PROJECT AID, FIRM PERFORMANCE AND THE LABOR'S SHARE

Silvia Marchesi, Tania Masi, Saumik Paul

November 2019

PRELIMINARY and INCOMPLETE

Abstract

This paper examines the link between development project aid, growth of firm sales, and labor's share, by using data on 136,507 firms spread across 139 countries, and 5,881 World Bank aid projects between 2002 and 2014. Utilizing a detailed firm-sector-region mapping, this paper distinguishes between sector-specific projects, which affects firms in a particular sector and region-specific projects, which affects firms from all sectors in a specific geographic region. The identification of the causal effect of project aid on firm performance relies on the variation in the aid flow across sectors within a region, across regions within a country, and the interaction of them over time. Preliminary results suggest that sectoral projects are more effective than regional one in increasing firms' sales growth. In particular, the amount of sales would be 8% higher for firms benefiting from sectoral projects. This paper contributes to the literature on the aid-effectiveness contingent on the types of aid and, to the best of our knowledge, is the first study that evaluates the effect of sectoral level aid on firm sales and the labor income share at the firm level.

Keywords: Aid effectiveness, World Bank, Geo-coding, Firm growth, Labor income share

JEL Classification: F35, O19, E24, E25

Marchesi: University of Milano Bicocca and LdA, <u>silvia.marchesi@unimib.it;</u> Masi: University of Milano Bicocca, <u>tania.masi@unimib.it;</u> Paul: University of Newcastle and IZA, <u>paulsaumik@gmail.com</u>

INTRODUCTION

There is a renewed interest in the aid-growth relationship that aims to refine the treatment of endogeneity between aid and economic performance in the existing literature, which has long been a subject of methodological weaknesses especially in cross-country analysis(Deaton, 2010, Temple, 2010). The availability of geo-coded aid data with precise locations of the aid-recipient regions within national boundaries has produced an emerging strand of literature evaluating aid-effectiveness at the subnational level. Likewise, advances have also been made in the directions of using outcome variables indicating economic prosperity at more disaggregated levels (Chauvet and Ehrhart, 2018; Del Prete *et al.* 2019; Ponticelli and Presbitero 2017;Bluhm et al. 2018; Dreher and Lohman 2015; Gehring *et al.* 2019; Marchesi and Masi 2019). Aa recent study documents that a 10-percent increase in aid raised firm sales' growth by around .5 percentage points (Chauvet and Ehrhart, 2018).¹ While the aid-effectiveness has mostly been studied through the lens of again in economic prosperity, it is imperative that we also understand how the growth-dividend affects returns to factor inputs. Specifically, little is known on how development aid affects the income share of labor at the firm level².

This paper extends the current literature on aid and economic performance in several directions. It examines the link between aid and shared economic prosperity by utilizing a sample of almost 136,507 firms spread across 139 countries. It evaluates the performance of firm considering changes in the firm sales as well as the labor's share in firm sales in response to development assistance provided by the World Bank. We postulate that project aid affects firm sales and the share of labor in it through firm-level restructuring, and test the causal channel by applying a detailed firm-sector-region mapping that distinguishes between sector-specific and region-specific development assistance projects provided by the World Bank between 2002 and 2014. The region-specific aid affects firms from all sectors in a specific region whereas the sector-specific aid affects firms in a particular sector (food, mineral, other manufacturing, wholesale and retail, transport, communication and hotel and other services). Variation in the aid flow across sectors within a region, across regions within a country, and the interactions of them over time identifies the causal effect of project aid on the firm performance. We use World Bank projects data, provided by AidData (2017), and firm level data from the World Bank Enterprise Survey (WBES)³. Our preliminary results suggest that sectoral projects are more effective than regional one in increasing firms' sales growth.

¹ Ponticelli and Presbitero (2017) also show that Chinese-financed development projects had a positive effect on firm sales and labor productivity in recipient economies.

² Several World Development Reports (WDR) published by the World Bank, especially since the 2006 report on Equity and Development, highlighted the role of shared prosperity and growth in lowering income disparity.

³ In the Appendix we describe in detail the mapping of the aid data between sectors and regions.

Our contribution is threefold. First, we contribute to the recent advances in the use of the geo-coded aid data by distinguishing between project- and region-specific aid. We claim that this allows for a closer match of the location of aid and its potential beneficiaries. Second, a distinction between project- and region-specific project aid sheds light on the various channels that impinge on the levels of aid-effectiveness extending the literature on the aid-effectiveness contingent on the types of aid (e.g., Clemens *et al.* 2012, Asmus *et al.* 2016). Lastly, to the best of our knowledge, this is the first study that evaluates the effect of the project aid on the labor income share at the firm level.

