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**Why Don't Firms Take Advantage of More Flexible Labor Options?
Regulation, Enforcement and Corruption**

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Abstract: This paper investigates how employment regulations affect firms' use of more flexible employment arrangements. Using firm level data from 27 countries in Eastern Europe and Central Asia the paper not only looks at variations in the formal, de jure restrictions on labor practices across countries, but explores variations in their enforcement to analyze the impact of regulations on labor flexibility as experienced by firms. It finds that greater regulatory burdens are associated with more firms using flexible labor arrangements. However, the extent to which they are used declines with increased regulatory burdens. Thus, while greater regulations may make flexibility more attractive, they may also curtail the share of workers under these arrangements. Methodologically, this underscores the importance of allowing for separate effects between the decisions to participate in these arrangements with the share of workers to be covered by them. The paper then looks to see whether differences in enforcement – due to discretion on the part of officials, the prevalence of more general corruption, as well as specific payments to labor officials – serve to relax the effect of regulations on firms. The results confirm that greater discretion and general corruption do serve to increase the extent of flexible labor arrangements, although the costs of paying bribes to labor officials themselves has less of this offsetting effect.

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1. Introduction

The balance between protecting workers' rights and the interests of business varies across countries, and recent analyses of labor laws show that it is often the poorer countries that have the strictest regulations (Botero et. al. 2004.) Several studies have investigated the impact of these regulations, generally focusing on their impact in raising unemployment, particularly of women and young workers (Lazear 1990; OECD 2004). This paper approaches regulations from a different perspective, focusing instead on the effect of regulations on the employment of part-time or temporary workers (PTTs).

Part-time and temporary workers can be attractive to firms as a source of flexibility in dealing with market fluctuations as they do not entail the same long-term commitment as a full-time employee. PTT workers can be a cheaper source of labor as they generally do not qualify for the full extent of benefits and labor protections. In this paper, we investigate the extent to which differences in the regulatory environment affects the use of PTT workers, both across countries and across firms within countries.

If regulations governing full time workers are particularly burdensome, PTT workers could provide an 'escape route', allowing firms to avoid some of these requirements. This would imply that using PTT workers is more attractive as measures of regulatory burden increase. On the other hand, it could also be that tougher regulations are designed to close the loophole of avoiding these labor protections by using PTT workers. In this case, as regulations become stricter, the use of PTT workers would fall. The overall effect could thus be ambiguous. This raises two sets of issues in approaching how to test for the effects of regulation.

The first issue is methodological. If regulatory burdens could potentially have

opposing effects on the use of PTTs, simply including measures of regulatory burdens in a regression could test if one effect dominates. However, it could also lead to non-significant results and a conclusion that regulations have little effect. Alternatively, one can use a specification that allows for both effects to enter separately. We do this by modeling the decision to hire PTT workers as a two-step process. First firms decide whether to hire PTT workers, and then decide what share of their workforce they will represent. Indeed, looking at the large number of firms that do not hire any PTT raises such a selection model as a fitting approach. Using this two stage approach confirms that both effects of regulations are at work. Regulatory burdens are associated with an increase in the probability that a firm will hire PTT workers, but are also associated with them representing a smaller share of their workforce.

The second issue is looking more closely at enforcement and how it might vary across firms. Such variations could be based on the degree of discretion officials have and by the prevalence of ‘gifts’ or bribes associated with interactions with officials. The paper tests if enforcement is more relaxed or exceptions can be granted or ‘bought’ by the firm, whether the effect of the regulations on these firms is lessened.

The paper finds that there are significant variations in enforcement and where enforcement is more lax, officials have more discretion, or in locations where corruption is more prevalent, we find a significant decline in the impact of labor regulations on decisions regarding PTT workers. However, the impact of bribery can be more complex. While locations where more firms pay bribes are associated with greater shares of PTT workers being used, when the size of bribes increases, this effect disappears.

The paper uses firm-level data from 27 countries in Eastern Europe and Central

Asia. The experience of firms in these transition countries are of particular interest. Firms not only face the types of shocks common in all parts of the world, but also the effects of still-evolving institutions and norms relevant to business and employment. So on the one hand, flexibility is likely to be more desirable. On the other hand, these are countries where regulations have traditionally been quite extensive. Looking simply at the *de jure* laws, Doing Business indicators show that the region's labor regulations make it far more rigid than all regions, with the exception of Sub-Saharan Africa. There is also a large variation in the *de facto* implementation of these regulations. The Global Governance indicators rank one third of the countries as below the median in terms of rule of law, regulatory quality and half below the median in terms of control of corruption. Using both differences across countries as well as firm level measures of enforcement and corruption, the paper shows how regulations play a significant role in the extent to which PTT workers are used.

The layout of this paper is as follows: Section two discusses more literature related to our questions, and the specific contribution of our research to this body of work. Section three describes the data and presents some descriptive statistics. Section four describes our methodology, section five includes our results and a discussion thereof, and section six concludes.

2. Motivation

In looking at the relationship between labor regulation and enforcement on official but non-standard employment arrangements in transition economies, this paper contributes to the literature on several dimensions. It expands the set of results looking at the effects of regulations at the firm level rather than aggregate outcomes. The paper expands the

outcomes for which regulations have an impact. Other papers have shown that regulations can matter for unemployment, labor participation and job turnover. This paper looks at the use of PTT workers, with some extensions to look at the use of informal employment too. It not only looks at formal regulations, it investigates variations in their enforcement. It uses cross-country data, allowing for exploitation of variations both across as well as within countries.

Literature on the effects of labor regulations in developing or emerging economies typically deals with firm-level data within one nation (e.g. Besley and Burgess 2004), or country-level data for cross-national analyses (Botero et. al. 2004). Indeed, cross-country work on the impact of labor regulations has grown with Doing Business' publication of measures of hiring and firing costs. While the original paper was more focused on explaining the source of variation in administrative and financial costs of labor regulations (i.e. legal origin or political affiliation), it did show that greater regulatory burdens were associated with higher unemployment, lower labor participation and larger unofficial economies.

Using different datasets, Haltiwanger, Scarpetta and Schweiger (2006) and Micco and Pages (2006) find evidence that the administrative and financial costs of firing workers impact job turnover at the industry level. Applying a Rajan and Zingales type difference-in-difference approach and using industry turnover rates in the United States as the benchmark, they do find that greater employment protections lower job turnover and that the effect is higher in industries that are more 'naturally volatile.' Clearly these country-level measures are having an impact and their significance is also confirmed in this paper. However, these measures also have two shortcomings for the purpose of this paper. First, the measures do

not capture differences within countries. The above papers have shown that the same regulation can have differential impact within a country, but it is also true that regulations themselves can vary – across sub-national areas, sectors, types of firms etc. It is desirable to have measures that could reflect these differences. Second, the Doing Business measures capture the *de jure* regulations, those procedures and costs that would be incurred if firms fully complied with what is on the books. This is of interest, but as this paper wishes to look into issues of enforcement, another source of information on regulations is needed.

The firm level datasets collected by the World Bank under the umbrella title of ‘Enterprise Surveys’ (that includes BEEPS, Investment Climate Surveys, RPED surveys) do have measures based on firms’ actual experiences. While they do include measures of time and costs to get things done, they also include subjective rankings of how constraining different dimensions of the business environment are. For the transition countries that make up the basis of this paper, most of these measures are in such a ranking format. One benefit of this approach is that the variables implicitly include a measure of impact. Firms are not asked to evaluate an issue in isolation, but rather in terms of how it affects their ability to operate and grow their business. Thus, areas that may be associated with long delays or high costs – but that are of marginal interest to the firm or for which alternatives are available – are not likely to score high on these constraints rankings.

