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Firms' demand for temporary labour in developing countries: Necessity or strategy?

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Abstract

Using data on private sector firms in developing countries, this paper investigates the determinants of firms' recourse to temporary labour. We find that there are two types of firms: those that do not use temporary labour, and those that do. Among the latter, some firms use temporary labour very intensively, suggesting that they may strategically organize their production processes around this type of employment relationship. These firms are different from others in their characteristics but also in their reasons for employing temporary labour. At the same time, our main findings suggest that, for all firms in developing countries, the key factors affecting demand for temporary labour are firm expansion and the regulations authorising the use of temporary labour for permanent tasks. Other employment protection legislation provisions have a limited and different effect, depending on the type of firm.

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1.   Introduction

Temporary employment has always existed in labour markets and serves specific purposes. Over the past several decades, however, there has been an increase in the use of temporary work in many parts of both the industrialized and the developing world, often for new motives and in sectors not previously characterized by these arrangements (ILO, 2015a). The shift toward temporary labour and other atypical forms of employment has prompted concerns about the future of work, including the status of the standard employment relationship, and has led to calls for the need to ensure that all workers, regardless of their contractual arrangement, enjoy decent working conditions (ILO, 2015b). In many developing countries, although wage employment continues to be more limited, there nonetheless appears to have been an evolution in contractual arrangements among waged workers. Such evolution has differed across countries, possibly as a result of different firm preferences, specific economic contexts, or legislative frameworks, potentially leading to long-lasting practices.

The aim of this paper is to analyse firm-specific, macroeconomic, and institutional factors that determine firm-level decisions to employ temporary labour in developing countries. Specifically, our goal is to understand whether the use of temporary labour is shaped by necessity or by firm strategy towards persistent use of temporary labour, and what is the role of labour market regulations in determining these practices. As we proceed, we also test the relevance of three hypotheses identified by previous literature for developed countries – flexibility, cost advantages, and technological change – for firm use of temporary labour, distinguishing between firms that potentially use temporary labour for different purposes.

Our study is based on the World Bank Enterprise Survey, which is the largest and most recent firm-level survey in the world. We use a sub-sample of over 72,000 private firms covering 118 developing countries during the period from 2006 to 2014. The survey contains detailed questions on firm's current and past activities. To assess the role of labour market institutions, we use a recently developed ILO EPLex indicator (ILO, 2015c), which measures the degree of employment protection afforded to workers with permanent contracts. We also test the relevance of fixed-term contracts regulations, employing an indicator of whether fixed-term contracts (FTCs) are authorized for permanent tasks and an indicator of whether FTCs have legal limits or can be used for unlimited duration.

Our main findings are three. First, the micro-level hypotheses for firm use of temporary labour identified by previous literature as relevant for developed countries – flexibility needs, cost saving strategies, and technological adjustments – are relevant in developing countries, too.

Second, the data and our empirical results suggest that there exist two types of firms: those that do not use temporary labour, and those that do. Firms that do not use any temporary labour (at least not on a regular basis), represent the majority of formal firms in developing countries, their share is about 60 per cent. Firms using temporary labour do so quite intensively: on average, about one third of their workforce is temporary. This average, however, also hinders important disparities across firms, as there are 5 per cent of firms that account for 57 per cent of all temporary labour, and 18 per cent of using firms have 50 per cent or more of their workforce staffed with temporary workers. Thus, it seems that some of the using firms use temporary labour not only for what can be called "traditional" purposes, such as replacing a temporarily absent worker, meeting short-term needs of seasonal spikes in demand, or for screening and probation, but also strategically, organizing their production processes around the use of temporary labour. Moreover, employing temporary labour may

be a two-step decision process at the firm level, whereby firms first make a deliberate decision about employing temporary labour on a regular basis, and then decide on its amount. While most of the previous literature also acknowledged the existence of a high share of firms not recurring to temporary labour, to the best of our knowledge, no previous paper explicitly accounted for a possibility of a two-step decision-making process. We show that, indeed, firms using temporary labour can be further split into firms with "moderate" and with "intensive" use. Intensive users have different reasons when compared to other using and non-using firms. They also have different firm-level characteristics as compared to others. Consequently, the role of some of the firm-level characteristics, established by the existing literature, varies between these types of firms. The only firm-level factor that has a similar impact on firm decisions to use temporary labour, independent of firm type, is a recent expansion in the firm's operations.

Third, we report mixed evidence on the role of regulations governing termination of regular contracts. The strongest and most robust effect for all types of firms is found on the indicator measuring whether fixed-term contracts (FTCs) are prohibited for permanent tasks: such prohibitions seem to have a strong deterring effect for the use of temporary labour for all types of firms. In addition, firms that use temporary labour intensively also account for a legal possibility to use temporary labour in an unlimited manner, while firms that use temporary labour moderately do not.

Our paper is close in spirit to studies examining the determinants of temporary employment in a multi-country setting, and also addressing the role of institutions (Kahn, 2007; Polavieja, 2006; Baranowska and Gebel, 2010; Hevenstone, 2010; Gebel and Giesecke, 2011; see also Hipp et al., 2015 for a recent literature review). However, those studies focused either on the aggregate level of temporary employment, or on micro worker-level incidence of temporary contracts; all of them were limited to developed countries. In contrast, our contribution is to focus on the firm-level decisions to employ temporary labour in developing countries. Our study is also close to Pierre and Scarpetta (2013), who use the same survey, but cover a different sub-sample. They suggest that firms in countries with high level of EPL use both more training and temporary labour – a result somewhat different from ours due to different measurement of EPL, and different modelling of both EPL's effect and firm decision to use temporary labour. In contrast to us, these authors describe not finding any significant effect of regulations concerning fixed-term contracts, which is somewhat counter-intuitive, though they do not formally report these results.

The rest of the paper is structured as follows. Section II contains a review of the literature and the main hypotheses that have been advanced to explain firms' use of temporary labour. In Section III, we provide a brief description of the data, followed by descriptive statistics in Section IV. Section V provides the main results of our analysis, distinguishing between those factors that are more 'internal' to the firm and those that are 'external', as well as between different types of firms. The last section gives a summary of our findings and discusses the implications for policy debates.

2. Literature review and hypothesis setting

What leads firms to use temporary labour? Why do some firms use temporary labour more than others? There are several stands of literature — management studies, industrial relations, sociology, and labour economics, that study the determinants of firm's decision to use temporary labour. The reasons most commonly put forward are flexibility, cost advantages, and technological change. These three reasons are not necessarily independent of one another, as organizations may use temporary workers for any one, or a combination, of these reasons; also, the cost advantage reason is often embedded into flexibility and technological change arguments. Yet while there is a vast literature addressing why firms chose to employ temporary workers, the literature is almost silent on why some firms chose to make this the focus of their organizational strategy, becoming 'intensive users', whereas other firms opt to use temporary workers only out of punctual necessity, and in moderate amounts. We return to this issue after first reviewing the flexibility, cost and technology arguments.

2.1 The flexibility argument

Firms in competitive labour markets face fluctuations in demand for their goods and services, either because of seasonality, changes in the business cycle, competition from other firms for market share, or external shocks. As labour is a variable cost in production (or at least a quasi-fixed cost (Oi, 1962)), firms have an incentive to ensure numerical flexibility in their labour force, so that they do not employ more staff than necessary when demand falls. Temporary labour is thus a convenient source of numerical flexibility.

On the other hand, firms also need to ensure that they have sufficient, knowledgeable staff to carry out the core operations of the firm and ensure firm longevity. Thus firms often seek the right balance between stability and flexibility in their workforce. Economists have long recognized that firms operate with this consideration in mind. In their seminal study of internal labour markets, Doeringer and Piore (1971) explained how within a firm there are essentially two labour markets, a primary, or internal, market consisting of jobs that are well-paid, stable and with advancement opportunities and a secondary, or external, market, which is lower-paid, lower-skilled and with fewer opportunities for training and advancement. The authors explained how many firms in diverse industries organized their workforce as internal labour markets, but also relied on a secondary group of workers whose skills were general and where the recruitment, screening and training costs were markedly lower.

Building on the insights of Doeringer and Piore (1971) and the efficiency-wage model of Bulow and Summers (1986) and Shapiro and Stiglitz (1984), Saint-Paul (1996) shows mathematically how dualism along the permanent-temporary workers divide can arise endogenously within a firm as a response to demand fluctuations. Because searching and recruiting workers with necessary skills and monitoring their work is costly, firms pay efficiency wages (wages above market clearing) to both motivate and retain workers. Since adjusting such labour to demand fluctuations is also costly, firms will have an incentive to split their workforce into a higher-paid, primary or core workforce and a secondary, or peripheral, workforce, for whom the adjustment costs are substantially lower. These adjustment costs may be related to the direct firing costs, but stem primarily because secondary employees are paid less than the efficiency wages that primary employees receive. Saint-Paul (1996) shows that such dualism arises naturally and can be optimal for a firm, even in absence of labour market institutions and regulations, such as employment protection legislation. In countries where firms have limited possibility of choosing which workers can be granted employment security because of the existing employment protection

legislation, the dualism within a firm can also arise when legal provisions explicitly allow for the use of temporary labour, and especially if legal provisions stipulate different level of protection for permanent and for temporary workers, thereby providing an additional incentive to use temporary labour.

Empirical evidence both in economics and in management literature, though on industrialized countries, shows that temporary workers can indeed be used to help firms attain numerical flexibility (Bentolila and Dolado, 1994), allowing them to survive under adverse macroeconomic conditions (Holmlund and Storrie, 2002; Benito and Hernando, 2008), or respond to demand fluctuations, as well as to protect 'core' workers from any potential downsizing due to demand fluctuations (Ko, 2003). Abraham and Taylor (1996) also show that temporary employment indeed represents a buffer stock to adjust to fluctuations in demand, but warn that while the demand for such work increases in less stable economic environments, it may also be mitigated by the firms' ability to reschedule the delivery of some of its products and services to off-peak periods. In particular, in firms providing out-of-site services and facing unstable demand, less labour is contracted-out, because employers do attach a certain value to maintaining stable relationships with their regular employees who may perform other in-house tasks during slow periods (see also Ton, 2014). Moreover, Hunt (2000) also warns that fixed-term contracts may offer firms a less-than desired flexibility due to restrictions that typically apply to the renewals of these contracts. Caggese and Cugnat (2008) suggest that the flexibility provided by temporary workers is particularly useful for firms facing financing constraints.

Some further nuances regarding the use of temporary workers as "buffers" is provided by the literature examining the role of unions and collective bargaining in firm's decision to hire temporary workers. On the one hand, unions may contribute to growing recourse of temporary employment if it helps isolate permanent workers from the negative effects of demand volatility and technological shocks (Saint-Paul, 1996; Bentolila and Dolado, 1994; Abraham and Taylor, 1996). Thus, a few empirical studies have found that temporary contracts are more wide-spread in countries with higher union densities or higher collective bargaining coverage (Kahn, 2007; Baranowska and Gebel, 2010; Hevenstone, 2010). On the other hand, unions may also oppose the recourse to temporary labour, either out of social cohesion considerations (Visser, 2002), or because they may perceive temporary workers as threats to their bargaining power (Heery, 2004), especially when firms strategically use externalized workers to diminish unions' power (Hatton, 2014).

2.2 Cost advantages

The management literature confirms the theoretical predictions from economics with respect to the role of labour costs in determining temporary labour hiring decisions. First, organizations devoting significant resources to *hiring* workers with highly job-specific profile, and also firms providing firm-specific training, would indeed be less likely to fill the vacancies requiring such training by temporary workers, because they would value the possibility to recoup the investment (Davis-Blake and Uzzi, 1993). However, if temporary contracts can be used for screening (Portugal and Varejao, 2009), such hiring costs can be reduced by more substantial recourse to temporary work (Faccini, 2014), provided that temporary workers are subsequently converted into permanent ones. As the pool of potential suitable job applicants is greater during recessions, firms have higher incentives to use temporary contracts for screening purposes when unemployment is high (Holmlund and Storrie, 2002). As such, the overall effect of the hiring costs on the use of temporary work depends on the type and purpose of temporary contracts.