This paper relates to two strands of literature.. The vast literature on aid effectiveness literature converges towards either a null effect (Doucouliagos and Paldam, 2009), or small positive effects (Galiani *et al.*, 2017) of aid on growth. This effect, however, depends on whether aid was politically motivated or had a clear development focus (Dreher *et al.*, 2018a). In that regard, the WB approach mostly reflects a model of conditional aid, which integrates expert knowledge with a clear focus on development. Although there is also some political influence on WB decisions (Dreher *et al.*, 2018b), their projects are less politically motivated than other types of aid (e.g., Dreher *et al.*, 2009).⁴ Still, traditional donors have also been criticized for a lack of "ownership" and underutilizing local knowledge in recipient countries (Dreher *et al.* 2017).⁵

More specifically, this paper is related to a growing body of literature which focuses on project-level aid (rather than country-level), especially in the case of World Bank projects. See, for example, Denizer *et al.* (2013), Dreher *et al.* (2013, 2015), Feeny and Vuong (2017), Kilby (2013, 2015), Öhler and Nunnenkamp (2014), Shin *et al.* (2017). Most of these papers actually focus on project performance. Focusing, in particular, on World Bank projects, Shin et al. (2017), find that the choice of an implementing partnership seems indeed to be a significant indicator whether a World Bank development project will be successful or not. One of the important factors for a successful allocation would be the expertise of the related implementing partner, such as skills (knowledge and experience) and governance (organizational and institutional aspects). By considering project preparation, Kilby (2015) represents an exception. He finds substantially shorter project preparation periods for World Bank loans to countries that are geopolitically important (especially to the U.S.). This channel of donor influence provides a new angle to examine the cost of favoritism and the impact of project preparation.⁶

⁴ There is some empirical evidence linking a country's geopolitical proximity to the World Bank's major shareholders with a variety of types of preferential treatment (e.g., Dreher *et al.* 2009, Kaja and Werker 2010; Kilby 2009, 2013). For a recent survey see Dreher and Lang (2016).

⁵ Minasyan et al. (2017), for instance, demonstrate the importance of donor quality for aid effectiveness. For recent surveys of the aid effectiveness literature, see Werker (2012), Dreher *et al.* (2017), and Doucouliagos (forthcoming).

⁶ Kilby (2015) assesses also the impact of World Bank project preparation on project outcomes finding that projects with longer preparation periods are significantly more likely to have satisfactory outcome ratings.

This paper also relates to the analysis of labor income share. Between 1994 and 2014, the labor income share dropped in 29 out of 50 countries⁷ (Dao, Das, Koczan, and Lian, 2017). A decline in the labor income share indicates a slower growth rate of product wages than the growth in the average productivity of labor. To this extent, micro-level studies provide insightful knowledge on the drivers of the labor income share. Studies at the firm or sectoral level could potentially explain the rising gap between the rate of growth in labor productivity and that of wages using financial aid, globalization, labor market regulations, and other institutional factors. A study by Böckerman and Maliranta (2012) using longitudinal plant-level data on Finland show that micro-level restructuring could explain a significant part of the differences between the declining labor income share and increasing labor productivity. They also show that a growing level of international trade catalyzes this process. Aghion and Howitt (2006), in an earlier paper, argued that micro-level restructuring is an important factor in understanding the industrial productivity growth. A similar concern is echoed in the trade and international finance literature (Melitz 2003; Bernard and Jensen 2004, Furceri *et al.* 2018). It argues that in the presence of heightened competitiveness due to globalization, resources are reallocated from the less efficient to the more efficient firms.

At the firm level, the labor income share can be defined as the portion of the firm's sale that goes to the workers. Firm-level restructuring can lower the labor income share in various ways. Böckerman and Maliranta (2012) find that productive firms are less likely to hire more employees at least in the short run because they use the existing set of inputs more efficiently. Consequently, a hiring freeze could restrict the growth rate of the total wage bill, anticipating that wages do not change in the short run. At the same time, a higher productivity growth resulting from the efficient allocation of resources increases the return to capital per unit of labor. Furthermore, complementarity between skilled labor and capital can induce firms to replace unskilled workers with capital if the latter becomes relatively cheaper. All these mechanisms could potentially lead to a lower share of income for labor.

We organize the rest of the paper as follows. In section 2, we discuss data sources, descriptive evidence on the firm level labor income share and mapping of the data between World Bank Enterprise Survey (WBES) and the World Bank Project (WBP) data. Section 3 illustrates the identification strategy and empirical model, focusing on firm sales. The explanation of the empirical results then follows in Section 4. Section 5 considers labour income share as dependent variable. Finally Section 6 concludes.

⁷ Accounting for almost two-thirds of the world's GDP.

2. BACKGROUND AND DATA DESCRIPTION

This paper exploit two datasets. We use the AidData (2017) dataset, which includes 5881 World Bank projects in the International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA) lending lines, approved from 1995 to 2014.