However, there are potential drawbacks to using subjective data. There is a concern that the rankings reflect differences in firm types or firms’ performance. This can be controlled for in part by including firm characteristics and measures of firm performance directly in the regression. One can also control for individual effects by looking at relative rankings. Respondents rank 17 issues on the same scale. De-meaning the responses gives

the relative importance of the issue to that firm. How well these subjective rankings reflect actual conditions can also be tested for. Using 104 countries, Hallward-Driemeier and Aterido (2007) find that the subjective rankings are highly correlated with objective measures in 16 of the 17 variables¹. The subjective rankings are also significantly correlated with external sources, including Doing Business indicators. Pierre and Scarpetta (2004) use 38 countries and confirm that measures of greater labor regulations are associated with higher shares of firms reporting labor regulations as constraining. Our analysis uses both subjective and objective measures of labor regulation and enforcement and finds the results to be robust for both types of measures. As such, this paper may be seen as contributing to the growing body of literature on the extent of agreement between these two types of measures (Nicoletti and Pryor, 2001).

There has been some work looking at labor regulations and their enforcement at the firm level in individual countries. MacCulloch and Di Tella use firm-level panel data in 21 OECD countries to show that regulatory burdens reduce overall employment and labor participation. There has been less work on how the regulations affect the composition of jobs. Almeida and Carneiro (2005) find significant effects in Brazil on the incidence of informal employment, but did not test for the effect on legitimate, more flexible arrangements. Pierre and Scarpetta (2004) look at how firms that report being more constrained by labor regulations adjust, whether they are more likely to hire temporary workers, do more training or a combination of the two. They find little impact of regulations on temporary workers, but some effect of full-time regulatory restrictions on the probability firms use temporary workers. This work builds on this by expanding the range

¹ The one exception was finance; those with loans complained more about the cost of finance than those without loans.

of measures of labor regulations, including the extent of their enforcement, looking both across countries and within countries and extending the analysis by looking at differential effects by firm size and by country groupings.

Looking at aggregate outcomes, there is some evidence that the effects of higher regulatory burdens on growth and informality can be mitigated as the overall institutional framework improves (Loayza, Oviedo and Serven, 2005). This paper conducts a similar extension. Interacting the measures of labor regulation and enforcement by measures of ‘rule of law’ and ‘government effectiveness’ are used to see if results change in countries with stronger institutional settings. In both cases, these results show that discretion and weak compliance enforcement have less impact in stronger institutional settings. However, if actual corruption is involved, then it has an even bigger impact on the proportion of PTT workers used.

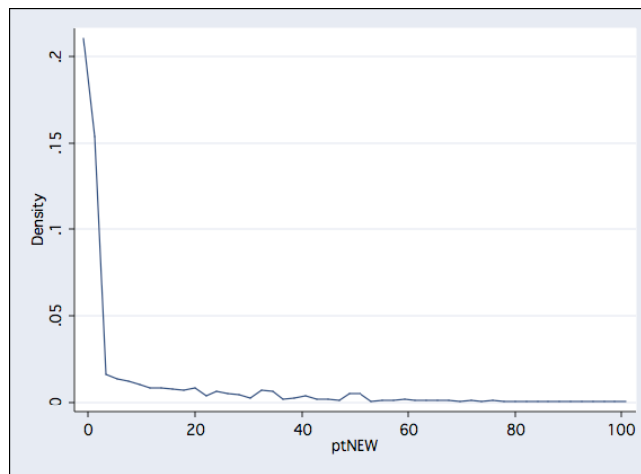
3. The Data

This paper uses firm level data on 9655 firms in 27 countries in Eastern Europe and Central Asia. Collected by the EBRD and the World Bank, the Business Environment and Enterprise Survey (BEEPS) collects detailed information on many aspects of the investment climate in which a firm operates as well as information about the firm’s own performance. The same questionnaire is implemented in each country, with a standardized sampling methodology, making the data comparable across countries. This is the third round of the survey, with the sample having been expanded and additional measures of firm performance having been added.

Our measure of part-time and temporary employment is a percentage of the total

labor force (full-time and PTT) that firms reported to us in our survey (see Table 2). Summary statistics for this variable across countries are given below. Interesting is that Estonia, Latvia and Lithuania, which have three of the most dynamic business environments of these transition countries, have a higher proportion of firms hiring at least some PTT workers. Overall, this variable shows a large mass point at zero, with roughly 2/3 of firms employing no PTT workers. See figure 1 below.

Figure 1: Distribution of PTT Workers



We also looked at breakdowns of percent PTT employment by industry and found, not surprisingly, that construction, business services (includes real estate and renting), hotels and restaurants and other services were likely to have the highest average shares of PTT workers. Firms with foreign ownership, state-owned firms, and older firms were likely to have somewhat fewer PTTs than others.

The dataset includes subjective assessments of various potential constraints and more objective measures, such as the time and monetary costs of completing various transactions or accessing services. This paper draws on both types of measures, focusing on four variables related to labor regulations and four measures of corruption.

Labor Regulation Measures:

- **Labor regulation:** this is a subjective measure of how constraining labor regulations are to the operation and growth of the respondent's firm. It is measured on a scale of 0 (no problem) to 3 (severe constraint).
- **Inspections:** Respondents were asked how many inspections took place at their establishment in the 12 months prior to the survey.

In addition, there are two measures of the enforcement and compliance with regulations.

- **Distortion:** Respondents were asked by how much they would want to adjust the size of their regular full-time workforce in the absence of any regulations. Firms could report a desire to either expand or contract their workforce. Given a potential asymmetry between these two groups, the variable is divided into two. *Distort-expand* includes firms that are constrained from expanding and *Distort-contract* includes firms that report being constrained in their ability to contract. These variables can be seen both as measures of the extent of the regulatory burden, but also the extent to which regulations are actually enforced.
- **Reporting compliance:** Firms were asked what share of their labor force is reported to the authorities. Given the sensitive nature of this information, firms were not asked to reveal their own behavior, but rather that of their competitors or other firms like theirs. While this strictly measures more general practices, it can be inferred that responses are likely to reflect the individual firm's compliance as well.

Corruption Measures: In addition to these variables on labor regulations, respondents provided information on a number of governance issues.

- **Corruption:** A perception variables on the extent to which corruption is a constraint to the operation and growth of the firm.

- ***Corruption-inspections:*** A measure of whether additional payments or gifts were expected during labor inspections.
- ***Discretion:*** Measures, on a scale of 1-6, predictability of the interpretation of regulations. The variable has been rescaled so that higher numbers indicate more discretion.
- ***Bribe frequency:*** A measure of how frequently bribes must be paid in order to ‘get things done,’ on a scale of 1-7, from ‘never’ to ‘always’.

One potential concern with these variables is that they are endogenous to firm performance and hiring practices.² To mitigate this potential endogeneity, these variables are averaged by country-industry-size so that they can be seen as representing that type of firm but be exogenous to the particular firm. This is equivalent to using country-industry-size dummies as instruments, and the test of over-identifying restrictions is not rejected (Dollar et. al. 2005).

Tables 1 and 3 provide information on the measures of labor regulation and enforcement. There is considerable variation in these measures – not just across countries, which would be expected, but also within countries. Some of this reflects differences across locations: enforcement seems to be higher in capital cities, but also across industries and sizes of firms. This variation is used in the identification strategy used in the paper.

In addition to these disaggregated measures of regulations and corruption, we draw

² However, it should be noted that the direction of such an effect is not clear. It could be that firms that are doing well or have optimistic managers report few constraints; alternatively, firms that are doing well could be precisely those for which constraints are less binding. On objective measures, there is considerable literature as to whether better performing firms attract the attention of officials seeking gifts or whether officials target less successful firms as they have little recourse to paying (Svensson; Kaufman et. al.), thus reflecting this same concern.

on aggregate sources. The Doing Business database constructs a ‘rigidity of employment’ variable based on the formal regulatory requirements in each country.³ It also includes information on restrictions on temporary workers. The “temporary regulation index” is taken from Pierre and Scarpetta 2004. The Global Governance Indicators provides composite measures of ‘rule of law’ and ‘government effectiveness’ that can be used to test the extent to which results change according to the broader institutional setting.