Second, organizations may value the lower direct labour costs that firms incur *while using* temporary labour, because in a vast majority of cases, temporary workers are indeed

paid lower wages as compared to permanent workers (for a review of empirical evidence, see ILO, 2015a). More specifically, the lower wages can be the result not only of different screening of temporary workers job intensity, as compared to permanent workers, but also because of probationary nature of some temporary contracts; shorter tenure of temporary workers; exclusion of temporary workers from corporate benefits, such as annual bonuses; or simply unequal treatment of non-standard workers (Lee and Yoo, 2008). Temporary workers are also less likely to be subject to social security contribution payments as compared to permanent workers, or be entitled to paid leave. Given this, the higher the wages and fringe benefits in an organization, the more incentives firms have to use temporary workers to offset such costs (Davis-Blake and Uzzi, 1993; Kalleberg et al., 2003; Houseman, 2001), although such relationship may be nonlinear with limits to the cost advantage of using temporary workers (Nielen and Schiersch, 2014).

Third, the use of temporary employment, especially in the European context of the past three decades, has often been explained by the significantly lower firing costs associated with terminating temporary contracts, as compared to permanent contracts. While workers on fixed-term contracts are typically well protected during the period covered by the contract (in some instances, termination of such contracts before their end date may entail payment of all wages due until the contractual end date), at the end of the contract, generally no reasons need to be provided by the employer to justify the end of the employment relationship, beyond the end date of a fixed-term contract being reached. In contrast, terminating employment relationship with permanent workers, at the initiative of the employer, usually entails certain costs, including severance payments, costs associated with notification procedures, and other compensatory payments if terminations are unfair. Starting in the 1970s, numerous European countries partly deregulated labour markets with the aim of increasing labour market flexibility, by allowing for a wider use of temporary contracts, by expanding their scope to jobs that were not temporary in nature, and by increasing the allowed duration and number of renewals. At the same time, employment protection for permanent workers remained relatively intact. As a result, the wedge in the costs associated with terminating a temporary and a permanent worker grew, leading many researchers to attribute the growth of temporary employment in some European countries to these partial reforms (Bentolila and Dolado, 1994; Blanchard and Landier, 2002; Boeri and Garibaldi, 2007; Faccini, 2014; OECD, 2014). Similar reforms on the use of temporary labour occurred in some developing countries, particularly Peru (Vega-Ruíz, 2005). Nonetheless, the low separation costs for temporary workers has to be weighed against costs associated with the frequent search for new workers (Holmlund and Storrie, 2002).

2.3   Technological change

Whereas the economics literature has focused on the use of temporary labour as a response to demand fluctuations, the management literature has emphasized the production model of the firm, particularly the extent to which production is standardized. The simplification of tasks brought about by technology means that tasks can be performed by less skilled workers, who need less training and thus can be brought in at short notice (Nollen and Axel, 1996). As a result, turnover is less costly for firms, thus there is less of an incentive to cultivate long-term employment relationships. Uzzi and Barsness (1998) suggest that firms using computerized technologies are also the ones that recur more often to fixed-term workers. On the other hand, sophisticated technologies may increase firm-specific knowledge and lessen recourse to temporary and outsourced labour, both to save on training costs and to preserve their know-how (Mayer and Nickerson, 2005). In addition, even with standardized production models, there may be advantages to having a stable workforce, in which the worker is encouraged to communicate problems and suggest innovations (Ton, 2014; Kleinknecht et al., 2014; Kleinknecht, 2015). Similarly, complex jobs, either from an interpersonal or a technological viewpoint, are less likely to be

performed by temporary workers, and firms' "knowledge workers" are most likely to be permanent employees (Davis-Blake and Uzzi, 1993).

2.4   Moderate v. intensive use of temporary labour

The economics and management literature explain how firms employ 'primary' or 'core' workers and 'secondary' workers who either serve as a buffer to respond to fluctuations in demand or who are performing more routine tasks and thus cost less. However, these theories, as well as the other explanations given above, do not explicitly address the degree to which firms use secondary workers. Seminal management articles have addressed the importance of having companies focus on 'core competencies' (Prahalad and Hamel, 1990), but without providing an indication of what the core activities of a firm are, or suggesting the limits to not directly employing 'core' workers for these functions. Yet there appear to be sizeable differences in the intensity of use of non-standard arrangements across companies, with a small percentage of firms making extensive use of them. For example, Capelli and Keller (2013) find in their study of U.S. businesses that among the top 5 per cent of firms using non-standard arrangements, 66 per cent of the workforce is part-time and 39 per cent is temporary workers (of which 10 per cent are hired through a temporary employment agency). Houseman (2001), also studying the U.S., finds that among firms using part-time and on-call workers, 8 per cent of firms had more than 75 per cent of their workers in part-time arrangements and 17 per cent of firms had more than 75 per cent of their workers in on-call arrangements. A study of in-house subcontracting in Korea (whereby workers are hired through a subcontractor but work on the premises of the lead firm) of 1,764 firms with more than 300 employees, found that 55 per cent used in-house subcontracting and that in 8 per cent of the firms, more than 50 per cent of the workforce were in an in-house subcontracting arrangement. While in-house subcontracting was most common in the steel and automobile industries where it originated, it had spread throughout manufacturing and services and was also common among public industries (Eun, 2012). Also with respect to subcontracting, Weil documents the myriad of industries that have 'fissured' key functions of their businesses, such as major hotel chains that have outsourced cleaning and front desk services to third-party management companies (Weil, 2014). More research, however, is needed to better understand why some firms rely on the intensive use of temporary and other non-standard work arrangements, while others do not, and the consequence of such use for both firms and workers alike.

3.   Data description

Our analysis is based on the World Bank Enterprises Survey, a representative firm-level survey of private companies in developing countries. The data were collected between 2006 and 2014, with most countries being surveyed twice, and a few countries, such as Bulgaria and Chile, surveyed three times. Apart from a small overlap, a different set of enterprises was surveyed in each wave, leading us to choose a pooled setting for the data analysis.

The survey data are collected from face-to-face interviews with top managers and business owners of formal (registered) companies with 5 or more employees , operating in manufacturing and services sectors. The survey covers a broad range of questions on firm-level characteristics, business environment topics, and characteristics of the firms' workforce, including the number of temporary and permanent workers in an enterprise. The latter questions allow computing both the use and the prevalence of temporary workers (as a share of all employees) in an enterprise.

The exact wording of the relevant question is "How many full-time temporary employees did this establishment employ in fiscal year X?", where temporary workers refer to "temporary or seasonal employees, defined as all paid short-term (i.e. for less than a fiscal year) employees with no guarantee of renewal of employment contract" (World Bank, 2011). This definition is somewhat different from the one employed in the literature: it is relatively broad as it captures all possible types of temporary workers, including seasonal and casual; at the same time it is narrow, because it excludes temporary workers employed for more than one year or having promise of renewal of their temporary contract. It, however, satisfies the key feature of temporary work from the firms' viewpoint: the fact that no guarantee of renewal of employment contract is provided.

Using this question, combined with the question on the number of permanent full-time employees employed in an establishment, we construct a variable temp_share_all, as a ratio of temporary workers to the sum of temporary and permanent workers. This variable is used as principal dependent variable in further analysis. As explained below, we also test alternative dependent variables.

After restricting the sample to firms containing information on the number of temporary employees and other key firm characteristics, as well as after retaining only meaningful observations (dropping firms with negative share of temporary employees, or this share greater than one; firms with negative age or unknown ownership type), the sample is reduced to 71,943 observations in 118 countries. This sample is used for constructing all descriptive statistics. Appendix A lists the set of countries and the exact years of data collection, and Appendix B contains full descriptive statistics of all independent variables used in the analysis. Once only the observations with non-missing data on all other firm characteristics are retained, the sample for empirical estimation is reduced to 43,158 observations .

In addition, we complement the World Bank Enterprises Survey with macro data from various sources. Data on GDP growth and GDP per capita are from the World Bank statistical portal; unemployment is from ILO STAT. To assess the role of regulations on termination of permanent contracts we use a recently developed ILO EPLex indicator measuring the overall degree of protection afforded by legislation to workers on permanent contracts (ILO, 2015c). Lastly, we also complement these data with two dichotomous variables from the World Bank's Doing Business indicators describing the regulation of fixed-term contracts (FTCs): the first takes value one if FTCs are authorised for permanent tasks, and zero otherwise; the second takes value one if FTC regulations specify any limits to the FTC duration, and zero otherwise.

4.   Descriptive statistics

Figure 1 shows the distribution of temporary employees, as percent of all employees in developing countries, in the manufacturing and services private sector. It shows that the average share of firms' temporary workforce spans from under 5 per cent in Latvia, Jordan, and Sierra Leone, to over 25 per cent in Vietnam, Peru, and Mongolia, being broadly consistent with the data from national sources (for the most recent figures, see ILO, 2015a). The mean share of temporary workers is 11 per cent, with roughly one-third of the surveyed countries with temporary employment around this mean.

Figure 1.   Incidence of temporary employment, as percentage of total wage employment, in private sector, circa 2010
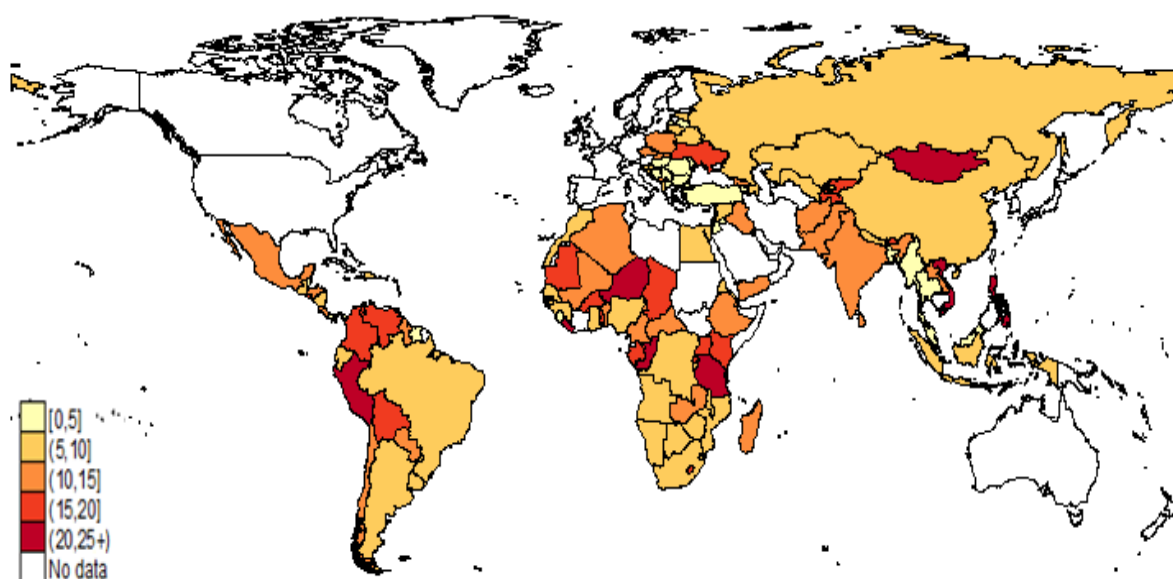
Source: Own computations based on the World Bank Enterprise Survey, 2015.

Notes: Data for 135 countries, for the latest available year, ranging from 2005 for Morocco and Egypt to 2014 for Afghanistan and Myanmar. For the majority of countries (67), data refer to 2009 or 2010.

Interestingly, however, only about 40 per cent of all firms throughout the world employ temporary workers, meaning that about 60 per cent of firms do not use temporary labour at all. The minority of firms that use temporary labour use it quite intensively: on average, about one third of their workforce is temporary (Figure 2). A closer look reveals however a strong heterogeneity across the using firms: 5 per cent of firms account for using 57 per cent of all temporary labour. From Figure 2, it is also apparent that there is a certain spike at 50 per cent of temporary labour, suggesting a possible categorization within the using firms. Firms with fewer than 50 per cent of temporary workers in their workforce account for 82 per cent of all using firms, and the mean share of temporary workers among them is a rather moderate 19 per cent. Firms with 50 per cent or more of temporary workers in their workforce account for 18 per cent of all using firms, and the mean share of temporary workers among them is 63 per cent. This suggests that there are some firms that may self-select into being high users of temporary labour, with their production process and human resource strategy organized around the use of temporary workers. Also, plausibly, firms make their decision about hiring temporary labour in two steps: they first decide whether to use or not temporary labour, and only then they decide how much.