The main outcome variables on firm performance come from a second dataset. We use an unbalanced panel of 136,507 firms spread across 139 countries, spanning a period of 15 years (2002 to 2017) from the World Bank Enterprise Survey data (Isaka and Paul, 2019). This survey includes firms spread across 139 countries and collects information on a broad range of topics, including access to finance, corruption, infrastructure, crime, competition, labor, obstacles to growth, and performance measures. Roughly 10% of the firms were successfully re-contacted so that they have more than one year of information, which makes this dataset an unbalanced panel. A full description of countries with survey years covered by the World Bank Enterprise Survey data is provided in the Appendix. The following section discusses in detail the methodology we follow to map these two datasets

2.1. Mapping aid data to firm level outcomes

Among other project characteristics, AidData provides information on the types of sector used to indicate which part or the economy is supported. We drop some of sectors as they are not conducive to account for firm level performances, and we finally work with a list of 62 sectors. We re-organize the classification of sectors from both datasets into a comparable set of six broad categories of industries: food, mineral, other manufacturing, wholesale and retail, transport, communication and hotel and other services. Table 1 presents this group of industries (coded 1 to 6).

WB project categories	WBES sector categories	Code
Region-specific	Firms in all sector	0
	Firms in food sector	1
	Firms in mineral sector	2
	Firms in other manufacturing sectors	3
Sector-specific	Firms in wholesale and retail sectors	4
	Firms in transport, communications (IT) and hotels	5
	Firms in other services sectors	6

Tab	le 1	Broad	l cat	eaor	ies n	f aid
Tub		Diouo	i cui	cyor	103 0	i uiu

Source: authors' calculations based on the Aiddata (2016)

The aid projects (e.g., infrastructure) that are not sector-specific and that could be related to the overall performance firms from any sector within a region are classified under region-specific category and coded as "0". We group 62 industrial sectors from the AidData into to these categories following the

table in the Appendix. We drop 18 sectors (e.g., flood protection or health) from the total list of 80 sectors of aid because as they are not directly related to the firm performance. In a similar way, we regroup 51 industrial sectors from the World Bank Enterprise survey data into the six broad categories sectors as defined in Table 1. Table 2 shows the distribution of 136,507 firms across this broad classification of industries. Almost 18% of the firms are in the wholesale and the retail category, followed by 14% in the mineral sector, 8% in the food sector and 3% in the transport, communication and the IT sector. The rest of the firms are classified into the "other manufacturing" and "other services" sectors. In the Appendix we show the detailed mapping of 51 industrial sectors from the World Bank enterprise survey data into six broad categories of aid.

WBES broad sector categories	Number	Percent
Firms in food sector (=1)	11364	8%
Firms in mineral sector (=2)	18977	14%
Firms in other manufacturing sectors (=3)	51824	38%
Firms in wholesale and retail sectors (=4)	24306	18%
Firms in transport, communications (IT) and hotels (=5)	4162	3%
Firms in other services sectors (=6)	25874	19%

Table 2. Distribution of firms across broad sectors in the WBES data

Source: authors' calculations based on World Bank Enterprise Survey (WBES) data

As a next step, we restrict the years of analysis into a feasible set. The World Bank Enterprise Survey data is available for the period from 2003 to 2018, whereas the information of the World Bank projects is available from 1995 to 2014. Following the literature, we use two-year lag assuming it takes about two years for a firm to potentially benefit since a World Bank project is committed. This allows us to evaluate any World Bank development commitments took place between 2001 to 2014, and the firm-level outcomes realized in the period from 2003 to 2016. In the Appendix we show the year in which WB projects were undertaken and the number of firms surveyed in each round. Turning to the Aiddata containing information on the World Bank development assistance, in the Appendix we also show the distribution of projects by country for the period from 2001 to 2014. Since the number of aid projects are more than one in many cases, and these aid projects could fall into the same or different broad sectors as defined in table 1, we created unique year-sector dummies for each region. This gives a total of 75 possible year-sector combinations from 15 years and World Bank interventions in 5 possible ways (region-specific, food sector, mineral sector, wholesale and retail trade sector and transport communication and hotels sector).

Finally, we locate World Bank projects into the same administrative level of the firms. While AidData provides geocoded data of each World Bank project, the geocodes are not available from the WBES data. Therefore, we identified the latitude and longitude of the ADM1 level in which the firm operates

using the names of the regions reported in the WBES dataset.8 Figure 1 shows the worldwide distribution of World Bank projects and firm displayed at the regional level. Red dots refer to WBES firms, while grey dots are WB projects.



Figure 1: Project and firm distribution across countries

Note: Red dots refer to WBES firms, while grey dots are WB projects.

Since the information on WB projects are provided considering different administrative levels, we reconducted them to the first administrative level. Finally, we matched each firm with WB projects implemented in the same ADM1 two years before the interview, and distinguishing between sectoral and regional projects.

Figures 2-4 below illustrate the distribution of all World Bank projects, regional and sectoral, respectively, by country's income group and by regions. Figure 2 shows that World Bank projects mostly go to low and lower middle income countries, around 60 percent of those countries. The proportion is much smaller for upper middle income and high income ones (around 20 percent). More specifically, South Asian countries obtain the highest percentage of them (80 percent), followed by East Asia and Sub-Saharan Africa, for which this proportion decreases to about 50 percent. Countries in the remaining

⁸ Specifically, we proceed as follow. First, we corrected misspelled names and unencoded characters. We also separated multiple locations (e.g. 5 small cities), attributed all ADM1 when "Entire country" was specified, and retrieved ADM1 when different levels were specified (e.g. NUTS or North, South etc). Then, we geolocated each query using the Python client Geopy. Finally, we fill data gaps if the algorithm failed to find the coordinates, using Google Maps. In the following analysis we discard firms that operates in more than ADM1.

three regions (Sub-Saharan Africa, Europe and Central Asia and Latin America) obtain more or less the same percentage of projects, about 20 percent of countries in these three areas.