4. Methodology

The PTT hiring decision is modeled as a two step process. This approach both makes theoretical sense and fits the data better than one-step analyses. Despite the much touted apparent benefits of flexibility associated with PTT workers, it remains true that the majority of firms only use full-time workers. This would be true if there are fixed as well as variable costs associated with a firm choosing to hire part-time or temporary employees. The fixed costs of hiring a non-zero number of PTT employees may include increased administrative costs from learning and maintaining two regulatory structures, plus costs due to union or public opposition or legal barriers to non-standard employment practices (Hamermesh 1993). Variable costs of hiring any particular number of PTTs include training costs, search costs, wages and benefits to these workers. PPT workers may also be less efficient if they have less experience and gain less firm-specific knowledge or if there are tensions between full time and PTT workers within a firm. Turnover of PTT is also likely to

³ The rigidity of hours index has 5 components: (i) whether night work is unrestricted; (ii) whether weekend work is unrestricted; (iii) whether the workweek can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for 2 months a year; and (v) whether paid annual vacation is 21 working days or fewer. For each of these questions, if the answer is no, the country is assigned a score of 1; otherwise a score of 0 is assigned. For example, Montenegro imposes restrictions on night work (a score of 1) and weekend work (a score of 1), allows 5.5-day workweeks (a score of 0), permits 50-hour workweeks for 2

be higher than for full time workers. If the PTT workers are really doing the work of full-time workers but are not given contracts or full benefits, this use of PTTs may also raise the possibility of fines and/or bribes. Thus, one would not expect to see firms using PTT workers unless the benefits exceeded both the variable and the fixed costs.

Firms are assumed to be profit maximizers. Firms thus choose whether or not to hire PTT workers if the net profits of doing so are positive, i.e. the savings from having PTT workers L_P rather than full time worker L_F exceeds the fixed cost F of hiring PTT workers as a function of regulations R . Assuming capital remains unchanged, so that the comparison is simply on differences in labor costs and productivity.

$$\pi(L_P, L_F, R_P, R_F) = (Y_P - w_P(R_P)L_P) - (Y_F - w_F(R_F)L_F) - F(R_P) > 0$$

This fixed cost, thus, yields a region of inaction in the question of whether to hire any PTT workers. Having the costs of employing PTT workers be lower than that of FT workers is not sufficient to ensure non-zero PTT employment.⁴ It also implies there can be a range of shocks in input prices and demand that will not lead firms to change their hiring practices. What is of interest here is the effect of changing regulatory requirements and their associated costs on the decisions of firms. Raising the regulations on PTT workers would not only reduce the cost savings of such workers, it could also raise the fixed costs directly, making it more likely that PTT workers are not hired. However, raising the regulatory burdens on full-time workers would raise their costs, making it easier to pass the

months (a score of 0) and requires paid vacation of 20 working days (a score of 0). Averaging the scores and scaling the result to 100 gives a final index of 40 for Montenegro.

⁴ It would be of interest to control directly for the differential wage costs of FT versus PTT workers. However, this information is not available in the dataset.

threshold.

In the second stage, if the costs of PTT workers are lower enough compared to FT workers to pass the fixed costs, what explains why firms don't opt exclusively for PTT workers? Part of this is internal to the firm: firm-specific experience and expertise is clearly desirable and certain positions cannot be rotated through with temporary personnel. Thus, there could be an optimal number of PTT beyond which increasing the share of PTT workers could be detrimental to output. But regulations can have an effect too. While none of the countries in our sample forbid the use of PTT workers, many do put restrictions on the share of work they can do. So, beyond their implications for costs, regulations can also restrict the share of PTT workers a firm may employ. There is also a possibility that regulatory costs rise with the share of PTTs. This would be particularly true if PTTs are being used as substitutes for FT workers and so are not in full compliance with the law. This opens the possibility of greater fines should they be discovered by regulators. If larger shares of PTT workers are more likely to attract the attention of inspectors, this may work to discourage their use.

Whether labor productivity actually changes significantly with the use of PTT workers is a matter for another paper. Here, it is simply recognized as a possibility. On the one hand, substituting PTT for FT workers could lower productivity if the PTT workers have less experience or greater turnover. This would thus work to raise the threshold for which the cost savings of PTT workers would need to pass in order for the firm to choose to use PTT workers. On the other hand, PTT workers could represent additional workers in which case YP is then the additional output expected and the second bracketed term drops out.

The regression for the selection (0/1) equation of is thus:

$$Y_1 = 1 \text{ if } (\beta_0 + \beta_1 X + \beta_2 Z + \beta_3 R + \beta_4 C + \varepsilon_s > 0) \\ = 0 \text{ otherwise}$$

where X includes a set of firm characteristics (age, ownership, export orientation), firm performance variables (employment growth, innovative activities), sector dummies and country controls (country dummies or controls such as GDP per capita, inflation, openness and financial depth). Z includes the exclusion restrictions; whether a firm's sales have shrunk, grown, or remained stable over the three years prior to the survey, and whether it had discontinued at least one product line. These indications of adjustment are likely to affect whether a firm has need of labor flexibility, but not the extent to which this is true. R includes the regulatory variables of interest. C includes variables of enforcement or corruption.

Then, using the Inverse Mills Ratio formed from the first step, for the observations with non-zero PTT employment,

$$Y = \gamma_0 + \gamma_1 X + \gamma_2 R + \gamma_3 C + \lambda + \varepsilon$$

yields full maximum likelihood estimates of the coefficients relevant to the levels question.

Further robustness checks involve interaction the measures of regulations and corruption, seeing how the impact varies across types of firms (namely size) and whether the broader institutional setting affects the results.

5. Results

Firm characteristics

Table 4 shows the basic results controlling only for firm characteristics and country effects. Firm characteristics and performance both have significant effects on the decision

to hire PTT workers and on the proportion of the workforce they represent. The share of PTT workers declines with firm size, but it is medium-sized firms (50-250 employees) that are significantly more likely to use PTT workers. A firm's age is not associated with any greater likelihood of employing PTT workers, but the extent of the reliance does decline with age. Ownership also matters. Privately owned firms employ a significantly larger share of PTT workers than do state owned firms. However, privately owned firms are significantly less likely to have PTT workers. Foreign ownership, on the other hand, has little association with the PTT choice. A firm's export status has little effect on whether or not they use PTT workers, but those that do, employ a smaller share.

The effects of firm performance are striking. Firms that are expanding employment overall or are innovating are significantly more likely both to employ PTT workers and to have them be a larger share of their workforce. To the extent the PTTs are a way that dynamic firms can adjust as they expand and innovate, the costs of excessive regulations are likely to have broader effects on productivity.

The likelihood-ratio test for independent equations was rejected for all the specifications, confirming the importance of controlling for selection effects. Both coefficients on the exclusion restrictions were significant and positive, as expected: growing sales and a discontinued product line are both likely to result in need for flexibility in inputs.

The second set of regressions includes country level controls rather than country dummies. As such it includes a measure of the formal regulatory burdens associated with labor. The first, 'labor-law rigidity', is associated with full-time workers. It is significant in both stages; firms are more likely to hire PTT workers in countries with more restrictive laws and to have them represent a larger share of their workforce. 'Temp Employment

Rigidity,' the variable on regulation of temporary workers, is significant in the second stage. In the second stage, greater restrictions are associated with firms hiring fewer PTT workers.

Level of regulation

Table 5 then includes the various measures of labor regulations and enforcement/corruption from the survey. As the results on firm characteristics and performance are robust to these additional variables, they are not reported in the tables to economize on space.

Overall, our results show a consistent pattern across the two types of measures of regulation – the perception of how constraining regulation is and the more objective measure of the time spent dealing with labor inspectors. The more burdensome the measure of regulations, the greater the probability that firms will use some flexible arrangements. However, the greater the regulations, the smaller the share of the work force that is hired under such arrangements. This is consistent with regulatory burdens raising the attractiveness of flexible arrangements, while also limiting the extent to which they can be exploited as a means of avoiding these burdens.

The additional variables that look at the extent to which firms are constrained in the ability to adjust their workforce show similar patterns. Both firms that would like to increase, and those that would like to decrease, their labor supplies are more likely to hire some PTTs than other firms. But, unsurprisingly, only those that would like to increase their workforce are likely to hire more than other firms that hire PTTs.

The extent to which firms believe other firms are complying with requirements in reporting their workers and wage bill can be seen as another measure of enforcement of regulations. Higher rates of reporting would be consistent with greater enforcement of the

labor laws. Indeed, the significance pattern is the same.

Enforcement and corruption

The next set of variables test the degree of enforcement by including measures of corruption and discretion. The hypothesis is that the ability to pay bribes or for officials to be willing to exercise discretion in the enforcement of regulations offers opportunities for firms to avoid particularly burdensome aspects of the law. As such, one would expect that higher measures of corruption would mitigate the effects of regulations on PTT, allowing firms to hire a larger share of their workforce under these alternative arrangements.

The regressions do find that greater corruption (although not necessarily more frequent bribery) works to offset these results, resulting in firms taking more advantage of flexible arrangements. The more officials are viewed to have discretion, the greater the extent of general corruption, as well as specific corruption related to labor inspections, the more PTT workers a firm is likely to have.

The one exception to the effects of corruption is with the bribe frequency variable. A greater frequency of bribe payments, and by inference larger overall bribe payments, actually has the opposite effect. This suggests there could be non-linearities in the effects of corruption on PTT employment: a corrupt environment can loosen some of the regulatory requirements, but if bribes become too frequent, these costs offset any benefits of not being strictly compliant with labor regulations.

Interactions

Table 6 provides a more direct test of whether corruption or lax enforcement can offset the effects of regulatory burden on making PTT more attractive while at the same time reducing the extent of their use. The labor regulation measures are interacted with the

discretion and corruption variables⁵. While the full set of controls are included, we simply report the direct effects and interaction terms to save on space. The sign patterns, especially of the significant coefficients, match up closely between the two sets, indicating some robustness to specification. However, many of our regressions show significant interaction terms in the opposite direction of the labor regulation coefficient. Thus, while labor regulations discourage the proportion of PTTs used, this is offset where there is greater discretion or more corruption. This provides further evidence that, as labor regulations and compliance become more burdensome, corruption provides a channel for achieving the desired flexibility.

The robustness of these effects is tested using additional measures from other sources. The Global Governance Indicators have a measure of ‘rule of law’ and ‘government effectiveness’ that can act as country-level measures of enforcement. This is similar to testing whether the effects are as robust in countries with otherwise stronger institutions. Table 7 shows that the patterns across the two measures of institutional quality are broadly similar. There are two main effects. The first is that the effects of greater enforcement of compliance and the extent of discretion are only significant in the countries with weaker institutions. Where the rule of law is stronger and where the government is more effective, they do not have a significant impact on how regulations impact PTT decisions. However, it is not that these countries provide no way for a firm to influence how the regulations are applied to their case. In fact, the interactions show that corruption – and in particular corruption in labor inspections – is even more effective at raising the willingness of firms to hire more PTT workers. Thus, in weaker institutional settings, more

⁵ We report the interactions for two of the variables due to space constraints. Similar results were found using the other labor regulation variables, although the magnitudes of the interaction effects were somewhat smaller

general discretion is associated with more relaxed enforcement and less discouragement of flexible arrangements. However, where the rule of law is otherwise stronger, specific payments are more associated with flexible outcomes.

Size

There is also considerable interest in understanding whether regulations are particularly onerous for smaller firms. This stems from a concern for poverty reduction, as well as a desire to help move more small firms from operating in the informal economy to the formal economy. Table 8 shows that there are indeed significant non-linear effects by size. The effect of regulations actually has *less* impact on whether small firms chose to have PTT workers. In terms of the second stage, the most significant difference is that the effect of more inspections on discouraging the use of PTT workers really only holds for small firms. However, looking at the results on corruption in inspections gives a clue why. It is small firms that are most likely to increase their use of PTT workers when labor officials are willing to be swayed. Inspections may discourage flexibility, but inspections that are more lax do not.

Extension: Additional types of 'flexible labor' arrangements.

The discussion so far has assumed that firms respond to the desire for more flexibility by hiring more PTT workers. But the extent to which they accurately report the number of workers or the true wage bill to the authorities is another dimension of flexibility available to them too. This would include practices of hiring PTT workers to do the equivalent work of FT workers, but without the formal contracts or full benefits. So, one might well expect a positive correlation between the use of PTT and non-compliance in reporting among firms seeking to duck their full regulatory obligations.

for the distortion variables.

Table 9 shows the results of regressing the extent to which the wage bill is underreported to the authorities as a function of the measures of regulatory burden and corruption, controlling for firm characteristics, sectors and country effects. While there are many firms that do not underreport, we did not find that selection is an issue. The effects are not statistically different in the decision of whether to underreport from the effects on the extent of underreporting. As such, a single regression is reported. Col 1 reports the basic relationships. Underreporting is more common among smaller firms, particularly among those with less than 10 employees. Foreign firms and exporters are less likely to underreport. While ‘regulatory burdens’ do not have an effect, those that report being constrained in their hiring and firing are more likely to underreport. Raising the frequency of inspections is likely to lower underreporting. Greater discretion is weakly associated with greater underreporting. While corruption is not significant overall, the measure of bribes is strongly associated with greater underreporting. The dummy of whether a firm employs PTT workers is highly significant. If one includes the extent of PTT workers in the workforce instead, the results are very similar. Recognizing that ‘PTT’ could be endogenous, col 2 reports the instrumental variables results, using as instruments the two variables used in the first stage of the Heckman regressions. The test of over-identifying restrictions is not rejected.

Col 3 (with country effects) and 4 (with country dummies) test whether there are significant differences in these patterns by size of firm. Particularly with the smallest firms most likely to under-report, are they more affected by regulations? Now, allowing the effect to vary by firm types, the effect of ‘regulatory burdens’ is positive and significant for the micro firms. The larger size dummies are negative, but not significant. There are also

differences in the impact of inspections. While more inspections are associated with greater reporting by small firms, this is not the case for the larger firms. The effects on corruption and bribes are also different by sizes of firms. For the small firms, bribes with labor officials are associated with less underreporting of labor, while overall bribes encourage greater underreporting. But for larger firms it is the opposite; bribes with labor officials leads to greater underreporting while general bribes has little effect.

These results are broadly consistent with the PTT results. Regulations make avoidance more attractive. This can increase the share of firms using PTT – or it can result in more underreporting to the officials of the true costs of labor. Opportunities for corruption generally offset these results.

6. Conclusion

This paper investigates the effects and interaction of the stringency in labor market rules and regulations and various indicators of corruption or lax enforcement on firms' employment choices. We use a new, cross-country firm-level dataset and several measures of both labor regulation and corruption that vary both across countries and within countries. The range of variables allows us to assess the robustness of our results, and to provide somewhat more nuanced interpretations of how enforcement can affect PTT choices. Our findings show the importance of modeling the effects of regulation in two stages. While strict labor regulations raise the attractiveness of more flexible arrangements for more firms, they also serve to restrict the extent to which firms take advantage of these types of flexibility. Measures of lax enforcement and corruption generally relax the effects of regulations, particularly in the second stage, when firms are choosing the optimal share of

PTT workers to employ. Specific measures of corruption associated with labor inspections are most commonly associated with raising firms' use of PTT workers, particularly for smaller firms and in countries that have stronger institutional settings. Flexibility can be enjoyed, but often at a price.

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Table 1a: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
Have PTT workers	0.36	0.48	0	1	9654
PTT as share of total workers	7.83	16.06	0	99	9654
Small firm (<10 workers)	0.40	0.49	0	1	9655
Medium firm (10-49 workers)	0.30	0.46	0	1	9655
Large firm (50+ workers)	0.29	0.46	0	1	9655
EU country	0.31	0.46	0	1	9655
Firm age	15.57	17.40	4	180	9647
Foreign owned	0.12	0.32	0	1	9655
Exporter	0.19	0.39	0	1	9592
Expanding employment	0.18	0.77	-1	1	9510
upgrade1	0.35	0.48	0	1	9655
upgrade2	0.50	0.50	0	1	9655
internet	0.67	0.47	0	1	9655
Rigid employment index	43.04	13.02	23	68	9655
Temporary regulation index	0.36	0.29	0	0.88	9455
Labor regulation as constraint	1.87	0.99	1	4	9434
Excess workers	0.52	0.67	0	3	9525
Insufficient workers	0.14	0.32	0	0.99	9525
Reporting compliance	87.17	21.17	10	100	9202
Number of labor inspections	1.88	5.59	0	99	9563
Discretion	2.76	1.45	1	6	9356
Corruption	2.15	1.14	1	4	9043
Corruption in inspections	1.71	1.12	1	6	8595
Frequency of bribes	2.24	1.46	1	6	9362

Table 1b. Correlation Matrix

	Labor regulation as constraint	Extent of distorted labor	Reporting of wage bill	Labor inspections	Discretion	Corruption- inspections	Corruption- inspections
Labor regulation as constraint	1						
Extent of distorted labor	0.0686*	1					
Reporting of wage bill	-0.0957*	-0.0642*	1				
Labor inspections	-0.0083	-0.005	0.0426*	1			
Discretion	-0.1635*	-0.0282*	0.0902*	-0.0157	1		
Corruption	0.3245*	0.0756*	-0.1885*	-0.0015	-0.1510*	1	
Corruption-inspections	0.2130*	0.0705*	-0.2055*	0.0696*	-0.1042*	0.2891*	1
Frequency of bribes	0.0984*	0.0538*	-0.2534*	0.0167	-0.0942*	0.3521*	0.4185*

Table 2

Percent PTT by Country						
Country	Median	75th Pctile	Mean	St. Dev.	Max	N
Albania	0.00	16.67	10.09	17.73	86.42	204
Armenia	0.00	13.64	11.58	21.63	87.50	351
Azerbaijan	0.00	0.00	4.32	12.81	79.55	350
Belarus	0.00	5.41	6.97	14.64	83.33	325
Bosnia	0.00	0.00	4.31	11.17	71.43	200
Bulgaria	0.00	1.03	6.25	14.87	88.24	300
Croatia	0.00	5.38	7.04	15.48	88.89	236
Czech Rep.	0.00	16.67	11.36	19.48	96.15	343
Estonia	1.68	12.50	9.01	15.49	93.02	219
FYROM	0.00	5.34	8.21	18.21	99.49	200
Georgia	0.00	11.52	11.14	21.59	98.92	200
Hungary	0.00	4.76	4.85	10.74	85.71	610
Kazakhstan	0.00	0.00	5.52	13.47	99.67	585
Kyrgyzstan	0.00	18.18	10.63	18.14	85.71	202
Latvia	5.26	22.22	13.26	17.45	78.95	205
Lithuania	4.35	18.37	12.28	16.58	71.43	205
Moldova	0.00	10.53	8.02	15.29	81.17	350
Poland	0.00	9.26	8.36	15.39	90.91	975
Romania	0.00	5.56	6.64	14.95	99.92	600
Russia	0.00	9.09	8.57	17.54	99.99	601
Slovakia	0.00	20.00	12.31	20.27	98.75	219
Slovenia	0.00	7.69	6.99	13.78	85.11	223
Tajikistan	0.00	5.01	5.17	11.95	78.95	200
Turkey	0.00	0.00	4.19	11.59	84.90	557
Ukraine	0.00	10.64	8.98	17.63	95.65	594
Uzbekistan	0.00	5.32	7.68	16.82	93.75	300
Yugoslavia	0.00	9.24	8.74	17.79	98.68	300
Total	0.00	7.69	7.83	16.06	99.99	9654

Table 3: Comparison of Formal Regulations Across Regions

Region	Rigidity of Hours Index	Difficulty of Firing Index	Nonwage labor costs as % of salary	Employment Index
Europe & Central Asia	50.7	37.1	26.7	40.8
OECD	45.2	27.4	21.4	33.3
East Asia & Pacific	25.2	19.6	9.4	23
Latin America & Caribbean	34.8	26.5	12.5	31.7
Middle East & North Africa	44.7	32.9	15.6	35.8
South Asia	25	37.5	6.8	34.8
Sub-Saharan Africa	52	44.9	12.7	47.1

The rigidity of hours index has 5 components: (i) whether night work is unrestricted; (ii) whether weekend work is unrestricted; (iii) whether the workweek can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for 2 months a year; and (v) whether paid annual vacation is 21 working days or fewer. For each of these questions, if the answer is no, the country is assigned a score of 1; otherwise a score of 0 is assigned. See www.doingbusiness.org

Table 4: Part-time and Temporary Employment

	Country Dummies		Country Level Variables	
	First Hurdle	Final	First Hurdle	Final
Country dummies	Yes	Yes	No	No
Log(per cap GDP)			-0.09 [0.034]***	-0.191 [0.044]***
Trade Openness			-0.001 [0.001]	-0.002 [0.001]**
Domestic Credit			-0.004 [0.002]***	0 [0.002]
Labor Law Rigidity			0.003 [0.001]*	0.002 [0.002]
Temp Employment Rigidity			0.113 [0.067]*	-0.135 [0.081]*
EU Country			0.64 [0.056]***	0.262 [0.097]***
Construction	0.295 [0.144]**	0.274 [0.184]	0.295 [0.156]*	0.392 [0.201]*
Manufacturing	0.107 [0.139]	-0.008 [0.178]	0.052 [0.151]	0.017 [0.193]
Transport	0.047 [0.147]	-0.065 [0.187]	0.068 [0.160]	0.053 [0.203]
Trade and Repair	0.021 [0.140]	-0.039 [0.180]	0.002 [0.153]	0.07 [0.196]
Renting, Services	0.156 [0.145]	0.27 [0.185]	0.195 [0.158]	0.415 [0.201]**
Hospitality	0.367 [0.149]**	0.291 [0.190]	0.339 [0.162]**	0.387 [0.207]*
Other Services	0.25 [0.150]*	0.317 [0.191]*	0.249 [0.162]	0.389 [0.207]*
Medium-Sized Firm	0.157 [0.038]***	-0.864 [0.047]***	0.154 [0.040]***	-0.897 [0.050]***
Large Firm	0.095 [0.056]*	-1.357 [0.064]***	0.069 [0.058]	-1.342 [0.067]***
log(Firm Age)	0.017 [0.023]	-0.14 [0.028]***	0.018 [0.024]	-0.118 [0.029]***
Orig. Private	-0.303 [0.057]***	0.289 [0.071]***	-0.289 [0.059]***	0.245 [0.075]***
Privatized	-0.091 [0.059]	0.236 [0.069]***	-0.034 [0.062]	0.259 [0.073]***
FDI	0.069 [0.045]	-0.075 [0.055]	0.054 [0.047]	-0.136 [0.058]**
Employment Growth	0.138 [0.019]***	0.074 [0.026]***	0.129 [0.020]***	0.086 [0.028]***
Exporter	0.042 [0.039]	-0.094 [0.047]**	0.023 [0.040]	-0.122 [0.048]**
New Product Line	0.026 [0.033]	-0.025 [0.040]	-0.005 [0.034]	-0.022 [0.041]
Upgraded Product Line	0.135 [0.032]***	0.073 [0.042]*	0.165 [0.032]***	0.107 [0.045]**
Internet Usage	0.147 [0.034]***	-0.059 [0.046]	0.142 [0.036]***	-0.095 [0.050]*
Sales Growth	0.056 [0.018]***		0.076 [0.019]***	
Discont'd Product Line	0.176 [0.038]***		0.235 [0.040]***	
Constant	-0.806 [0.190]***	2.559 [0.294]***	-0.093 [0.320]	3.963 [0.423]***
Observations	9359	9359	8569	8569
Lambda		0.57		0.46
s.e. Lambda		0.12		0.15
LR test indep eqns		6.38		3.76
Prob>Chi2		0.01		0.05
Log-Likelihood		-10227.37		-9543.81

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Effects of Regulation, Enforcement and Corruption

	[1]	[2]	[3]	[4]
Labor Law Rigidity	0.005 [0.002]***	0.005 [0.002]**		
Temp. Employment Rigidity	0.107 [0.072]	-0.256 [0.086]***		
Labor Regulation	0.132 [0.069]*	-0.602 [0.085]***	0.284 [0.123]**	-0.737 [0.151]***
Distort-Expand	0.039 [0.023]*	0.136 [0.029]***	0 [0.000]**	0.001 [0.000]***
Distort-Shrink	0.095 [0.050]*	0.005 [0.062]	0.001 [0.000]**	0 [0.001]
Reporting Compliance	0.005 [0.003]	-0.01 [0.004]**	0.002 [0.005]	-0.026 [0.006]***
Inspections	0.078 [0.013]***	-0.062 [0.016]***	0.058 [0.015]***	-0.066 [0.018]***
Discretion	0.02 [0.047]	0.234 [0.059]***	-0.029 [0.072]	0.152 [0.091]*
Corruption	0.001 [0.066]	0.414 [0.084]***	0.08 [0.102]	0.261 [0.128]**
Corruption-Inspections	-0.059 [0.071]	0.181 [0.093]*	-0.04 [0.099]	0.443 [0.126]***
Bribe Frequency	0.197 [0.047]***	-0.21 [0.061]***	-0.063 [0.084]	-0.146 [0.106]
Sales Growth	0.06 [0.019]***		0.05 [0.018]***	
Discontinued Product Line	0.192 [0.039]***		0.154 [0.037]***	
Constant	-2.187 [0.513]***	4.395 [0.691]***	-1.821 [0.564]***	4.966 [0.724]***
Country Dummies	No	No	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Observations	8464	8464	9243	9243
Country dummies	No	No	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes
lambda	0.66		0.7	
se lambda	0.11		0.1	
LR test indep eqns	7.65		11.66	
Prob>Chi2	0.01		0	
Log-Likelihood	-9302.61		-10007.37	

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Interacting Regulation and Enforcement				
	Labor Regulation		Inspections	
	First Hurdle	Final	First Hurdle	Final
Discretion				
Regulation	0.131 [0.072]*	-0.699 [0.086]***	0.256 [0.083]***	-0.211 [0.103]**
Enforcement	0.044 [0.049]	0.227 [0.058]***	-0.11 [0.059]*	0.353 [0.076]***
Interaction	0.06 [0.04]	0.12 [0.05]***	0.053 [0.026]**	-0.04 [0.031]
Corruption				
Regulation	-0.067 [0.276]	-1.185 [0.324]***	0.097 [0.069]	0.052 [0.087]
Enforcement	-0.102 [0.230]	-0.228 [0.282]	0.122 [0.077]	0.287 [0.099]***
Interaction	0.087 [0.122]	0.324 [0.146]**	-0.007 [0.032]	-0.054 [0.039]
Corrupt-Inspect				
Regulation	0.043 [0.350]	-2.144 [0.426]***	0.163 [0.069]**	0.076 [0.089]
Enforcement	-0.038 [0.361]	-1.599 [0.452]***	0.18 [0.093]*	0.347 [0.125]***
Interaction	0.054 [0.201]	1.041 [0.247]***	-0.047 [0.040]	-0.083 [0.050]
Bribe Freq				
Regulation	-0.153 [0.207]	-0.647 [0.241]**	0.176 [0.048]***	-0.147 [0.062]***
Enforcement	-0.137 [0.168]	-0.326 [0.203]	0.238 [0.063]***	-0.122 [0.085]
Interaction	0.156 [0.096]	0.176 [0.115]	-0.042 [0.022]*	0.04 [0.028]

All regressions include the full set of firm characteristics, sector dummies and country controls. Each block represents a separate regression.

Table 7: Do Effects of Regulation and Corruption Vary By Institutional Setting?

	Rule of Law		Gov't Effectiveness	
	First Hurdle	Final	First Hurdle	Final
Labor Regulation	0.249	-0.625	0.255	-0.653
	[0.103]**	[0.137]***	[0.100]**	[0.134]***
Labor Reg. interact	-0.095	0.064	-0.109	0.105
	[0.138]	[0.171]	[0.137]	[0.170]
Distort-Expand	0.001	0.002	0.001	0.002
	[0.000]**	[0.000]***	[0.000]**	[0.000]***
Distort-Expand interact	-0.001	-0.001	-0.001	-0.001
	[0.000]	[0.001]	[0.000]	[0.001]
Distort-Shrink	0.001	0	0.001	0
	[0.001]	[0.001]	[0.001]	[0.001]
Distort-Shrink interact	0	-0.001	0	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]
Reporting Compliance	-0.007	-0.013	-0.006	-0.013
	[0.004]*	[0.005]***	[0.004]*	[0.005]***
Reporting interact	0.028	0.014	0.027	0.015
	[0.006]***	[0.008]*	[0.007]***	[0.008]*
Inspections	0.059	-0.062	0.049	-0.05
	[0.018]***	[0.024]***	[0.017]***	[0.022]**
Inspect interact	0.021	-0.027	0.052	-0.04
	[0.025]	[0.030]	[0.026]**	[0.031]
Discretion	0.126	0.407	0.136	0.401
	[0.058]**	[0.079]***	[0.057]**	[0.079]***
Discretion interact	-0.272	-0.375	-0.321	-0.342
	[0.096]***	[0.123]***	[0.104]***	[0.131]***
Corruption	-0.087	0.235	-0.099	0.253
	[0.083]	[0.111]**	[0.082]	[0.110]**
Corruption interact	0.232	0.37	0.301	0.311
	[0.164]	[0.202]*	[0.178]*	[0.217]
Corruption-Inspections	-0.022	-0.004	-0.043	0.027
	[0.088]	[0.117]	[0.086]	[0.115]
Corrupt-Inspect interact	-0.181	0.636	-0.165	0.652
	[0.174]	[0.224]***	[0.198]	[0.248]***
Bribe Frequency	0.093	-0.123	0.106	-0.137
	[0.051]*	[0.068]*	[0.051]**	[0.067]**
Bribe interact	-0.018	-0.21	-0.06	-0.138
	[0.132]	[0.158]	[0.137]	[0.162]
Observations	8663	8663	8663	8663
Lambda		0.69		0.7
s.e. Lambda		0.11		0.11
LR test indep eqns		8.31		9.46
Prob>Chi2		0		0
Log-Likelihood		-9483.86		-9480.79

Table 8: Do the Effects Vary By Size and Ownership?

	Interaction by Size		By Ownership	
	First Hurdle	Final	First Hurdle	Final
Labor Regulation	0.349	-0.522	0.142	-0.621
	[0.108]***	[0.123]***	[0.070]**	[0.087]***
Labor interaction	-0.287	-0.063	0.093	0.183
	[0.116]**	[0.135]	[0.186]	[0.217]
Distort-Expand	0.2	0.002	0	0.001
	[0.55]***	[0.001]***	[0.000]*	[0.000]***
Distort-Expand interaction	-0.002	-0.001	0	0
	[0.001]***	[0.001]	[0.001]	[0.001]
Distort-Shrink	0.002	0.001	0.001	0
	[0.001]**	[0.001]	[0.001]**	[0.001]
Distort-Shrink interaction	-0.002	-0.002	-0.001	-0.002
	[0.001]	[0.001]*	[0.001]	[0.002]
Reporting Compliance	0.005	-0.027	0.006	-0.01
	[0.006]	[0.008]***	[0.003]**	[0.004]***
Report. Compliance interaction	-0.001	0.02	-0.016	-0.02
	[0.006]	[0.008]**	[0.009]*	[0.011]*
Inspections	0.054	0.018	0.066	-0.071
	[0.018]***	[0.022]	[0.013]***	[0.017]***
Inspections interaction	0.037	-0.143	0.043	0.092
	[0.026]	[0.032]***	[0.034]	[0.038]**
Discretion	0.122	0.233	-0.002	0.27
	[0.075]	[0.088]***	[0.045]	[0.057]***
Discretion interaction	-0.156	0.066	0.164	-0.06
	[0.086]*	[0.103]	[0.132]	[0.162]
Corruption	-0.184	0.432	0.038	0.339
	[0.127]	[0.144]***	[0.066]	[0.084]***
Corruption interaction	0.262	-0.118	-0.462	0.533
	[0.133]**	[0.156]	[0.228]**	[0.276]*
Corruption-Inspections	-0.215	-0.757	-0.055	0.188
	[0.149]	[0.183]***	[0.072]	[0.094]**
Corr-Inspect interaction	0.244	1.115	-0.023	-0.473
	[0.160]	[0.200]***	[0.246]	[0.300]
Bribe Frequency	0.184	-0.018	0.191	-0.173
	[0.076]**	[0.094]	[0.048]***	[0.062]***
Bribe Freq. interaction	0.009	-0.166	-0.077	-0.062
	[0.089]	[0.111]	[0.137]	[0.164]
Sales Growth	0.067		0.063	
	[0.019]***		[0.019]***	
Discont'd Product Line	0.196		0.194	
	[0.039]***		[0.039]***	
Constant	-2.152	4.399	0.816	5.238
	[0.482]***	[0.663]***	[1.154]	[1.411]***
Country controls	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Observations	8663	8663	8663	8663
Lambda		0.64		0.65
s.e. Lambda		0.11		0.12
LR test indep eqns		7.84		6.95
Prob>Chi2		0.01		0.01
Log-Likelihood		-9471.33		-9509.99

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Under-Reporting Wage Bill - Effects of Regulation and Corruption

	[1]	[2]	[3]	[4]		[1]	[2]	[3]	[4]
Labor Law Rigidity	0.057	0.05	0.06		Discretion	1.153	1.101	0.556	0.437
	[0.022]***	[0.028]*	[0.023]***			[0.689]*	[0.758]	[1.018]	[1.445]
Temp. Emp. Rigidity	-1.43	-2.27	-1.01		X Medium Firm			1.219	0.399
	[1.159]	[1.331]*	[1.191]					[1.017]	[1.000]
EU Country	-4.476	-8.856	-4.617		X Large Firm			-2.11	-0.176
	[0.963]***	[1.841]***	[0.989]***					[1.519]	[1.520]
Medium-Sized Firm	-1.19	-1.644	-14.2	-2.432	Corruption	1.309	1.359	1.354	-1.264
	[0.687]*	[0.772]**	[8.174]*	[7.844]		[1.023]	[1.125]	[1.404]	[1.914]
Large Firm	-2.993	-3.088	-5.861	-4.091	X Medium Firm			-2.397	-0.372
	[0.956]***	[1.052]***	[3.182]*	[7.852]				[2.030]	[1.994]
log(Firm Age)	-0.621	-0.635	-0.567	-0.813	X Large Firm			-3.158	0.295
	[0.382]	[0.420]	[0.383]	[0.367]**				[2.254]	[2.286]
Orig. Private	2.254	2.461	2.141	2.677	Corrupt-Inspect.	-1.747	-1.288	-4.662	-0.241
	[1.004]**	[1.106]**	[1.005]**	[0.942]***		[1.094]	[1.213]	[1.501]***	[1.873]
Privatized	7.083	8.996	6.969	6.253	X Medium Firm			2.615	3.27
	[0.970]***	[1.254]***	[0.973]***	[0.915]***				[2.451]	[2.203]
FDI	-2.479	-2.863	-2.207	-2.379	X Large Firm			9.126	6.518
	[0.758]***	[0.844]***	[0.757]***	[0.713]***				[2.649]***	[2.372]***
Exporter	-0.292	-0.696	0.126	-0.636	Bribe Frequency	2.529	1.418	3.345	0.308
	[0.640]	[0.718]	[0.636]	[0.607]		[0.717]***	[0.876]	[1.181]***	[1.717]
Employment Growth	0.81	-0.18	1.023	0.832	X Medium Firm			1.76	0.352
	[0.309]***	[0.481]	[0.311]***	[0.295]***				[1.656]	[1.619]
Upgraded Product	2.217	1.99	2.12	1.67	X Large Firm			-2.306	-3.37
	[0.533]***	[0.592]***	[0.534]***	[0.51]***				[1.607]	[1.654]**
Labor Regulation	0.912	0.111	2.696	4.424	PTT>0 Dummy	2.785	2.309	3.002	3.453
	[1.114]	[1.256]	[1.494]*	[2.488]*		[0.488]***	[0.706]***	[0.489]***	[0.464]***
X Medium Firm			-0.774	-3.516					
			[1.843]	[1.802]*	Country controls	Yes	Yes	Yes	No
X Large Firm			-0.645	-3.673	Country	No	No	No	Yes
			[2.050]	[2.128]*	Instrument for	No	Yes	Yes	Yes
Distort-Expand	0.017	0.014	0.023	0.024	Constant	1.118	1.445	3.758	17.779
	[0.004]***	[0.004]***	[0.005]***	[0.005]***		[5.996]	[6.597]	[6.635]	[8.629]**
X Medium Firm			-0.006	-0.008	Observations	8271	8271	8271	8830
			[0.008]	[0.008]	R-squared	0.08	Pr>F 0.00	Pr>F 0.00	Pr>F 0.00
X Large Firm			-0.013	-0.009					
			[0.010]	[0.009]					
Distort-Shrink	0.048	0.04	0.092	0.074					
	[0.008]***	[0.009]***	[0.016]***	[0.015]***					
X Medium Firm			-0.049	-0.034					
			[0.021]**	[0.020]*					
X Large Firm			-0.066	-0.05					
			[0.020]***	[0.019]***					
Inspections	-1.367	-1.997	-2.821	-1.18					
	[0.194]***	[0.304]***	[0.493]***	[0.575]**					
X Medium Firm			1.314	0.868					
			[0.570]**	[0.568]					
X Large Firm			2.337	1.232					
			[0.563]***	[0.592]**					

Standard errors in brackets
 * significant at 10%; ** significant at 5%; *** significant at 1%

APPENDIX

This appendix explores the empirical significance of using the two-step estimator. Our initial specification regressed the percentage of part-time or temporary employment on our regulatory measures, with controls for country and firm characteristics. Many coefficients for the variables of interest are significant, yet the proportion of the variance it explains is surprisingly low. The second column shows the results of only looking at firms with positive numbers of PTT workers. Dropping the zero-PTT observations increased the power of the regression to explain that portion of our observations.

Although OLS is not likely to be consistent given the non-linearities in the data, results from these regressions confirmed much of our intuition about the PTT employment decision. Consistent with Scarpetta, we find that medium and large firms are less likely to use as many PTTs as smaller firms. Also, originally private and privatized firms appear to rely more on flexible employment than state-owned firms. Firms in which foreigners have at least a 10% stake, and firms that export, are less likely to use as much PTT employment. Firms that have increased their employment over the three years prior to the survey are also likely to employ more PTTs. In terms of our variables of interest, Distort-Expand (firm would prefer a larger workforce) and increasing Corruption (how problematic it is to firm operations), are associated with more PTT employment. 'Labor Regulation,' reporting of workforce, labor inspections, less official discretion, and higher frequency of bribes are all associated with lower PTT usage, intuitive because these all indicate either lack of or high cost of employment flexibility. The OLS results are intuitive, but don't appear to yield the whole picture.

Due to the large mass point at zero, and seeking the simplest solution, we initially considered a Tobit type 1 estimator. However, a comparison of the (normalized) tobit coefficients with the probit of the relevant dummy variable on the same regressors revealed very different parameter estimates (See comparison regression results in the Appendix). The probit is nested within the tobit if variables are related to the 0/1 decision to hire any PTT in the same way as the "how much" decision (the tobit coefficients are scaled up to yield the non-zero amounts of PTT). The normalized statistically significant tobit coefficients from our regression ranged from two to 77 times the size of the statistically significant probit coefficients. The implication of this comparison is that the covariates' relationships to whether any PTT employees are hired are different from those affecting the decision of the amount of PTT workers hired.

As a more appropriate estimation method than the type 1 Tobit, we began to look at double hurdle or selection models. They not only allow for differing effects of regressors on the dependent variable, but also for the variables in each "hurdle" to differ. So in our case, the questions of whether to hire any PTTs and of how many to hire could have different variables affecting them, or the same variables, but in different ways. This class of models also makes sense from a theoretical perspective, for the reasons outlined above.

Using a double-hurdle framework, zero PTT employment can arise in one of two

ways: if the fixed cost of hiring a positive number of PTTs is not overcome by the potential savings, or if the optimal PTT employment is zero, we observe zero PTT employment. However, it seems unlikely that, in the absence of fixed costs, desired PTT employment would often be zero, given the perception of benefits of PTT employment to firms in terms of flexibility and, possibly, lower wages, benefit costs, and/or firing costs. Then the observation of a positive PTT employment decision only if the first hurdle is overcome implies dominance of the first hurdle. Furthermore, we expect that the determinants of whether any PTTs are hired and how many are hired have many common determinants, some of which are unobserved. Smith (2002) shows that in a double hurdle model with dominance and dependence between the hurdles, the first hurdle acts as a sample selection mechanism, reducing the second hurdle to Heckman's classic selection model. We use a maximum likelihood estimator based on the Heckman selection model for the second hurdle, and also report the probit estimates from the selection equation as interesting in their own right. The hypothesis of the independence of the two equations is easily rejected, confirming the appropriateness of the selection model.

Comparison between Possible Specifications

	OLS on ptNEW	OLS nonzeros	OLS logpt	Tobit	Probit
Log(per cap GDP)	-0.319 [0.387]	-0.034 [0.737]	-0.032 [0.040]	-0.733 [0.985]	-0.008 [0.033]
Trade Openness	0.003 [0.008]	0.044 [0.016]***	0.002 [0.001]**	0.003 [0.021]	0 [0.001]
Domestic Credit	-0.065 [0.021]***	-0.126 [0.041]***	-0.005 [0.002]**	-0.137 [0.053]**	-0.003 [0.002]*
Rigid Employment Index	0.041 [0.016]**	0.018 [0.029]	0.001 [0.002]	0.146 [0.040]***	0.005 [0.001]***
EU Country	5.083 [0.711]***	1.566 [1.315]	0.108 [0.071]	16.19 [1.793]***	0.579 [0.061]***
Construction	3.808 [1.819]**	4.018 [3.421]	0.214 [0.184]	8.78 [4.608]*	0.253 [0.153]*
Manufacturing	-0.561 [1.754]	-1.116 [3.309]	-0.026 [0.178]	-1.213 [4.458]	-0.007 [0.147]
Transport	-0.53 [1.855]	-0.666 [3.500]	-0.043 [0.188]	-0.934 [4.715]	0.007 [0.156]
Trade and Repair	-1.528 [1.778]	-2.143 [3.366]	-0.028 [0.181]	-2.87 [4.522]	-0.022 [0.150]
Renting, Services	2.204 [1.838]	3.434 [3.454]	0.238 [0.186]	5.415 [4.654]	0.163 [0.154]
Hospitality	2.576 [1.885]	0.903 [3.522]	0.179 [0.189]	7.852 [4.763]*	0.298 [0.158]*
Other Services	2.436 [1.891]	2.891 [3.552]	0.213 [0.191]	5.96 [4.784]	0.18 [0.159]
Medium-Sized Firm	-3.587 [0.515]***	-8.205 [0.933]***	-0.679 [0.050]***	-4.387 [1.292]***	0.047 [0.043]
Large Firm	-5.026 [0.707]***	-10.055 [1.236]***	-1.115 [0.066]***	-7.532 [1.760]***	-0.037 [0.059]
log(Firm Age)	-0.267 [0.279]	-0.707 [0.519]	-0.095 [0.028]***	-0.414 [0.705]	-0.001 [0.024]
Orig. Private	-0.296 [0.707]	4.074 [1.240]***	0.303 [0.067]***	-4.65 [1.752]***	-0.265 [0.059]***
Privatized	1.205 [0.735]	3.674 [1.275]***	0.26 [0.069]***	1.107 [1.812]	-0.037 [0.061]
FDI	-0.596 [0.554]	-1.621 [1.008]	-0.12 [0.054]**	0.086 [1.394]	0.054 [0.047]
Exporter	-0.143 [0.470]	-0.719 [0.846]	-0.116 [0.045]**	0.24 [1.174]	0.03 [0.040]
Employment Growth	1.399 [0.236]***	0.374 [0.436]	0.045 [0.023]*	3.797 [0.595]***	0.121 [0.020]***
Distort-Expand	0.011 [0.003]***	0.022 [0.005]***	0.001 [0.000]***	0.022 [0.007]***	0 [0.000]*
Distort-Shrink	0.002 [0.006]	-0.009 [0.011]	0 [0.001]	0.018 [0.015]	0.001 [0.000]**
Labor Regulation	-3.539 [0.799]***	-11.914 [1.457]***	-0.638 [0.078]***	-2.63 [1.996]	0.127 [0.068]*
Reporting Compliance	-0.023 [0.032]	-0.246 [0.066]***	-0.015 [0.004]***	0.065 [0.083]	0.005 [0.003]*
Inspections	-0.092 [0.148]	-1.901 [0.273]***	-0.09 [0.015]***	0.944 [0.372]**	0.072 [0.013]***
Less Discretion	1.366 [0.504]***	4.585 [0.959]***	0.254 [0.052]***	2.353 [1.278]*	0.02 [0.043]
Corruption	2.66 [0.746]***	7.652 [1.448]***	0.38 [0.078]***	4.118 [1.914]**	0.011 [0.065]
Corruption-Inspections	1.883 [0.803]**	4.724 [1.615]***	0.172 [0.087]**	1.769 [2.069]	-0.044 [0.070]
Bribe Frequency	-0.339 [0.530]	-5.007 [1.019]***	-0.256 [0.055]***	2.208 [1.353]	0.167 [0.046]***
New Product Line	-0.34 [0.397]	-1.38 [0.731]*	-0.074 [0.039]*	-0.293 [0.996]	0.007 [0.034]
Upgraded Product Line	1.721 [0.380]***	1.525 [0.721]**	0.07 [0.039]*	4.668 [0.964]***	0.144 [0.032]***
Internet Usage	0.929 [0.411]**	-1.429 [0.823]*	-0.099 [0.044]**	3.312 [1.061]***	0.12 [0.036]***
Sales Growth	0.493 [0.230]**	-0.034 [0.444]	-0.015 [0.024]	1.738 [0.590]***	0.066 [0.020]***
Discontinued Product Line	2.037 [0.481]***	0.718 [0.829]	0.017 [0.045]	6.207 [1.174]***	0.227 [0.040]***
Constant	12.148 [5.327]**	69.987 [10.299]***	5.925 [0.553]***	-30.732 [13.667]**	-1.85 [0.459]***
Observations	8663	3126	3126	8663	8663
R-Squared	0.06	0.25	0.38		

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: If the tobit is an appropriate model, the standardized tobit coefficient should be proportional to the probit coefficients. Here, the standardized tobit coefficients vary significantly from the probit coefficients when both coefficients are significant.