Figure 2. Distribution of the firm-level number of temporary employees, as percentage of total employment, in firms employing at least 1 temporary worker
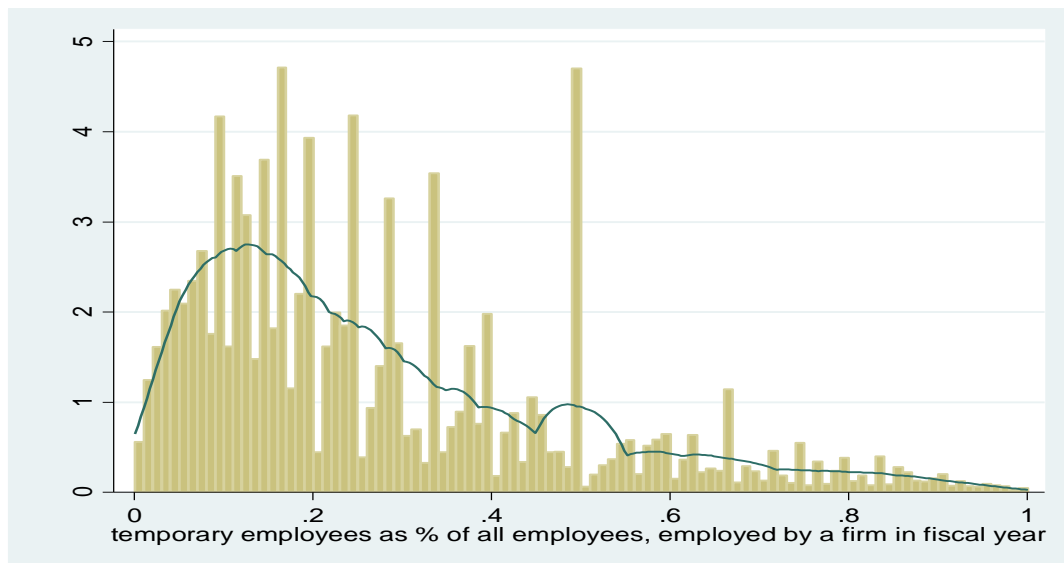
Source: Own computations based on the World Bank Enterprise Survey, 2015.

Notes: Data for 118 countries (baseline regression sample), all survey years (2006-2014).

Thus, we also checked the differences in means of characteristics of firms that do not use temporary labour, and the firms that do, distinguishing also between moderate and intensive users (Appendix C). The differences in most firm characteristics appear to be statistically significant based on t-tests for differences of sample means. While it is difficult to find a common pattern in these descriptive results, moderate users of temporary labour are more similar to non-using firms in terms of labour efficiency. They are also the ones that provide the most training to permanent staff. Figure 3 shows the distribution of firm size across three types of firms, and suggests that both types of using firms are bigger in size as compared to non-using firms, with intensive users having a potential to be more sizeable than all others. Thus, it seems that there are worthy differences between these firms.

Figure 3. Distribution of firm employees (in logs), by type of firm with respect to temps use
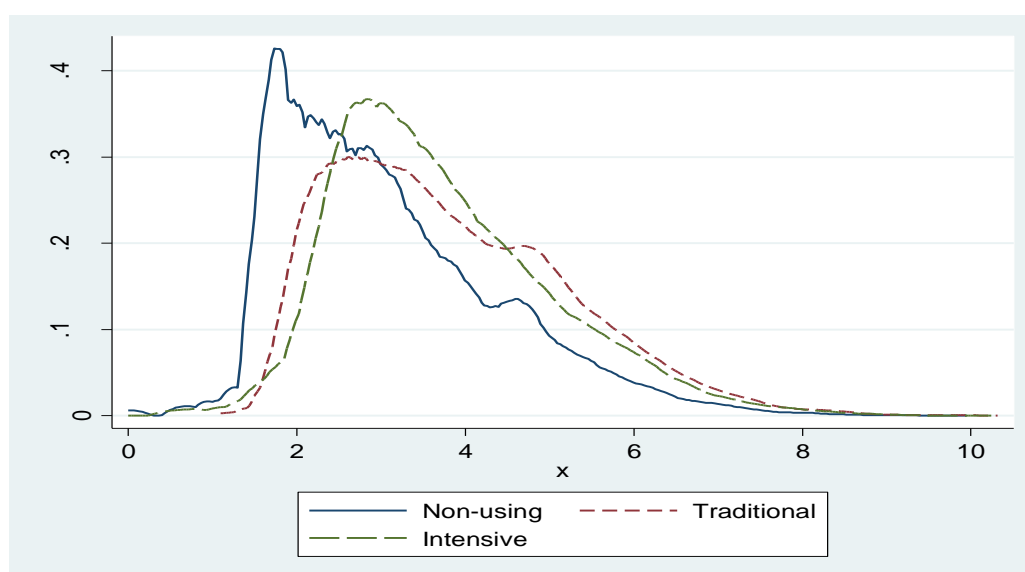

Source: Own computations based on the World Bank Enterprise Survey, 2015.

Notes: Data for 118 countries (baseline regression sample), all survey years (2006-2014).

Table 1 further provides an overview of the incidence of temporary employment across regions and sectors. It shows that in the Middle East and North Africa, as well as in South Asia, temporary employment, on average, is more wide-spread in manufacturing than in services (even though, of course, not all temporary employment in manufacturing sector is necessary employed in manufacturing production activities; it may include support and auxiliary personnel). The opposite is true in Africa, East Asia and Pacific, Europe and Central Asia, and in Latin America. With the exception of Middle East and North Africa, construction and transportation seem to be the sub-sectors that uniformly employ the largest share of temporary workers across the world. Temporary workers represent over 35 per cent of all workers in this sector in East Asia and Pacific, over 30 per cent in Latin America and Caribbean, over 25 per cent in Africa, and nearly 20 per cent on South Asia. Within manufacturing, it is the leather industry that employs the largest share of temporary workers (average number of temporary employees per firm is 32 per cent); in services, it is construction and transportation (average number of temporary employees per firm is 39 per cent) (Table 2). Intensive users of temporary workers are found mainly in services, hotels and restaurants, but also in the wood, food, and leather industry. Interestingly, the presence of intensive users in those sectors most associated with temporary employment—such as construction and transport—is more limited, suggesting that the motivations of the 'intensive' users extends beyond seasonality or other demands of the production process.

Table 1. Incidence of temporary employment, as percentage of total employment, by region and sector, circa 2010

	Manufacturing	Services
Region		
Africa	9.69	11.51
East Asia and Pacific	7.90	8.37
Europe and Central Asia	5.92	7.69
Latin America and Caribbean	7.01	11.93
Middle East and North Africa	13.21	12.21
South Asia	13.08	11.16

Source: Own computations based on the World Bank Enterprise Survey, 2015.
Notes: Data for 118 countries, all survey years (2006-2014).

Table 2. Incidence of temporary employment, by sector

M/S	Sector	Share of firms using any temporary labour	Mean share of temporary workers per firm	Share of using firms in which temp. lab. is >=50% of the workforce
M	Textiles	0.36	0.24	0.14
M	Leather	0.39	0.32	0.19
M	Garments	0.39	0.27	0.15
M	Food	0.47	0.28	0.19
M	Metals and machinery	0.40	0.25	0.14
M	Electronics	0.36	0.25	0.16
M	Chemicals and pharmaceuticals	0.42	0.22	0.11
M	Wood and furniture	0.38	0.31	0.22
M	Non-metallic and plastic materials	0.43	0.28	0.18
M	Auto and auto components	0.36	0.20	0.07
M	Other manufacturing	0.40	0.25	0.12
S	Retail and wholesale trade	0.33	0.26	0.15
S	Hotels and restaurants	0.43	0.29	0.20
S	Construction, Transportation	0.55	0.39	0.15
S	Other services	0.37	0.26	0.34

Source: Own computations based on the World Bank Enterprise Survey, 2015.
Note: Data for 118 countries, all survey years (2006-2014). M = manufacturing; S = services

Figures 4-7 also examine the relationship between the share of temporary wage employment and key country characteristics of interest to our analysis: the level of economic development, labour market regulations governing the use of FTCs and the termination of regular contracts. From Figures 4-5, firms in lower- and lower-middle income countries have considerably higher shares of temporary employees than in upper-middle and high-income countries, their number clearly decreasing with country's development. This finding reflects the more widespread use of casual employment in developing countries. In Figure 6, temporary wage employment distribution is shown by two types of countries: those that authorise the use of temporary labour for permanent tasks, and those that do not. While the two distributions appear similar, there is evidence that countries where FTCs are legally authorised for permanent tasks have a higher number of firms using temporary workers, particularly at the higher-end of the temporary employment distribution. The regulations of regular contracts appear unrelated to the firms' use of temporary labour (Figure 7).

Figure 4. Distribution of temporary employees, by country's level of development
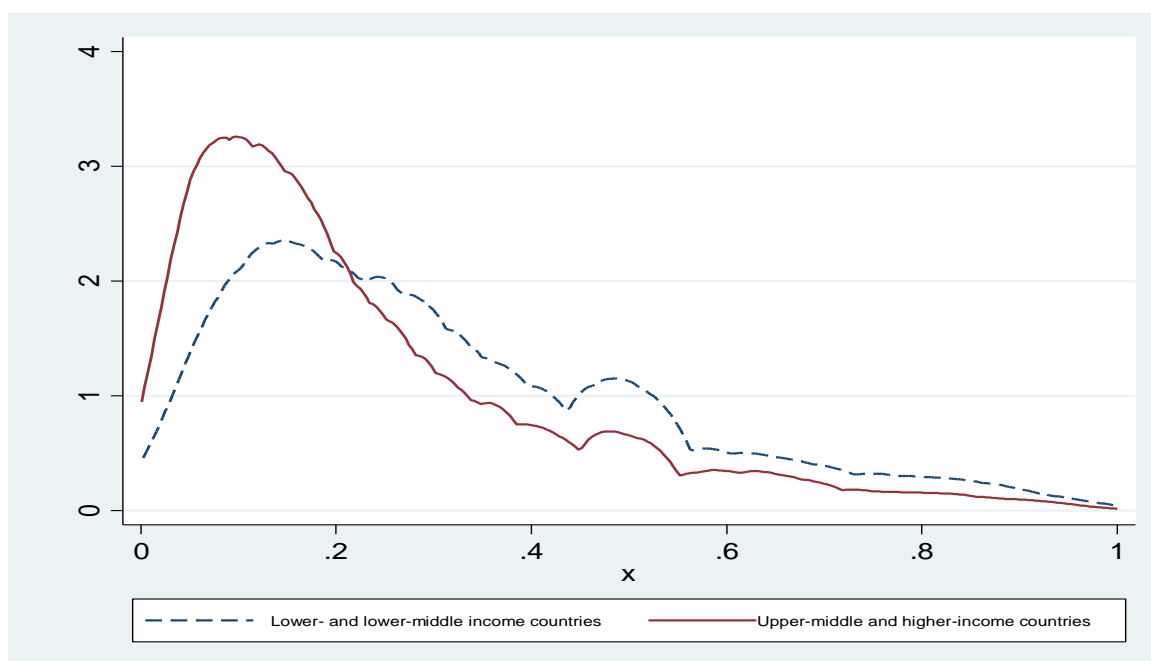
Source: Own computations based on the World Bank Enterprise Survey, 2015.