Figure 2: All World Bank projects

Figure 3 shows that regional projects are mostly concentrated in low and lower middle income countries as opposed to middle and high income ones. As the region classification is concerned, we can see that regional projects are more common in Middle East and North Africa, followed by South Asia, Europe and Central Asia and Latin America; Sub-Saharan Africa and East Asia receive the smallest percentage.



Figure 3: Regional projects

Finally, from Figure 4 below we can see that sectoral projects are also more common in low and lower middle income countries, and, for those countries, higher in percentage that regional ones. Similarly, high income countries tend to receive a higher percentage of sectoral than regional projects, while, for upper middle countries the percentage is quite similar. About 30 percent of countries in East and South Asia, and around one quarter of Sub-Saharan countries receive sectoral projects, while only around 5 percent of the countries in Middle East and North-Africa obtain sectoral aid. Thus sectoral projects are more common than regional aid in East and South Asia and in Sub-Saharan Africa as well. The opposite

holds for countries in the Middle East and North-Africa which tend to receive more regional aid. Finally the proportion of regional and sectoral projects is quite similar for European and Central Asian and for Latin American countries.





2.2. Sales and the labor Income share at the firm level

This paper employs a novel firm-level dataset on the labor income share compiled by Isaka and Paul (2019). Using the World Bank Enterprise Survey data, Isaka and Paul (2019) put together an unbalanced panel of 146,666 firms from 139 countries, spanning a period of 15 years (2002 to 2017). The survey includes firms spread across 139 countries and collects information on a broad range of topics, including access to finance, corruption, infrastructure, crime, competition, labor, obstacles to growth, and performance measures. Roughly 10% of the firms were successfully re-contacted so that they have more than one year of information, which makes this dataset an unbalanced panel. Table A7 provides a description of countries with survey years covered by the World Bank Enterprise Survey data.

The labor income share is essentially a macroeconomic concept, defined as the share of national income allocated to labor, and is generally computed from aggregate data by dividing total labor compensation by national income (GDP). The labor compensation should encompass not only wages and salaries but also bonuses and social payments, which are considered non-wage compensation, for the accuracy of calculation. However, even this computation does not give us the labor income share that we seek to obtain because it overlooks contributions from self-employment (Krueger, 1998; Gollin, 2002). If the earnings of the self-employed are taken as capital income as in the conventional method, then it may underestimate the true value of labor income share and bias international comparisons (Guerriero, 2012). Thus, in the macro framework, researchers suffer from the limitation of how to take self-employment into account to gain a less biased labor income share.

In this paper, we use the information on compensation at the firm level, which is less susceptible to problems related to the mixed income that arises from self-employment. The Enterprise Survey (ES) asks the same set of questions of enterprises that have employer–employee relationships, so we are not concerned about the comparison within our dataset. Following Zhou (2016), we define the labor income share (LIS) at the firm level as:

$$LIS_{i,t} = \frac{Compensation of employees_{i,t}}{total \ sales_{i,t}}$$

Using this definition, we can use almost all observations in our dataset, including services and other sectors. Compensation of employees is the total annual cost of labor (including wages, bonuses, and social payments). Figure 5 illustrates the distribution of total sales by sectors and countries' classification, while Figure 6 and 7 show the distribution of log sales and LIS by sectors, firm' size, and countries' classification, respectively















Before scrutinizing labor income share, some observations are found far beyond its expected range. These values may bias our estimation, so we attempted to detect outliers as follows: First, the LIS values are transformed into log (LIS). Then we apply the three-standard-deviation rule: observations that are more than three standard deviations away from the mean are then marked as outliers and turned into missing. In the Appendix we illustrate the distribution of LIS by income group and regions, by firm size and ownership as distinguished by the two sectors of manifacturing and serices.

3. MODEL AND DATA

We investigate the impact of foreign aid on firm performance using the following general specification:

$$p_{i,k,h,j,(t,t-2)} = \alpha + \beta T_{h,k,t-1} + \gamma X_{i,k,h,j,t} + \delta Y_{h,j,t-2} + \tau_{k,t} + \varepsilon_{i,k,h,j,t}$$
(1)

As outcome variable p, we first consider a dummy variable, *growth*, that is equal to 1 if the sales of firm i, in industry k, region h and country j are higher at time t than at time t-2, and 0 otherwise. Then, we consider the annual growth rate of the sales, computed over three years, between year t and t-2. Finally, we evaluate the effect of Labor income share, defined as in Section 2. T is the treatment variable, a dummy equal to 1 if at least one WB project is implemented in region h (or sector k) at time t-1. We evaluate all WB projects, as well as regional and sectoral projects separately. We also control for the project amount.

X is a set of time varying firm-level characteristics, while *Y* is a set of (time variant) regional-level variables including recipient i's logged regional population.⁹ We include industry x year dummies, $\tau_{k,t}$, in order to control for industry time-varying heterogeneity.

⁹ Time invariant regional controls could be: the initial level of regional development, area, air-line distance from the regional centre to the country capital.

In this framework, the aid variable is measured at the local level whereas the outcome, sales growth, is measured at the firm level. As underlined by Chauvet and Ehrhart (2018), there result a statistical bias from attempting to measure the effect of aggregate policy variables on micro units. Consequently, the standard errors are clustered at the level of aggregation of the variable of interest. In our case, given that projects are aggregated at the region-year level, we cluster the standard errors at the same level.

We control for the lagged value of *Sales*, in logarithm, which is measures at t-2. We also control for the following characteristics. *Firm Size*, which takes the value one for firms with fewer than 20 employees, the value two for firms with between 20 and 100 employees, and three for firms with more than 100 employees. *Legal Status of the firm*, which is a categorical variable accounting for the ownership of the firm. *National Sales*, which is the percentage of sales in the domestic market. Finally, *Cost per Employee*, which is the sum of labor, production and sale costs divided by number of employees. The firm-level characteristics are measured in year t since we do not have their pre-determined value at year t-2.

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm characteristics					
Growth (dummy)	52899	0.67	0.47	0.00	1.00
Growth rate of sales	52899	0.04	0.61	-15.20	0.94
Labour Income Share	33528	0.22	0.21	0.00	7.00
Sales (log)	52899	17.04	3.05	1.65	33.85
Sales _{t-2} (log)	52899	17.00	3.06	6.68	37.24
Firm size	52899	1.80	0.78	1.00	3.00
Legal Status of the firm	52899	2.89	1.09	1.00	6.00
National Sales	52899	90.44	24.58	0.00	100.00
Cost per employee (log)	52899	12.92	2.80	-3.00	26.85
Regional level					
Wb projects	52899	0.46	0.50	0.00	1.00
Project amount	52899	60.11	248.94	0.00	1990.42
Regional Projects	52899	0.09	0.28	0.00	1.00
Regional project amount	52899	23.01	91.82	0.00	604.48
Sectoral Projects	52899	0.22	0.41	0.00	1.00
Sectoral project amount	52899	37.10	172.90	0.00	1402.86
Population	52899	15.40	1.69	9.10	19.03

Table 3: Summary Statistics

Notes: Firm-level variables are from the World Bank Enterprise Surveys (various years).

Table 3 presents basic summary statistics for our sample of firms. To avoid extremely fast-growing firms driving the results, we excluded the top ten percent of the growth distribution from the sample.

Methodologically, we exploit variation between "treated" and "non-treated" firms and apply a classic Difference in Differences regression. We start to consider the effect of all projects, we then focus on the differential effect of both region- and sector-specific World Bank development assistance. The control group encompasses firms which are receiving no project at all.

4. BASELINE RESULTS

This section presents our baseline results distinguishing between sales and labor income share.

4.1 SALES

We start by evaluating the effect of WB projects on sales growth defined as a dummy variable taking value 1 whether sales are higher at time t than at time t-2. In columns 1, 3, 5, and 7 we consider the dummy variable of the treatment, only, whereas in the remaining columns we control for the amount of aid too. Columns 1 and 2 show the results when all aid projects are considered without differentiating between types of project, columns 3 and 4 report the impact of regional projects, and columns 5 and 6 of sectoral projects. Finally, the last two columns contain the full specification which included both regional and sectoral projects. While all these results are reported for comparison, we largely base the discussion on the fully specified model of column 8.

Size is positive and significant suggesting that larger firms also tend to have a positive growth of sales. Firms with higher cost per employee are also associated to higher growth rate. Finally regions with higher population density are also more likely to have firms with positive growth rate. The coefficient of Sales_{t-2} suggests a catching-up effect: firms with lower sales in *t-2* tend to have a higher probability of having a positive growth of sales than firms that already had high sales.

Turning to the correlation between foreign aid and firm growth, Table 4 shows a positive and significant coefficient for sectoral projects, when they are considered separately (column 4) and in conjunction with regional projects (column 8). This suggests that they are more effective than regional ones to enhance firm sales. In particular, benefiting from sectoral WB project may increase the probability of having a positive sales growth by 6%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WB projects	0.057*** (0.019)	0.050*** (0.019)						
Project amount		0.000** (0.000)						
Regional Projects		. ,	0.012	0.020			0.003	0.016
Regional project amount			(0.020)	-0.000 (0.000)			(0.020)	-0.000 (0.000)
Sectoral Projects					0.078*** (0.026)	0.061** (0.027)	0.081*** (0.025)	0.064** (0.027)
Sectoral project amount					. ,	0.000** (0.000)	. ,	0.000* (0.000)
Sales _{t-2} (log)	-0.075*** (0.003)	-0.075*** (0.003)	-0.072*** (0.003)	-0.072*** (0.003)	-0.071*** (0.003)	-0.071*** (0.003)	-0.073*** (0.003)	-0.073*** (0.003)
Firm size	0.178*** (0.006)	0.178*** (0.006)	0.162*** (0.007)	0.162*** (0.007)	0.170*** (0.007)	0.170*** (0.007)	0.174*** (0.006)	0.173*** (0.006)
Legal Status	0.003 (0.004)	0.003 (0.004)	0.002 (0.005)	0.002 (0.005)	0.008 (0.005)	0.008 (0.005)	0.005 (0.005)	0.006 (0.005)
National Sales	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Cost per employee (log)	0.069*** (0.003)	0.069*** (0.003)	0.068*** (0.004)	0.068*** (0.004)	0.067*** (0.004)	0.067*** (0.004)	0.068*** (0.004)	0.068*** (0.004)
Population	0.021*** (0.006)	0.019***	0.005	0.005 (0.008)	0.017**	0.015 [*] (0.009)	0.018** (0.008)	0.017* [*] (0.008)
Constant	0.883*** (0.083)	0.907*** (0.088)	1.047*** (0.097)	1.039*** (0.099)	0.893*** (0.103)	0.914*** (0.104)	0.885*** (0.094)	0.896*** (0.096)
Observations	52,899	52,899	32,923	32,923	39,800	39,800	44,415	44,415
R-squared	0.136	0.136	0.161	0.161	0.152	0.153	0.146	0.147
Industry x year dummies	YES	YES	YES	YES	YES	YES	YES	YES

Table 4: Sales growth and World Bank projects

Notes: The dependent variable is growth (dummy) Standard errors (in parentheses) are clustered at regional x year level. Significance levels: *0.10, ** 0.05, *** 0.01***

In Table 5 we consider, as dependent variable, the difference of the amount of firm sales (in log). As above, in columns 1, 3, 5, and 7 we consider the dummy variable of the treatment, only, whereas in the remaining columns we control for the amount of aid too. Columns 1 and 2 show the results when all aid projects are considered without differentiating between types of project, columns 3 and 4 report the impact of regional projects, and columns 5 and 6 of sectoral projects. Finally, the last two columns contain the full specification which included both regional and sectoral projects. We base the discussion on this last specification.

In this case also, size is positive and significant suggesting that larger firms also tend to have a higher growth rate, and regions with higher population density are also more likely to have firms with higher growth rate. Moreover, inward-looking firms are also associated to lower growth rate, although the coefficient is very small.

Turning to the correlation between foreign aid and firm growth, regression (1) shows a positive and significant coefficient for sectoral project suggesting that they are more effective than regional ones to enhance firm sales. This time, however, the committed amount seems not significant. In particular, the annual growth rate may be 4% higher for firms benefiting from sectoral projects. That is, considering the average firm in the sample, the amount of sales may be 8% higher for firms benefiting from sectoral projects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WB projects	0.033*** (0.011)	0.033*** (0.011)						
Project amount	, , , , , , , , , , , , , , , , , , ,	0.000 (0.000)						
Regional Projects		, ,	0.002	0.008			-0.004	0.006
Regional project amount			(0.016)	(0.018) -0.000 (0.000)			(0.015)	(0.016) -0.000* (0.000)
Sectoral Projects				()	0.045***	0.041**	0.046***	0.042**
Sectoral project amount					(0.016)	(0.017) 0.000 (0.000)	(0.016)	(0.017) 0.000 (0.000)
Salest-2 (log)	-0.084*** (0.005)	-0.084*** (0.005)	-0.083*** (0.005)	-0.083*** (0.005)	-0.085*** (0.005)	-0.085*** (0.005)	-0.086*** (0.005)	-0.086***
Firm size	0.151*** (0.008)	0.151*** (0.008)	0.148*** (0.008)	0.148*** (0.008)	0.151*** (0.009)	0.151*** (0.009)	0.154*** (0.009)	0.154*** (0.009)
Legal Status	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.000
National Sales	-0.000**	-0.000**	-0.000**	-0.000** (0.000)	-0.000	-0.000*	-0.000*	-0.000**
Cost per employee (log)	0.077***	0.077***	0.077***	0.077***	0.079***	0.079***	0.079***	0.079***
Population	0.012***	0.012***	0.002	0.002	0.011**	0.011**	0.012***	0.012***
Constant	0.334*** (0.045)	0.336*** (0.048)	0.433*** (0.050)	0.427*** (0.051)	0.338*** (0.055)	0.343*** (0.055)	0.336*** (0.051)	(0.052)
Observations	52,899	52,899	32,923	32,923	39,800	39,800	44,415	44,415
R-squared Industry x year dummies	0.199 YES	0.199 YES	0.233 YES	0.234 YES	0.219 YES	0.219 YES	0.210 YES	0.210 YES

Table 5: Annual growth rate of the sales and World Bank project	S
---	---

Notes: The dependent variable is the annual growth rate of the sales. Standard errors (in parentheses) are clustered at regional x year level. Significance levels: *0.10, ** 0.05, *** 0.01***

4.2 Labor Income Share

In this section, we estimate Equation (1) considering, as dependent variable the labor income share described in Section 2. Table 6 presents the results. In columns 1, 3, 5, and 7 we consider the dummy variable of the treatment, only, whereas in the remaining columns we control for the amount of aid too. Columns 1 and 2 show the results when all aid projects are considered without differentiating between

types of project, columns 3 and 4 report the impact of regional projects, and columns 5 and 6 of sectoral projects. Finally, the last two columns contain the full specification which included both regional and sectoral projects. As above we largely base the discussion on the fully specified model of column 8.

The coefficients of firm size, cost per employee, and sale at *t*-2 are significant and have the same sign of those in table 4. Interestingly, population density and the legal status of the firms are associated with lower level of labor income share. We plan to investigate these results in further analysis.

Considering the impact of aid projects, again only sectoral projects are associated with higher level of labor income share, while regional projects do not affect the ratio between the compensation of employees and total sales. In particular, the labor income share is 25% higher whether firms receive regional projects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WB projects	0.016**	0.016**						
Project amount	(0.001)	0.000						
Regional Projects		()	0.009	0.014			0.013	0.017
Regional project amount			(0.011)	(0.014) -0.000 (0.000)			(0.011)	(0.014) -0.000 (0.000)
Sectoral Projects				(0.000)	0.022**	0.023**	0.023**	0.025***
Sectoral project amount					(0.009)	-0.009) (0.000)	(0.009)	-0.000 (0.000)
Salest-2 (log)	-0.043***	-0.043***	-0.049***	-0.048***	-0.045***	-0.045***	-0.044***	-0.044***
Firm size	(0.003) 0.046*** (0.005)	(0.003) 0.046*** (0.005)	(0.004) 0.052*** (0.006)	(0.004) 0.052*** (0.006)	(0.004) 0.047*** (0.006)	(0.004) 0.047*** (0.006)	(0.004) 0.047*** (0.006)	(0.004) 0.047*** (0.006)
Legal Status	-0.003**	-0.003**	-0.002	-0.002	-0.005***	-0.005***	-0.004**	-0.004**
National Sales	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Cost per employee (log)	0.033***	0.033***	0.039*** (0.004)	0.039*** (0.004)	0.035***	0.035***	0.034***	0.034***
Population	-0.012***	-0.012***	-0.005	-0.004	-0.009***	-0.009***	-0.011***	-0.010***
Constant	(0.003) 0.467*** (0.033)	(0.003) 0.469*** (0.035)	(0.003) 0.396*** (0.035)	(0.003) 0.390*** (0.035)	(0.003) 0.435*** (0.039)	(0.003) 0.434*** (0.039)	(0.003) 0.449*** (0.036)	(0.003) 0.445*** (0.037)
Observations	33,528	33,528	19,928	19,928	24,362	24,362	27,719	27,719
R-squared	0.126	0.126	0.115	0.115	0.118	0.118	0.115	0.115
Industry x year dummies	YES	YES rincomo obr	YES re Standard	YES	YES	YES	YES at regional y	YES

Table 6: Labor income share and World Bank projects

Notes: The dependent variable is the labor income share. Standard errors (in parentheses) are clustered at regional x year level. Significance levels: *0.10, ** 0.05, *** 0.01***

5. IDENTIFICATION STRATEGY

The above analysis provides evidence on the positive correlation between aid projects and firm prosperity. However, the estimated impact of aid could be biased by different endogeneity channels. In this section, we discuss our strategies to overcome the endogeneity problem.

5.1 Within country analysis

In the previous section we compare the effect of WB projects on firm performance without considering the location of the firms in the control group. In this section, we exploit the within country variation between "treated" and "non-treated firms". We use the illustration in Figure 9 to explain our identification strategy.

Assume that a representative country consists of four regions (A, B, C and D). The World bank financial aid is tied up to each region but C in other words, regions A, B, D are mapped into one or more World Bank assistance programs. Each region has two types of firms: mineral sector firms and other sector firms. For the sake of simplicity, we assume that the World Bank interventions can be classified into two broad groups: region-specific assistance (shaded in light grey color) and sector specific assistance (marked by horizontal lines). The sector-specific assistance can be thought as projects that are dedicated to development of mineral industry and benefit the mineral sectors firms only. At the same time, region-specific projects could include investment in infrastructure and connectivity that benefits firms irrespective of any sector.





Thus, from the above illustration we can conclude that all firms in region A and region D receive regionspecific assistance. Mineral sector firms in regions A and B receive sector-specific assistance, whereas firms located in region C do not get any development assistance. One possible explanation could be that region C consists of more productive firms, and we take into consideration possibilities of such selection bias while evaluating the firm performance. On the other hand, mineral sector firms in region A are benefited from both region-specific and sector-specific projects.

The algorithms of our empirical model specification aiming to evaluate the effect of World Bank development assistance on firm-level outcomes are the following:

{Treatment: mineral sector firms in region A – other sector firms in region A} against {Control: mineral sector firms in region B – other sector firms in region B}

This model identifies the additional effect of region-specific interventions on mineral sector firms when they were already benefitting from mineral-sector projects.

{Treatment: mineral sector firms in region B} against {Control: mineral sector firms in region D}

This model identifies the additional effect of mineral sector intervention on mineral sector firms when they were already benefitting from region-specific projects.

EMPIRICAL FINDINGS TO BE ADDED

5.2 Firm-level panel data

In section 4 we estimated Equation (1) considering all the firms in the WBES dataset. That sample do not allow us to include firm fixed effects. Following Chauvet and Ehrhart (2018), we restrict our sample to firms observed twice in time in order to control for firm-level time-invariant heterogeneity. Therefore, we investigate the impact of foreign aid on firm performance using a slightly modified version of equation (1), that is:

$$g_{i,k,h,j,(t,t-2)} = \alpha + \beta T_{h,k,t-1} + \gamma X_{i,k,h,j,t} + \delta Y_{h,j,t-2} + \mu_i + \tau_{k,t} + \varepsilon_{i,k,h,j,t}$$
(2)

which includes firm fixed effects, μ_i , as well as industry x year dummies, $\tau_{k,t}$, which capture industrylevel business cycles.

EMPIRICAL FINDINGS TO BE ADDED

Our framework accounts for part of the observable heterogeneity -using a large set of control variables both at the firm and regional level -and for the unobservable heterogeneity - using firm fixed effects and industry x year dummies. However, the estimated correlation between foreign aid and firm growth could still be biased by two remaining endogeneity channels: reverse causality and the existence of time varying unobservable heterogeneity. Strategies to deal with the endogeneity of aid at the macroeconomic level have evolved and improved over time. In the next sub-section we will explain our choice.

5.3 Instrumental variable

A new strand is currently emerging in the aid effectiveness literature based on quasi-experiments, i.e. specific situations that can be taken to identify the impact of aid on growth. Early work in this area focuses on shocks affecting donor countries such as the variation in oil prices to instrument aid from Arab countries (Werker *et al.*, 2009). Similarly, Nunn and Qian (2014) use Nunn and Qian exploit temporal variation in US wheat production, which they interact with the aid recipient's probability to receive US food aid. In essence, this strategy is similar to Bartik instruments used, e.g., in the labor economics literature (Autor *et al.*, 2013) or the shift-share instruments common in the migration literature (Altonji and Card, 1991). In contrast to most Bartik and shift-share instruments, where cross-sectional units differ in many dimensions, e.g., different industry shares or immigrant enclave sizes, the units in our approach differ only along one dimension, the probability to receive aid (Gehring *et al.* 2019, Dreher *et al.* 2017).

Specifically, we use the interaction of the donor's aid budget, computed as the total sum of all ODA (OOF) commitments in a given year, with the recipient-specific probability of receiving aid from the respective donor as instrument for the World Bank aid. Broadly following Gehring and Lang (2018), we calculate the World Bank's aid "budget" with measures of its aid resources: the IBRD's equity-to-loans ratio and the IDA's "funding position.¹⁰

For the World Bank (IBRD and IDA), we follow Dreher and Lohmann (2016) and Dreher *et al.* (2017) in exploiting variation in aid resulting from a country crossing the IDA's income threshold for receiving highly concessional official financing. We again interact these variables with the probability to receive aid to create our instruments.

EMPIRICAL RESULTS TO BE ADDED

¹⁰ Gehring and Lang (2018) suggest the IMF's liquidity ratio interacted with the probability of a country to be under an IMF program as instrument for IMF loans.

6. FINAL REMARKS

This paper examines the link between aid, firm growth and shared prosperity, by using data on almost 136,507 firms spread across 139 countries, and 5,881 projects classified as sectoral or regional. It evaluates the performance of firm considering changes in the firm sales as well as the labor's share in firm sales in response to development assistance provided by the World Bank. Applying a detailed firmsector-region mapping, this paper distinguishes between sector-specific and region-specific development assistance projects provided by the World Bank between 2002 and 2014. The regionspecific aid affects firms from all sectors in a specific region whereas the sector-specific aid affects firms in a particular sector. Variation in the aid flow across sectors within a region and across regions within a country over time identifies the causal effect of aid on the firm performance. This identification strategy is implemented using geo-coded data from World Bank projects, provided by AidData (2017), and the World Bank Enterprise Survey (WBES). Preliminary results suggest that sectoral projects are more effective than regional one in increasing annual growth rate of sales. That is, considering the average firm in the sample, the amount of sales may be 8% higher for firms benefiting from sectoral projects. This paper contributes to the literature on the aid-effectiveness contingent on the types of aid and, to the best of our knowledge, this is the first study that evaluates the effect of the sectoral level aid on the labor income share at the firm level.

REFERENCES

- Aghion, Philippe, and Peter Howitt. 2006. Appropriate growth policy: A unifying framework. Journal of the European Economic Association 4(2-3): 269-314.
- AidData, 2017, WorldBank_GeocodedResearchRelease_Level1_v1.4.2 geocoded dataset. Williamsburg, VA and Washington, DC: Aid Data. <u>http://aiddata.org/research-datasets</u>
- Asmus Gerda, Axel Dreher and Peter Nunnenkamp, 2016, Is Targeted Aid More Effective? