
Wood	0.159***
	(0.021)
Paper	0.257***
	(0.015)
Publishing and printing	0.198***
	(0.021)
Refined petroleum etc	0.533***
	(0.023)
Chemical products	0.290***
	(0.015)
Rubber	0.244***
	(0.014)
Non-metallic mineral products	0.210***
	(0.018)
Basic metals	0.265***
	(0.035)
Fabricated metal products	0.219***
	(0.013)
Electronic machinery	0.264***
	(0.016)
Motor vehicles	0.255***
	(0.019)
Other transport equipment	0.222***
	(0.028)
Furniture, jewellery, toys etc.	0.145***
	(0.017)
Electricity, gas and air-conditioning	0.300***
	(0.034)
Water supply and sewage	0.187***
	(0.044)
Observations	31,206
R-squared	0.356

Notes: Dependent variable (social security coverage): share of workers receiving social security. OLS estimates. Robust standard errors clustered at the firm level (in parenthesis). Revenue and wage and are in real constant USD (base year 2005). For legal status the reference category is private enterprise and for sectors it is construction. Year and province dummies included. ***p<0.01, **p<0.05, *p<0.1.

Table A2: Impacts of social security coverage on revenue and profit (period 4)

(a) Revenue

	(1) OLS	(2) OLS (extended)	(3) Fixed effect
Social security	0.379***	0.450***	0.167***
	(0.028)	(0.027)	(0.014)
Firm size (logged)	0.026***	-0.032***	-0.285***
	(0.008)	(0.008)	(0.011)
CPs	-0.586***	-0.469***	0.303
	(0.092)	(0.082)	(0.325)
Limited liability	0.131***	0.064*	0.092
	(0.035)	(0.033)	(0.058)
Joint Stock	0.214***	0.099**	0.224***
	(0.044)	(0.041)	(0.066)
Foreign	0.326***	0.137***	0.223**
	(0.047)	(0.045)	(0.099)
Firm age	0.016	0.036**	
	(0.019)	(0.018)	
Female share	-0.919***	-0.721***	0.160***
	(0.059)	(0.054)	(0.034)
Average wage		1.040***	0.186***
		(0.041)	(0.038)
Performance lagged		0.562***	0.566***
		(0.005)	(0.004)
Observations	31,500	31,500	31,500
R-squared	0.294	0.452	0.504
Number of id_unique			6,300

Notes: Dependent variable: real net revenue per worker. OLS and fixed effect estimates. Robust standard errors clustered at the firm level (in parenthesis). Revenue and wage and are in real constant USD (base year 2005). For legal status the reference category is private enterprise. Year, province and sector dummies included in all specifications. ***p<0.01, **p<0.05, *p<0.1. The results for the periods 1, 2 and 3 are similar and thus not reported.

(b) Profit

	(1)	(2)	(3)
Social security	1.023***	1.045***	0.177***
	(0.061)	(0.058)	(0.041)
Firm size (logged)	0.016	-0.048***	-0.372***
	(0.020)	(0.018)	(0.023)
CPs	-0.341***	-0.281**	-0.430
	(0.130)	(0.129)	(0.388)
Limited liability	0.006	-0.055	0.141
	(0.064)	(0.062)	(0.114)
Joint Stock	0.507***	0.430***	0.196
	(0.083)	(0.080)	(0.144)
Foreign	1.620***	1.449***	0.096
	(0.112)	(0.111)	(0.339)
Firm age	-0.018	0.004	
	(0.043)	(0.041)	
Female share	-0.884***	-0.693***	-0.124
	(0.120)	(0.113)	(0.090)
Average wage		0.877***	0.124*
		(0.083)	(0.073)
Performance lagged		0.541***	0.533***
		(0.006)	(0.005)
Observations	12,950	12,950	12,950
R-squared	0.400	0.547	0.510
Number of id_unique			2,590

Notes: Dependent variable: real gross profit per worker. OLS and fixed effect

estimates. Robust standard errors clustered at the firm level (in parenthesis). Profit and wage and are in real constant USD (base year 2005). For legal status the reference category is private enterprise. Year, province and sector dummies included in all specifications. ***p<0.01, **p<0.05, *p<0.1. The results for the periods 1, 2 and 3 are similar and thus not reported.