Notes: Data for 118 countries, all survey years (2006-2014). World Bank typology of countries by income

Figure 5.   Temporary employees and country income
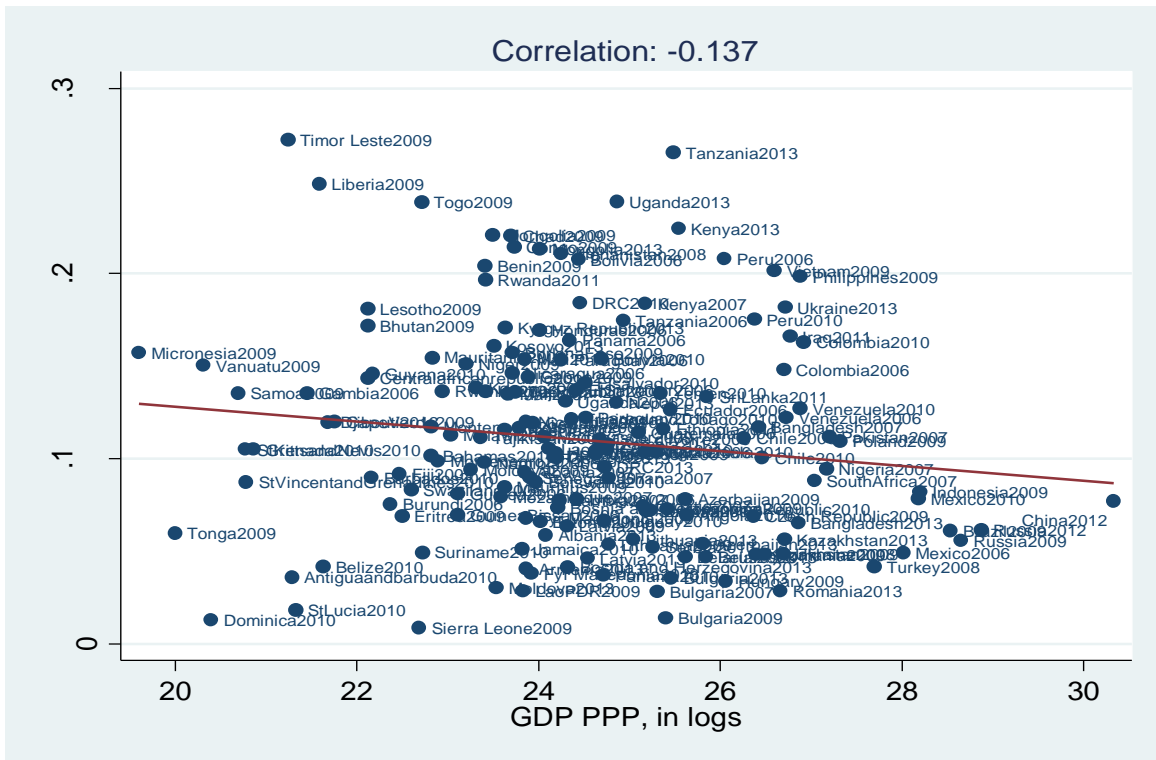
Source: Own computations based on the World Bank Enterprise Survey, 2015; and World Bank ICP, 2015.

Notes: Data for 166 country-year pairs (117 countries).

Figure 6.   Distribution of temporary employees, as percent of firm's workforce, by legal regulations governing fixed-term work
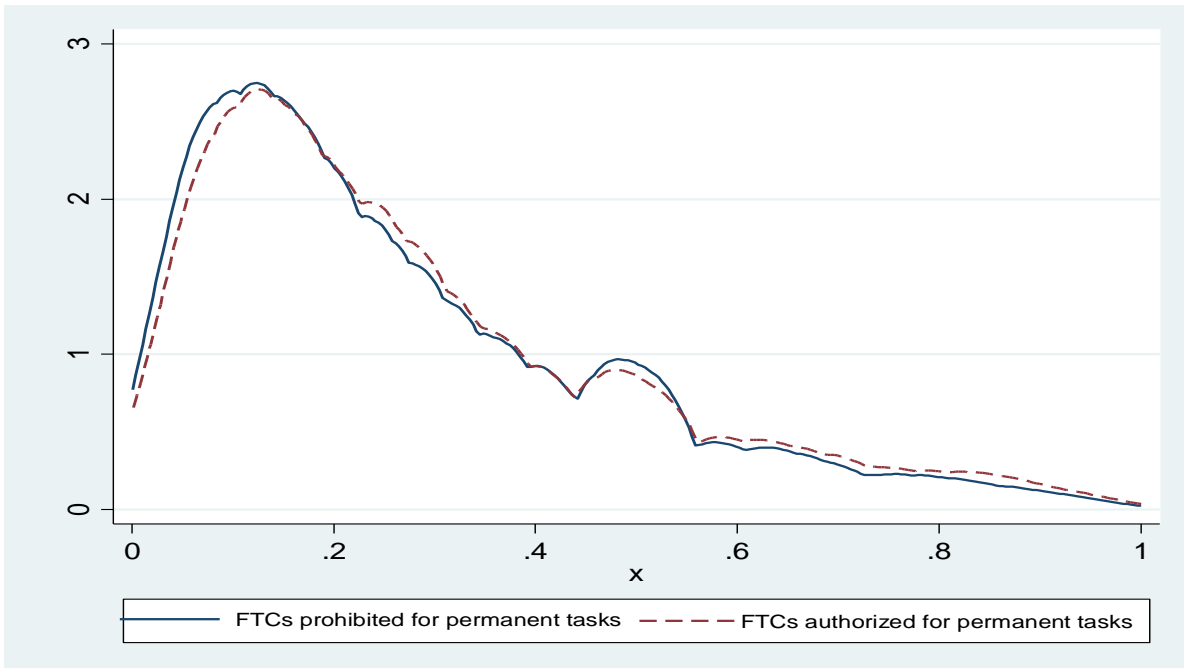
Source: Own computations based on the World Bank Enterprise Survey, 2015; and WB DB 2015 information.

Notes: Data for 118 countries, all survey years (2006-2014).

Figure 7. Temporary employees and country EPL
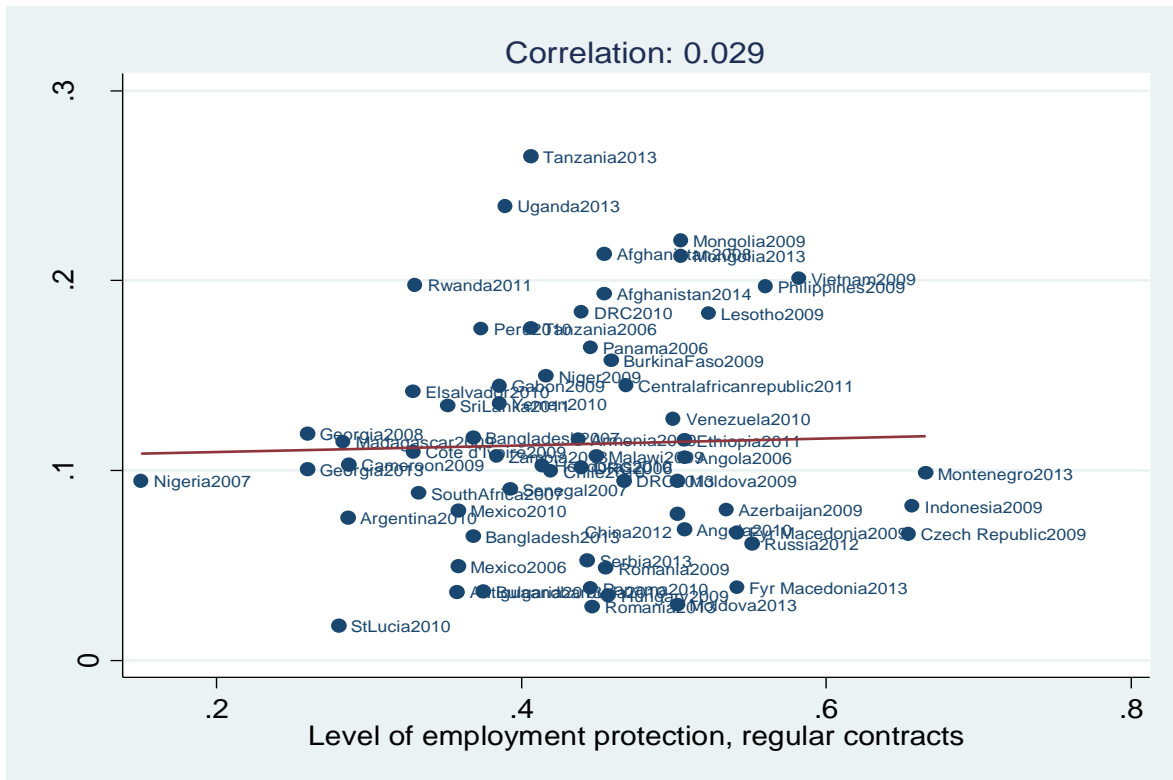
Source: Own computations based on the World Bank Enterprise Survey, 2015; and ILO EPLex (ILO, 2015d) information

Notes: Data for 63 country-year pairs (45 countries).

5.   Empirical setting and results

5.1   Specifications

Drawing on the overview of the literature, we start by examining the role of various factors in firm's decision regarding the amount of temporary labour to employ. The reasons that prompt firm's use of temporary labour are divided into those reasons that are 'internal' to the firm (micro-level) and those that are 'external' (macro-level). Within internal reasons, we distinguish between those that are related to flexibility, cost, and technology. For external factors, we test the relevance of the macroeconomic conditions and labour market institutions.

Our empirical set-up follows closely Davis-Blake and Uzzi (1993), Devicienti et al. (2014), and Portugal et al. (2009). The baseline specification allowing to analyse the firm-level internal determinants of using temporary workforce is as follows:

$$Temp\_share\_all_{ijkt} = \alpha_{ijk} + \beta_{1i} X_i + \beta_{2i} Y_i + j_j + k_k + t_t + \varepsilon_{ijkt} \qquad (1)$$

where $Temp\_share\_all_{ij}$ is the share of temporary labour in firm i operating in sector j country k and year t; X_i is the set of individual baseline firm characteristics; Y_i is the set of additional individual firm characteristics that allow testing the relevance of flexibility, cost,

and technology factors on the *micro* level. In all specifications, we control for sector, country, and year, by including the corresponding j_j, k_k, t_t dummies[1]; ε_{ijkt} is the error term.

Among the individual baseline firm characteristics X_i, we include the *total number of employees in a firm and its square*, to capture both the actual firm size and its possible nonlinear effects; *firm age* as a difference between the year of the survey and the date of firms' creation; two dichotomous variables for *firm ownership*: whether the firm is mainly owned by domestic private or foreign private individuals, the benchmark category being whether the firm is owned by domestic government; as well as *average productivity*, defined as logarithm of the ratio of the last years' establishment's total annual sales converted in the US dollars divided by all employees, as a measure (or rough proxy) of efficiency[2].

To analyze the relevance of *macro* factors, we also estimate specifications such as (2), where K_{kt} is the country-year specific macroeconomic variable.

$$Temp\_share\_all_{ijkt} = \alpha_{ijk} + \beta_{1i} X_i + \beta_{2i} Y_i + \beta_{3kt} K_{kt} + j_j + t_t + \varepsilon_{ijkt} \qquad (2)$$

Since not all countries are observed more than once in the data, to avoid multicollinearity issues, in such regressions, we omit country fixed effects, but cluster errors on the country level. We first estimate (1) and (2) by OLS, to obtain results comparable to those in the literature.

Lastly, we also consider the possibility that firms make their decisions regarding hiring temporary labour in two steps, first deciding whether to employ it or not, and only afterwards deciding on the amount. In these specifications, we use Cragg (1971) hurdle model, in which different factors affect each stage. Our hurdle model is characterized by the relationship:

$$Temp\_share\_all_{ijkt} = s_i h_{ijkt}{}^* \qquad (3)$$

where s_i is the selection variable equal to one if firms employ any temporary labour, and zero otherwise:

$$s_i = \begin{cases} 1 \ if \ Z_i \gamma + \varepsilon_i > 0 \\ 0 \qquad otherwise \end{cases} \qquad (4)$$

In this equation, Z_i is a vector of explanatory variables of the selection stage, γ is a vector of coefficients, and ε_i is a standard normal error term.

In its turn, h_{ijkt} * is the continuous latent dependent variable observed only if $s_i = 1$. The linear outcome model is:

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[1] Alternatively, one could also include survey dummies. We prefer separating country and time fixed effects, to the extent that several countries were surveyed several times, and there is enough variation in both countries and years.

[2] To explore the rich data at hand, we also tested potential importance of some other variables, such as a dichotomous variable for female ownership, a dichotomous variable measuring whether a firm has been formally registered when it began operations, and a variable measuring the skill production mix (computed as a ratio of permanent full-time employees that are skilled production workers, compared to all full-time permanent workers). We have not found any statistically significant effects on these variables (not reported, but available on request), and hence did not retain them for further specifications. We did find a statistically significant effect on the variable measuring the proportion of nonproduction employees to all permanent full-time employees (equally not reported); however, this variable is only available for manufacturing, thus considerably reducing the sample size. We have not retained it in further specifications either.

$$h^*_{ijkt} = \alpha_{ijk} + \beta_{1i} X_i + \beta_{2i} Y_i + \beta_{3kt} K_{kt} + j_j + t_t + \varepsilon_{ijkt} \qquad (5)$$

where X_i, Y_i and K_{kt} are the micro and macro explanatory variables as in equations (1) and (2).

5.2 Micro level determinants of firms' use of temporary labour

In this section, we explore the very rich questionnaire and construct variables most used in the literature to capture the external flexibility needs and the needs to adjust to the volatile environment; costs of labour; and technological factors on the *micro* level. These variables constitute the Y_i vector in specification (1). Table 3 reports estimation results using simple OLS regression, where, in columns 1-3, these variables are grouped by type of hypothesis that they pertain to; and in column 4 they are included jointly. We also control for X_i firm characteristics; *average productivity* is the only variable among them that exhibits the most robust and consistent effect across all specifications, suggesting that firms with higher average productivity recur less to temporary labour.

Flexibility hypothesis

To measure the need for external flexibility, in Table 3, column 1 we include information on the *principal market served*, the *extent of informal competition*, *demand volatility*, an indicator of *firm expansion*, and *whether a firm is credit-constrained*[3].

More specifically, the information on the *principal market served* is constructed from the survey question regarding the main market (either local, national or international) in which the establishment sold its major product over the past year. From these responses, we construct two dichotomous variables, the first equal to one if the principal market served is national, and the second equal to one if the principal market is international, with local market being a benchmark category.

The extent of *informal competition* is measured by a dichotomous variable equal to one if a firm reports suffering from competition against unregistered firms.

If firms use more temporary labour as a buffer to adjust to fluctuations in demand, a *demand volatility* measure is another relevant variable. We construct such measure following Devicienti et al. (2014) as the standard deviation of the difference between current annual sales and the annual sales three years ago calculated at the 2-digit ISIC product classification of the firm's main product. Higher values of this variable indicate higher volatility of demand for the firm's main product; the computation of this measure at the product level, rather than at firm level, also helps mitigate endogeneity concerns related to this variable.

Firms may need more flexibility when they expand their operations. As a measure of *expansion*, we include the ratio of current number of permanent employees to the number of permanent employees three years ago (expansion over a short to medium term). Higher values of this variable capture a mid-term and long-term growth of the core labour force and firm's expansion.

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[3] There is literature addressing how unionization can affect, both positively and negatively, firms' recourse to temporary labour. We used information on the share of unionized workers in an enterprise to explore this issue. The variable has an insignificant effect, but it is also available for only a fifth of the sample (the question is asked in only 27 countries, and only in 2006; with substantial number of missing values). Thus, we do not retain this variable for further analysis.

Table 3.   Firm-level determinants of using temporary work: flexibility, cost, and technology

VARIABLES	(1)	(2)	(3)	(4)
	Flexibility	**Cost**	**Technology**	**All**
Total N employees	1.15e-06	6.28e-06*	9.21e-06*	-6.52e-06
	(2.23e-06)	(2.77e-06)	(3.65e-06)	(4.38e-06)
Total N employees squared	-1.01e-10*	-3.20e-10*	-4.35e-10**	2.66e-10
	(1.08e-10)	(1.44e-10)	(1.66e-10)	(1.94e-10)
Firm age	0.006**	-0.001*	1.91e-05	0.005**
	(4.89e-05)	(5.74e-05)	(8.47e-05)	(0.001)
Own : domestic private	-0.008*	-0.016**	-0.018*	-0.002
	(0.004)	(0.005)	(0.008)	(0.011)
Own : foreign private	0.006	-0.009	-0.004	0.005
	(0.004)	(0.006)	(0.009)	(0.011)
Ln (Efficiency)	-0.010**	-0.017**	-0.017**	-0.008**
	(0.005)	(0.008)	(0.001)	(0.001)
National market	0.007**			-0.005
	(0.002)			(0.003)
International market	0.014**			0.002
	(0.003)			(0.006)
Informal competition	0.009**			0.012**
	(0.002)			(0.003)
Demand volatility	0.002**			0.003**
	(0.0001)			(0.0006)
Employment current to that three years ago	0.089**			0.094**
	(0.002)			(0.004)
Access to finance is an obstacle	0.002**			0.002
	(0.001)			(0.001)
Ln (Total labor cost)		0.002**		0.003**
		(0.006)		(0.009)
Training offered		0.012**		0.007**
		(0.002)		(0.002)
Regulations is an obstacle		0.005**		0.003*
		(0.001)		(0.001)
Education is an obstacle		0.003**		-0.001
		(0.0001)		(0.001)
Telecoms are a problem			0.006**	
			(0.001)	
Certification			-0.010**	-0.003
			(0.003)	(0.003)
Borrowed technology			0.007*	
			(0.003)	
Constant	0.085**	0.322**	0.295**	0.013
	(0.020)	(0.023)	(0.038)	(0.018)
Observations	43,158	43,158	21,600	43,158
R-squared	0.358	0.117	0.122	0.321

Note: Dependent variable in columns 1-4 is the share of temporary employees in a firm. Estimation method: OLS. All regressions include sector, country, and year effects. Robust standard errors in parentheses. ** - significant at 1 per cent, * - significant at 5 per cent.

Finally, the extent to which *access to finance* is an obstacle to the operations of an establishment is constructed from a question on whether firms perceive access to finance as being "no obstacle, a minor obstacle, a moderate obstacle, or a very severe obstacle to the current operations of the establishment", with higher values reflecting higher degree of obstacles. This is done consistently with Cagese and Cunnat (2008), who argue that the payment of wages and firing costs makes hiring and firing sensitive to the financing frictions that firms face and who classify firms as those facing financial constraints if they "answered positively to one or more questions regarding problems in obtaining additional credit".

All of these variables are found to have a statistically significant impact on the use of temporary labour both in the individual and (with some exceptions) joint specification (column 4 of Table 3), confirming the relevance of the flexibility hypothesis for firms in developing countries. As will be shown later, however, the only robust variables are, however, the ones measuring *firm expansion* and to a certain extent *informal competition* and *demand volatility*. While some of the firm's growth can happen because of the conversion of temporary into permanent contracts and investing in personnel, our results show that the firm expansion is accommodated by the use of temporary labour. Conversely, companies that had downsized might have done so at the expense of changing organizational structure, job definitions, but also terminating or not-renewing temporary labour.

Cost hypothesis

While many of the flexibility-related variables also embed cost factors, the literature offers more direct ways of testing for the relevance of the cost hypothesis. We follow it by including, in Table 3 column 2, *the total labour costs*, as well as controls for whether firms offer *training to permanent staff*. Our estimation results show that the higher is the total labour bill (expressed in logarithmic term, and converted into USD), the higher is the incidence of temporary labour. The training dummy also shows a positive and significant result. The literature suggests that training effects may be different depending of the nature of temporary jobs and depending on the nature of training. The positive coefficient on training offered to permanent workers is in line with the hypothesis suggesting that firms organize their workforce along the core-periphery model, whereby the core workforce receives training and is used with a long-term perspective, while the periphery workforce, which is also usually less skilled and lower paid, rotates regularly.

In addition, we test whether the firm-reported perceptions of *labour regulations as being an obstacle* (though this question does not specify which labour regulations are referred to), and whether the firm-reported perceptions of *difficulty of finding a suitably educated workforce*, are associated with hiring temporary labour. Research shows that firm perceptions of regulations correlate well with the de jure level of actual labour regulations in a country (Pierre and Scarpetta, 2006). Both variables have a significant positive effect in the "cost" regression in Table 3 column 2, but only the firm-reported perceptions of labour regulations have a persistently robust effect in a larger specification (Table 3 column 4). In what follows, we discuss the robustness of other results to the inclusion on these variables.

Technology factors

To check the relevance of technology, we use three variables: the degree to which *telecommunications* were perceived as an obstacle to the current operations of the establishment; whether the establishment has an internationally recognized *certification*; and whether the establishment uses any technology *licensed* from a foreign-owned company (Table 3, column 3). The *telecommunications* variable most likely reflects volatility in production and thus the need to have a 'buffer' of labour, rather than the effect of technology on the standardization of production and the use of different types of labour. The

other two technology variables respond more directly to the literature. While in the "technology" specification of Table 3 column 3 these variables have expected signs, their inclusion also reduces substantially the sample size. In a larger specification of Table 3 column 4, we retain only the "certification" variable to preserve the sample size; however, its effect is no longer significant.

5.3   Macro level determinants of firms' use of temporary labour

Firms do not operate in isolation, and hence macroeconomic conditions as well as laws regulating the workplace are important influences on the degree of flexibility and cost-adjustments required by firms. Moreover, the level of economic development of a country may also affect the level of temporary wage employment if, for example, countries transitioning from self-employment to wage employment recur more heavily to temporary labour. Following the literature, we test the relevance of the level of country's economic development, its macroeconomic situation, as well as the relevance of labour market regulations governing the termination of regular contracts and the use of fixed-term contracts.

In Table 4, column 1, we build up on Table 3 column 4 by including three dichotomous variables reflecting country' level of economic development. As compared to low-income countries (the omitted group), firms in upper-middle and high-income countries feature a lower level of temporary labour, consistent with descriptive evidence in Figures 4-5. As the use of temporary labour is pro-cyclical (OECD, 2012, 2014; ILO, 2015a; Serrano et al., 2014 – for developing countries), we also control for GDP growth and its three-year lag, as well as for the level of unemployment (Holmlund and Storrie, 2002). These variables, however, are not found to be statistically significant in developing countries, potentially because, unlike in the developed countries, in developing countries the pool of suitable job applicants is not restrained by the number of unemployed, but is also represented by a larger number of self-employed willing to switch to wage employment, thus rendering the number of unemployed less relevant .

In the remainder of Table 4, we test the relevance of the labour market regulations governing the termination of regular contracts and the use of fixed-term contracts. To measure the level of protection afforded by employment protection legislation for regular contracts, we include the newly developed EPLex indicator (ILO, 2015c), which accounts for all aspects of employment protection legislation, such as the extent of protection afforded by valid and prohibited grounds for dismissal, trial periods, notification procedures and length of notice period, severance and redundancy payments, and redress provisions. While this indicator is available for 100 countries around the world and spanning 2009-2014; its overlap with the World Bank Enterprises Survey country sample is not perfect and restricts our sample to 45 countries. As some of the authors using these indicators note, it is also important to look at the role of each individual EPL sub-component, rather than at the EPL aggregates (Verkerke and Freyens, 2016 forthcoming). Thus, we use both aggregated EPLex indicator, to compare our results with those found in the literature, and the disaggregated components, to have a better understanding which EPL pillar is more relevant. To measure the regulations governing the use of fixed-term contracts, we use the World Bank's Doing Business Indicators database, and specifically two dichotomous variables: one on whether FTCs are prohibited for permanent tasks; and the other on whether legislation does not limit the use of FTCs .

In Table 4 column 2, an aggregate EPLex indicator is included in addition to the controls for macroeconomic conditions; its effect appears to be statistically insignificant, in line with the descriptive evidence of Figure 7. In column 3, two measures of FTC regulations are additionally included. While the EPLex variable remains insignificant, the

dichotomous variable measuring whether FTCs are prohibited for permanent tasks shows a negative and significant sign: the prohibition to use FTCs for non-temporary tasks clearly reduces firms' recourse to temporary labour.

Table 4. Macro-level determinants of temporary work use

	(1)	(2)	(3)	(4)	(5)
	Macro	**Macro, EPL**	**Macro, EPL, FTC**	**Macro, FTC, EPL disaggregated**	**No macro, no perceptions, no training, FTC, EPL disaggregated**
Low-middle income	0.002	0.008	0.001	0.009	-0.007
	(0.012)	(0.016)	(0.017)	(0.015)	(0.013)
Upper-middle income	-0.036**	-0.033*	-0.031*	-0.037	-0.065**
	(0.013)	(0.016)	(0.016)	(0.019)	(0.014)
High-income	-0.038**	-0.031*	-0.036*	-0.059*	-0.093**
	(0.013)	(0.017)	(0.018)	(0.025)	(0.019)
GDPgrowth	-3.64e-05	-0.0004	-0.0002	0.001	
	(0.001)	(0.001)	(0.001)	(0.001)	
GDPgrowth _3y_lag	-0.0005	0.0002	-0.001	0.001	
	(0.001)	(0.0007)	(0.001)	(0.001)	
Unemployed	0.001	-3.27e-05	-0.001	-0.003*	
	0.002	0.008	0.001	0.009	
EPLex		0.022	0.080		
		(0.052)	(0.045)		
FTC prohib perm			-0.028**	-0.046**	-0.042**
			(0.011)	(0.009)	(0.009)
FTC dur unlim			0.004	-0.001	-0.001
			(0.010)	(0.014)	(0.014)
A1_1 : Valid Reasons for Dismissal				0.043*	0.047**
				(0.016)	(0.016)
A1_2: Prohibited Grounds for Dismissal				0.061*	0.020
				(0.023)	(0.017)
A2 : Trial period				-0.021	-0.027*
				(0.016)	(0.013)
A3 : Notification Requirements				-0.055	0.033
				(0.044)	(0.039)
A4 : Severance/ Redundancy				-0.085**	-0.083**
				(0.027)	(0.023)
A5 : Redress for dismissals				0.041*	0.021
				(0.018)	(0.021)
Constant	0.003	-0.041	-0.039	-0.025	-0.025
	(0.021)	(0.043)	(0.047)	(0.052)	(0.051)
Observations	41,824	21,204	21,204	21,204	21,614
R-squared	0.331	0.337	0.341	0.348	0.346

Note: Dependent variable in columns 1-5 is the share of temporary employees in a firm. Estimation method: OLS. All regressions include firm-level controls as in Table 3, column (4), sector and year effects. Robust standard errors clustered on country, in parentheses. ** - significant at 1 per cent, * - significant at 5 per cent.

In Table 4 column 3, we include the ILO EPLex indicator disaggregated by its components, to assess which provisions play the most significant role in firms' decision-making. From this column, it is the degree of protection afforded by valid and prohibited grounds for dismissals, and degree of protection afforded to worker in case he or she wishes to contest the dismissal, that seem to be the factors positively affecting firm use of temporary labour. These factors are also the ones that, from an economic viewpoint, embed the highest degree of uncertainty about the outcomes of the dismissal process (ILO, 2015c). In contrast, higher levels of severance and redundancy pay have a negative association with temporary labour. Once again, the most robust effect is on the FTC regulations.

5.4   Robustness of the results

In the last column of Table 4, we test robustness of these findings to a specification omitting insignificant macroeconomic controls, the firm-reported perceptions of the extent to which labour regulations are an obstacle since those may be correlated with the EPLex (as shown in Pierre and Scarpetta, 2006), and the availability of training for permanent staff, since that may be co-determined with temporary labour when level of employment protection is too high (as shown in Pierre and Scarpetta, 2013). Regulations prohibiting FTC use for permanent tasks remain significant throughout, while results on EPL components are less stable.

We further checked robustness of these findings not only to the model specification, but also to alternative dependent variables and to the estimation methods, in Table 5. Column 1 is a replication of Table 3 column 4 for comparative purposes. Column 2 of Table 5 is also a replication of Table 3 column 4, but on a sample restricted to the one with available institutional data. This ensures that we compare changes in coefficients that are due to changes in the model, not to the sample. Column 3 of Table 5 adds further disaggregated EPL variables and regulations of fixed-term contracts. In column 4, the dependent variable is a binary variable equal to one if firms use any temporary labour, and zero otherwise; the estimation method is probit. Because a substantial percentage of firms do not employ temporary labour at all, our dependent variable, expressed either as a share or as a number of temporary workers, features a sizeable number of zeroes. Thus, in column 5, we also fit the Poisson count model which may be seen as more appropriate than OLS. All in all, our results are consistent across the different specifications.

5.5   Modelling the firm decision-making process

Our last and main analytical exercise concerns conceptually re-modelling firm-level decision to hire temporary labour. From the descriptive statistics, we noted that only about 40 per cent of all firms throughout the world employ temporary workers, meaning that about 60 per cent of firms do not use temporary labour at all, at least not on a regular basis. This leads us to suppose that firms make two-step decisions, by first choosing whether to use any temporary labour at all, and only then choosing its amount. To model such two-step decisions empirically, we employ a hurdle model, which allows disentangling the factors that affect the first and the second stage of the decision (Table 5, column 6). Among the variables affecting the first-stage decision we include the regulations of fixed-term contracts, as well as the maximum duration of trial periods for regular contracts, with the idea that in countries with shorter trial periods, fixed-term contracts can be used more intensively to serve a probationary role. All other variables are assumed to affect the second-stage firm decision on the quantity of temporary labour used. We also experimented with additionally including relatively stable, exogenous, firm-level characteristics, such as firm age, firm

ownership, market served, or certification to the first stage. The overall results when including these firm-level characteristics were similar.[4]

Table 5. Robustness of the results. Modelling the "two-step" firm decision process

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Share, OLS, T3	Share, OLS, T3 EPL sample	Share, OLS EPL	Dummy; Probit	Share; Poisson	Hurdle Model : full	Hurdle Model : «moderate» users	Hurdle Model : «intensive» users
Total N employees	-6.52e-06	-1.12e-05*	-1.22e-05*	-2.60e-05	-0.001	-2.69e-05**	-1.81e-05**	-9.91e-06
	(4.38e-06)	(4.69e-06)	(4.66e-06)	(3.70e-05)	(7.37e-05)	(9.17e-06)	(6.58e-06)	(1.78e-05)
Total N employees squared	2.66e-10	4.77e-10*	5.07e-10*	1.23e-09	5.26e-09	1.13e-09*	8.77e-10**	1.82e-09
	(1.94e-10)	(2.17e-10)	(2.18e-10)	(1.68e-09)	(3.54e-09)	(4.41e-10)	(2.96e-10)	(3.83e-09)
Firm age	0.004**	0.0003**	0.0003**	0.005**	0.001	-0.0003*	-0.0006**	0.0005*
	(0.0001)	(0.0001)	(0.0001)	(0.0009)	(0.002)	(0.0002)	(0.0001)	(0.0001)
Own : domestic private	-0.002	-0.007	-0.009	-0.304	-0.133	0.0325	0.033**	0.004
	(0.011)	(0.012)	(0.013)	(0.205)	(0.141)	(0.016)	(0.012)	(0.014)
Own : foreign private	0.005	0.002	-0.001	-0.147	-0.049	0.031	0.024	0.014
	(0.011)	(0.013)	(0.017)	(0.190)	(0.159)	(0.019)	(0.014)	(0.017)
Ln (Efficiency)	-0.008**	-0.008**	-0.008**	-0.094**	-0.086**	-0.002	0.003*	-0.005**
	(0.001)	(0.002)	(0.002)	(0.015)	(0.017)	(0.002)	(0.002)	(0.002)
National market	-0.0004	-0.001	-0.001	-0.002	-0.002	-0.006	-0.011*	-0.004
	(0.003)	(0.003)	(0.003)	(0.032)	(0.056)	(0.007)	(0.005)	(0.006)
International market	0.002	0.001	0.001	-0.059	-0.013	0.021*	-0.004	0.004
	(0.006)	(0.007)	(0.006)	(0.056)	(0.092)	(0.011)	(0.008)	(0.009)
Informal competition	0.012**	0.009**	0.008*	0.117**	0.096*	0.006	0.009*	-0.007
	(0.003)	(0.003)	(0.003)	(0.029)	(0.048)	(0.005)	(0.004)	(0.005)
Demand volatility	0.002**	0.002*	0.002*	0.012	0.015	0.003*	0.002	0.004*
	(0.001)	(0.001)	(0.001)	(0.008)	(0.014)	(0.001)	(0.003)	(0.002)
Employment current to that three years ago	0.094**	0.095**	0.094**	0.492**	0.354**	0.106**	0.051**	0.038**
	(0.005)	(0.006)	(0.006)	(0.046)	(0.010)	(0.002)	(0.002)	(0.002)
Access to finance is an obstacle	0.0002	0.001	0.003*	0.003	0.022	0.006*	0.004**	-0.0001
	(0.001)	(0.002)	(0.001)	(0.012)	(0.018)	(0.002)	(0.002)	(0.002)
Ln (Total labor cost)	0.003**	0.004*	0.005**	0.117**	0.046**	-0.017**	-0.018**	0.004*
	(0.0001)	(0.002)	(0.002)	(0.012)	(0.017)	(0.002)	(0.002)	(0.002)
Training offered	0.007**	0.016**	0.012**	0.230**	0.180**	-0.013*	-0.015**	0.018**
	(0.003)	(0.005)	(0.004)	(0.033)	(0.051)	(0.006)	(0.004)	(0.005)
Regulations is an obstacle	0.003*	0.006**	0.007**	0.068**	0.056*	0.007*	0.005*	0.001
	(0.001)	(0.002)	(0.002)	(0.016)	(0.023)	(0.003)	(0.002)	(0.002)
Education is an obstacle	-0.0007	-0.0003	-0.0002	0.028*	0.019	-0.008**	-0.003	-0.003
	(0.001)	(0.002)	(0.002)	(0.013)	(0.021)	(0.003)	(0.001)	(0.003)
Certification	-0.003	0.003	0.006	-0.048	0.088	0.041**	0.023**	0.031**
	(0.003)	(0.004)	(0.004)	(0.046)	(0.059)	(0.007)	(0.005)	(0.007)

[4] As such, we do not report the results, but they are available upon request.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A1_1: Valid grounds for dismissals			0.051**	0.386**	0.379**	-0.017	-0.014	0.015
			(0.017)	(0.139)	(0.143)	(0.016)	(0.012)	(0.014)
A1_2 : Prohibited grounds for dismissals			0.023	0.379**	0.277*	0.009	0.016	-0.010
			(0.016)	(0.141)	(0.117)	(0.014)	(0.010)	(0.013)
A2 : Trial period			-0.027	-0.058	-0.255*	*-0.031*	*-0.083**	*0.270***
			(0.014)	(0.117)	(0.118)	*(0.028)*	*(0.223)*	*(0.047)*
A3 : Notification Requirements			0.033	0.381	0.482	0.067	0.058*	-0.030
			(0.038)	(0.338)	(0.310)	(0.034)	(0.026)	(0.034)
A4 : Severance/ Redundancy			-0.079**	-0.612**	-0.486**	0.027	0.034*	0.018
			(0.024)	(0.197)	(0.181)	(0.018)	(0.014)	(0.018)
A5 : Redress for dismissals			0.027	0.208	0.310*	0.031*	0.030*	-0.009
			(0.021)	(0.178)	(0.133)	(0.015)	(0.011)	(0.014)
FTC dur unlim			-0.001	0.022	-0.043	*0.008*	*-0.011*	*0.194***
			(0.0137)	(0.119)	(0.081)	*(0.020)*	*(0.021)*	*(0.034)*
FTC prohib perm			-0.042**	-0.376**	-0.388**	*-0.108***	*-0.091***	*-0.123***
			(0.009)	(0.085)	(0.073)	*(0.018)*	*(0.019)*	*(0.031)*
Constant	0.013	-0.012	-0.005	-1.315**	-2.598**	*0.126***	0.182***	0.302**
	(0.018)	(0.036)	(0.048)	(0.483)	(0.367)	*(0.035)*	(0.041)	(0.057)
Observations	43,158	21,377	21,377	21,377	21,377	21,377	20,485	21,377
R-squared /Pseudo R-squared	0.321	0.326	0.336	0.221	0.267	0.294	0.278	0.292

Note: Dependent variables: col. 1, 2, 3, 5 - share of temporary employees in a firm; col. 4 - dummy variable measuring whether a firm employees any temporary labour; col. 6, 7, 8 – two stage estimation; dummy variable measuring whether a firm employees any temporary labour in the first stage; share of temporary employees in a using firm in the second stage. Estimation methods: col. 1, 2, 3 – OLS; col. 4 – probit; col. 5 – PMLE: col. 6, 7, 8 – Cragg hurdle model (coefficients in italics and bold are from the first stage regression; all others are from the second stage). All regressions include country-income, sector, and year effects. Robust standard errors, clustered on country level, in parentheses. ** - significant at 1 per cent, * - significant at 5 per cent.

Taken together, results in Table 5 column 6 show that many variables considered up to now do not stand robustness check to this alternative specification, either losing significance or reversing signs. In order to better understand these results, we exploit another key observation from the descriptive statistics suggesting that there may also be different types of firms that use temporary labour: some firms use temporary workforce in "moderate" amounts, while others use it very intensively. In some sense, the former firms may be more similar to firms that do not use any temporary labour at all then to intensive users. For example, moderate users may be those non-using firms that occasionally happen to use some temporary labour for what can be called "traditional" reasons, such as replacing a temporarily absent worker, meeting short fluctuations in seasonal demand, or for probation, with the aim of converting them into permanent employees. In contrast, intensive users would be those that strategically organize their production process around the possibility of using temporary labour. Thus, the true difference may not between the using and non-using firms, but firms that use temporary labour very intensively and all others.

To explore this possibility, we divide the firms that use temporary labour into two groups, based on descriptive statistics. The first group is composed of moderate, or traditional, users: these are the firms that have fewer than 50 per cent of temporary labour in their workforce. They represent 87 per cent of the sample of the using firms. The second group is composed of intensive, or strategic, users: these are the firms in which 50 per cent

or more of their workforce is temporary labour[5]. We then run two additional hurdle models. In Table 5 column 7, the selection model is fit for non-using firms versus moderate users (in other words, intensive users are dropped from the estimation). In Table 5 column 8, we treat moderate users *as if* they were the same as non-using ones; hence the selection stage of the hurdle model is between an intensive user and all others.

The results of these two estimations are striking. They help explain why the aggregated hurdle model gave unexpected and very mixed results, and also reinforce the idea that the two types of using firms are very different. They also help understand why existing literature on firm use of temporary labour, which did not distinguish between these different firms, sometimes produced opposing results on the role of some firm-level characteristics. Approximately half of the variables in the model differentiating between non-using and moderately-using firms have signs as suggested by previous literature and by our own previous estimations; but the same is also true in the model differentiating between intensive users and all other firms. Specifically, contrasting column 7 and 8 of Table 5, we find that intensive users are older and less efficient, they are also more labour-intensive firms that use temporary labour to face demand volatility and to save on labour costs. In contrast, moderate users are younger, more efficient, and less labour-intensive; they choose to employ temporary labour to cope with informal competition and credit constrains, as well as under the condition that the costs of labour are low. A case in point is the switching sign on the *training for permanent staff* variable. For intensive users, it appears with a positive and significant sign. Existing literature suggests that finding a positive sign is in line with the hypothesis that firms organize their workforce along the core-periphery model, whereby the core workforce receives training and is used with a long-term perspective, while the periphery workforce, which is also usually less skilled and less paid, rotates regularly and can be terminated at any time, for example, when just-in-time production needs are met. For moderate users, the sign on the *training for permanent staff* is negative, and this finding is also legitimate in the literature. It signifies that most of the firms' workforce is core and benefits from equal access to training, while temporary labour is used for probationary reasons, with the aim of converting them to permanent jobs. Finding this opposite sign on training reinforces the idea that "intensive" and "moderate" users differ in their approach as to what role that temporary labour is supposed to serve.

Interestingly, the only firm-level variable that has the same sign for both types of firms is *employment current to that three years ago*, suggesting that expanding firms use temporary labour more intensively. In a separate set of regressions (not reported, but available on request), we also interacted this variable with sector dummies in order to capture the extent to which decisions to employ temporary labour may be driven by specificities of the production process. For moderate users, expansion in any sector leads to higher use of temporary labour, indicating once again that the moderate using firms are adding workers in response to increasing demand. For intensive users, however, only an expansion in six of the fifteen sectors (leather, food, metals and machinery, chemicals and pharmaceuticals, non-metal sector, and construction) leads to greater use of temporary labour. This suggests again that the reasons for employing large amounts of temporary labour among 'intensive' users goes beyond pressures of increased demand. Moreover, it does not seem that the structure of the production process associated with these sectors is driving firms' decision to primarily employ temporary workers, as these sectors entail a wide variety of production methods.

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[5] We also tried alternative thresholds. The results presented in this section still hold true if we set the threshold of 40 per cent; they start being different from those presented here if a lower threshold is chosen. We prefer to keep the 50 per cent threshold, as it is justified by descriptive statistics (Figure 2). It is of course possible that some firms with fewer than 50 per cent of temporary labour also use temporary labour strategically and as part of their human resources model.

On the macro policy side, the single most robust and consistent variable affecting firm-level decisions is whether fixed-term contracts are prohibited for permanent tasks: both types of firms use less temporary labour if such prohibitions legally exist. For intensive users, regulations allowing for an unlimited use of temporary labour and regulations allowing for longer probationary periods are also important, once again suggesting that such firms may strategically and intentionally benefit from such regulations to maintain their high levels of temporary labour. At the same time, other regulations on terminating permanent contracts do not seem to play a role for intensive users. In contrast, for moderate users, regulations of terminating permanent contracts afforded by such specific aspects of regulation as severance pay, or contesting dismissals, appear to lead to higher use of temporary labour, suggesting as well that these firms hire temporary workers with a later transition to permanent employment in mind. These firms, however, disregard regulations allowing for an unlimited use of temporary labour when choosing whether to employ any temporary labour or not – most probably because indeed they have no intention to take advantage of these regulations and use temporary labour indefinitely. Interestingly also, longer probationary periods do not spark more use of temporary labour by moderate users; if anything, they are associated with lower use of temporary labour, possibly because it is quickly converted into permanent one when genuinely used for probation purposes.

Our results on EPL are different from those of Pierre and Scarpetta (2013), who report that the level of EPL has a positive effect on the firm's use of temporary labour, while regulations of fixed-term contracts do not play a role. The differences between their results and ours are mainly due to a different sample size, different modelling of the firm decision to use temporary labour, different set of controls, different estimation techniques (notably distinguishing between different types of using firms), and a different measure of EPL (they rely on the World Bank's Employing Workers measures that include procedural requirements, notice period, and severance payments, we use numerous additional EPL components). While we also find some evidence that some of the EPL components, though not the aggregate EPL, may foster the use of temporary labour by some firms, we find a more expected, consistent, and strong effect of regulations of fixed-term contracts on the firm use of temporary labour.

6.   Conclusions

This study has sought to increase understanding of the use of temporary labour by firms in developing countries. Using firm-level data from the World Bank Enterprise Survey, we attempted to identify the reasons that motivate firms to rely on temporary labour. The vast country coverage also allowed us to examine the role of labour market institutions and of the macroeconomic environment in affecting firms' demand for temporary labour, providing a new evidence for non-OECD, non-European countries, and also providing new evidence to developments during a period of global economic crisis. As such, the study contributes to a better understanding of both firm-level and country-level determinants of temporary labour use in developing countries.

The paper showed that the use of temporary labour differs widely across firms, with the majority of firms (60 per cent) not using temporary labour at all. Within the 40 per cent of firms that do use temporary labour, temporary labour accounts for 28 per cent of the labour force on average, but there is wide variability in use.

Our analysis indicates that firms' motivation for using temporary labour is similar to that found in studies on industrialized countries. Flexibility and cost considerations are the key motivators; in particular, it is the expanding firms that are in the highest demand for temporary labour. At the same time, the novel result of this paper is to distinguish between

three types of firms: those that do not use temporary labour, those that use it for what we called "traditional" purposes, and those that use it "intensively". We show that intensive or "strategic" users are quite distinct from all other firms, including on how they respond to labour regulations. Legislation limiting the use of temporary contracts to specific activities of firms has a statistically negative influence on the use of temporary labour among all types of firms. In contrast, legislation limiting the duration of fixed-term contracts affects only those firms that are intensive users; it does not seem to influence firms using moderate amounts of temporary workers. Some aspects of employment protection legislation governing termination of regular contracts seem also to be relevant for the amount of labour hired by moderate users, but not for intensive users.

There has been a growing concern in recent policy debates about an increase in non-standard forms of employment and the decline of the standard employment relationship. Although temporary contracts are just one form of atypical contract, little is known about their use in developing countries. This study was an attempt at exploring trends in the use of temporary labour across developing countries in order to better understand firms' principal motivations. From a policy perspective, our findings are telling as they improve policymakers understanding of business constraints, but also give evidence of the scope of legislation to tailor business practices. They are also important in light of proposals for reforms of regulations of both permanent and temporary contracts, because they indicate that some reforms would have a different impact depending on the type of the firm. For example, according to our results, changes in the regulations of permanent contracts would probably do little to curb the use of temporary labour by those firms that already built this practice into their production processes. In contrast, there may be merits to some more specific policies targeted at firms using temporary labour intensively, especially if there is evidence of abuse of such practice.

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Annex

Appendix A. Sample Description

Destination country	Year	N Obs	Percent of Temporary Employees	Destination country	Year	N Obs	Percent of Temporary Employees	Destination country	Year	N Obs	Percent of Temporary Employees
Afghanistan	2008	434	21.3918	El Salvador	2010	277	14.16529	Namibia	2006	317	9.688589
Afghanistan	2014	91	19.28149	Eritrea	2009	106	6.89072	Nepal	2009	360	10.39414
Albania	2007	189	9.384569	Estonia	2009	239	6.64964	Nepal	2013	470	13.06999
Albania	2013	314	5.75747	Ethiopia	2011	499	11.60685	Nicaragua	2006	439	14.70149
Angola	2006	399	10.68037	Fiji	2009	78	9.366153	Nicaragua	2010	280	12.07867
Angola	2010	247	6.892796	Gabon	2009	130	14.47734	Niger	2009	113	14.97948
Antigua&Barbuda	2010	129	3.622026	Gambia	2006	165	13.55719	Nigeria	2007	1888	9.470597
Argentina	2006	980	9.538945	Georgia	2008	254	11.94288	Pakistan	2007	879	11.19986
Argentina	2010	925	7.523945	Georgia	2013	277	10.08041	Panama	2006	449	16.47372
Armenia	2009	274	11.63175	Ghana	2007	491	8.955808	Panama	2010	174	3.806549
Armenia	2013	238	4.12913	Grenada	2010	137	10.33253	Paraguay	2006	470	15.38784
Azerbaijan	2009	321	7.914034	Guatemala	2006	484	11.48099	Paraguay	2010	303	12.35198
Azerbaijan	2013	247	5.424102	Guatemala	2010	424	10.42807	Peru	2006	602	20.77694
Bahamas, The	2010	113	10.34101	Guinea	2006	220	7.610419	Peru	2010	892	17.44318
Bangladesh	2007	1497	11.7283	Guyana	2010	135	14.31241	Philippines	2009	1082	19.69354
Bangladesh	2013	1372	6.516064	Honduras	2006	386	16.78804	Poland	2009	276	10.96497
Barbados	2010	106	8.830107	Honduras	2010	248	10.27072	Romania	2009	334	4.873075
Belarus	2008	210	4.714482	Hungary	2009	271	3.430295	Romania	2013	463	2.833184
Belarus	2013	277	4.581499	Indonesia	2009	1208	8.12531	Russia	2009	708	5.542517
Belize	2010	144	4.107819	Iraq	2011	746	16.61607	Russia	2012	2928	6.153202
Benin	2009	140	20.4159	Jamaica	2010	291	5.12601	Rwanda	2006	212	13.63512
Bhutan	2009	247	17.251	Kazakhstan	2009	423	4.859324	Rwanda	2011	183	19.7706
Bolivia	2006	517	20.5292	Kazakhstan	2013	414	5.705701	Samoa	2009	65	13.08744
Bolivia	2010	200	15.36946	Kenya	2007	651	18.41259	Senegal	2007	502	9.003974
Bosnia and Herz.	2009	268	7.364587	Kenya	2013	565	22.28328	Serbia	2009	348	7.204587
Bosnia and Herz.	2013	290	4.238508	Kosovo	2009	225	13.83496	Serbia	2013	326	5.279713
Botswana	2006	317	11.69092	Kosovo	2013	172	15.71932	Sierra Leone	2009	72	0.8796296
Botswana	2010	221	8.365674	Kyrgyz Repu	2009	179	13.8971	South Africa	2007	930	8.800745
Brazil	2009	1640	6.065185	Kyrgyz Repu	2013	204	17.29786	Sri Lanka	2011	518	13.42112
Bulgaria	2007	965	2.841465	Lao PDR	2009	356	2.766383	St. Kitts and Nevis	2010	122	10.80674
Bulgaria	2009	222	1.409893	Lao PDR	2012	241	10.46691	St. Lucia	2010	138	1.833798
Bulgaria	2013	263	3.6525	Latvia	2009	233	6.465533	St VincentGrenadines	2010	135	8.021189
Burkina Faso	2009	348	15.78973	Latvia	2013	260	4.58356	Suriname	2010	148	4.930005
Burundi	2006	269	7.413216	Lesotho	2009	126	18.27225	Swaziland	2006	289	8.275153
Cabo Verde	2009	136	12.0012	Liberia	2009	146	24.83996	Tajikistan	2008	269	10.92475
Cameroon	2009	338	10.30204	Lithuania	2009	237	5.411226	Tajikistan	2013	242	13.70742
CAR	2011	135	14.49879	Lithuania	2013	214	5.57341	Tanzania	2006	406	17.49463
Chad	2009	139	22.1019	Macedonia	2009	302	6.723407	Tanzania	2013	261	26.53369
Chile	2006	894	11.22114	Macedonia	2013	337	3.828199	Timor-Leste	2009	112	27.23614
Chile	2010	917	9.977137	Madagascar	2009	339	11.48611	Timor-Leste	2013	403	10.02667
China	2012	2575	7.714693	Malawi	2009	127	10.75824	Togo	2009	138	23.87403
Colombia	2006	946	14.82269	Mali	2007	490	13.50929	Tonga	2009	145	5.985089
Colombia	2010	882	16.31705	Mali	2010	217	15.34622	Trinidad and Tobago	2010	315	11.94436
Congo, DR	2006	338	10.16731	Mauritania	2006	225	15.64842	Turkey	2008	819	4.203303
Congo, DR	2010	231	18.33741	Mauritius	2009	354	8.554749	Uganda	2006	541	12.98259
Congo, DR	2013	461	9.466037	Mexico	2006	1236	4.95173	Uganda	2013	360	23.90944
Congo, Rep.	2009	108	21.4466	Mexico	2010	1341	7.902197	Ukraine	2008	572	4.857404
Costa Rica	2010	424	10.46577	Micronesia	2009	55	16.02705	Ukraine	2013	167	18.36828
Cote d'Ivoire	2009	494	10.98156	Moldova	2009	342	9.45156	Uruguay	2006	492	7.821853
Croatia	2007	571	7.492337	Moldova	2013	297	2.940748	Uruguay	2010	458	6.625985
Croatia	2013	311	7.194686	Mongolia	2009	356	22.10404	Vanuatu	2009	94	15.44932
Czech Republic	2009	176	6.676604	Mongolia	2013	314	21.28933	Venezuela, RB	2006	438	12.21569
Djibouti	2013	204	12.14256	Montenegro	2009	76	11.89336	Venezuela, RB	2010	180	12.72716
Dominica	2010	141	1.2824	Montenegro	2013	99	9.873299	Vietnam	2009	981	20.12735
Dominican Rep.	2010	306	7.271244	Mozambique	2007	469	7.911129	Yemen, Rep.	2010	317	13.53957
Ecuador	2006	565	12.57322	Myanmar	2014	539	4.089261	Zambia	2007	475	7.613627
El Salvador	2006	655	13.73477					Zambia	2013	602	10.74533

Note: Counted are the observations of the sample restricted for *the baseline* econometric analysis. Total sample is 71,943 observations. This is the sample we use for all descriptive statistics in this paper. In some specifications, the sample size is reduced to 43,158 observations with non-missing data on *all* firm-level variables of interest; and to 21,377 observations with non-missing data on *all firm-level and country-level variables* of interest.

Appendix B. Description of Variables

Variable	Description
Temp_share_all	Ratio of the total number of temporary workers to the sum of temporary and permanent workers in a firm
Dummy temp	Dichotomous variable equal to one if a firm employs any temporary labour, zero otherwise
Temporary all	Total number of temporary workers in an enterprise
Total N employees	Total number of temporary and permanent workers in a firm
Total N employees squared	Total number of temporary and permanent workers in a firm, squared
Firm age	Difference between the year of the survey and the date of firms' creation
Own : domestic private	Dichotomous variable equal to one if a firm is mainly owned by domestic private individuals
Own : foreign private	Dichotomous variable equal to one if a firm is mainly owned by foreign private individuals, the benchmark category being whether the firm is owned by domestic government
Ln (Efficiency)	Logarithm of the ratio of the last years' establishment's total annual sales converted in the US dollars and divided by all employees
National market	Dichotomous variables equal to one if the principal market in which the establishment sold its major product over the past year is national
International market	Dichotomous variable equal to one if the principal market in which the establishment sold its major product over the past year is international; local market serving as a benchmark category
Informal competition	Dichotomous variable equal to one if the establishment competes against unregistered or informal firms
Demand volatility	Log of standard deviation of the difference between current annual sales and the annual sales three years ago calculated at the 2-digit ISIC product classification of the firm's main product. Higher values of this variable indicate higher volatility of demand for the firm's main product
Employment current to that three years ago	Ratio of current number of permanent employees to the number of permanent employees three years ago
Access to finance is an obstacle	Is access to finance, which includes availability and cost, interest rates, fees and collateral requirements: 0-No Obstacle, 1 - a Minor Obstacle, 2 - a Moderate Obstacle, 3 - a Major Obstacle, or 4 - a Very Severe Obstacle to the current operations of this establishment?
Ln (Total labor cost)	Logarithm of the total annual cost of labor, coverted into US dollars, in this establishment in the last fiscal year
Training offered	Dichotomous variable equal to one if over the last fiscal year the establishment had formal training programs for its permanent, full-time employees
Regulations is an obstacle	Are labor regulations: 0- No Obstacle, 1 - a Minor Obstacle, 2 - a Moderate Obstacle, 3 - a Major Obstacle, or a 4 - Very Severe Obstacle to the current operations of this establishment?
Education is an obstacle	Is an inadequately educated workforce: 0 - No Obstacle, 1 - a Minor Obstacle, 2 - a Moderate Obstacle, 3 - a Major Obstacle, or 4 - a Very Severe Obstacle to the current operations of this establishment?
Telecoms are a problem	Is telecommunications: 0 - No Obstacle, 1 - a Minor Obstacle, 2 - a Moderate Obstacle, 3- a Major Obstacle, 4 - a Very Severe Obstacle to the current operations of this establishment?
Certification	Dichotomous variable equal to two if the establishment has an internationally-recognized quality certification; to one otherwise
Borrowed technology	Dichotomous variable equal to one if the establishment uses technology licensed from a foreign-owned company, excluding office software
Manufacturing	Dichotomous variable equal to one if a firm operates in manufacturing sector; zero if in services

Source: World Bank Enterprise Survey, 2015. Online Database. Available at: www.enterprisesurveys.org . Accessed: January 2015.

Low-middle income ; Upper-middle income; High-income	Dichotomous variables equal to one if a country belongs to one of these groups, based on the World Bank classification; low-income countries is the omitted benchmark category
GDPgrowth	Contemporaneous GDP growth
GDPgrowth_3y_lag	GDP growth with a 3-year lag
FTC prohib perm	Dichotomous variable equal to one if fixed-term contracts use is legally prohibited for permanent tasks
FTC dur unlim	Dichotomous variable equal to one if fixed-term contracts use has legally set maximum duration

Unemployed	Unemployment rate, total labour force

EPLex	Employment protection legislation summary indicator measuring the degree of protection afforded to workers when permanent contracts are terminated at the initiative of the employer
A1_1 : Valid reasons for dismissal	Component measuring the degree of protection embedded in the valid reasons for dismissals (ranging from 0, when there is no obligation to have a reason for dismissal, to 1, when there is an obligation to have a reason for dismissal, and valid grounds are only worker's conduct)
A1_2: prohibited grounds for dismissal	Component measuring the degree of protection embedded in prohibited grounds for dismissals (ranging from 0 national labour legislation contains a list of prohibited grounds for dismissal / discrimination cases that only partly meets the ILO fundamental principles and rights at work to 1 when national labour legislation contains a list of prohibited grounds for dismissal / discrimination cases that fully meets the ILO fundamental principles and rights at work; and exceeds the principles established by specific international labour standards governing employment termination
A2 : Trial period	EPLex sub-component measuring maximum probationary period, including all possible renewals, normalized to reflect 0 - no limitation; 1 - less than 1 month
A3 : Notification requirements	Average of two EPLex sub-components; first measuring procedural notification requirements for individual dismissals (ranging from 0 – when employer need only orally notify a worker of a decision to terminate his employment; to 1 – when employer cannot proceed to dismissal without authorisation from a third party); and second measuring notice period at seven different tenures (normalized so that 0 = minimum, including zero; 1 = maximum).
A4 : Severance/ Redundancy	Average of two EPLex sub-components; first measuring severance pay at 7 tenures, second measuring redundancy pay at seven tenures; each normalized so that 0 = sample minimum; 1 = sample maximum.
A5 : Redress for dismissals	EPLex sub-component reflecting the degree of protection embedded in the options legally offered to workers contesting their dismissal because of the lack of valid grounds; ranging from 0, when no remedy is available as of right, to 1 when reinstatement is available in case of unfair dismissal and is the primary remedy for unfair dismissal; legal text explicitly mentions award of back pay and/or other additional payments

Appendix C. Descriptive Statistics

Variable	Firms not using any temporary labour		Moderate users (temporary labour<50% of workforce)		Intensive users (50% or more of workforce is temporary)	
	Obs	Mean	Obs	Mean	Obs	Mean
Temp_share_all	44,541	0.00	22,604	0.20	4,798	0.64
Temporary all	44,541	0.00	22,603	21.98	4,794	83.41
Total N employees	44,541	78.43	22,528	128.51	4,789	113.67
Firm age	44,541	16.14	22,604	19.23	4,798	15.59
Own : domestic private	44,541	0.90	22,604	0.86	4,798	0.89
Own : foreign private	44,541	0.07	22,604	0.11	4,798	0.07
Ln (Efficiency)	44,541	9.85	22,604	9.75	4,798	8.90
National market	44,541	0.24	22,604	0.25	4,798	0.22
International market	44,541	0.06	22,604	0.06	4,798	0.07
Informal competition	44,541	0.41	22,604	0.44	4,798	0.44
Demand volatility	44,533	22.50	22,598	22.64	4,797	22.55
Employment current to that three years ago	40,028	1.25	19,148	6.10	4,111	7.68
Access to finance is an obstacle	42,340	1.56	21,884	1.63	4,583	1.73
Ln (Total labor cost)	41,762	10.94	21,356	11.56	4,436	10.66
Training offered	32,978	0.36	16,748	0.51	3,450	0.40
Regulations is an obstacle	44,002	0.91	22,461	1.13	4,737	1.01
Education is an obstacle	43,954	1.34	22,399	1.60	4,728	1.44
Borrowed technology	27,451	0.13	14,137	0.17	2,819	0.13
Certification	43,469	1.82	21,896	1.75	4,656	1.82
GDPgrowth	44,541	3.12	22,604	3.17	4,798	3.28
GDPgrowth_3y_lag	44,541	4.51	22,604	4.30	4,798	4.22
Unemployed	43,407	8.75	21,935	8.97	4,714	8.15
AREA1	21,714	0.50	10,304	0.52	2,354	0.49
AREA2	21,714	0.64	10,304	0.65	2,354	0.69
AREA3	21,714	0.28	10,304	0.29	2,354	0.30
AREA4	21,714	0.21	10,304	0.21	2,354	0.19
AREA5	21,714	0.61	10,304	0.59	2,354	0.62
EPLex	21,714	0.43	10,304	0.43	2,354	0.43
FTC prohib perm	44,497	0.53	22,544	0.50	4,796	0.48
FTC dur unlim	44,541	0.54	22,604	0.56	4,798	0.60
Manufacturing	44,541	1.45	22,604	1.40	4,798	1.47

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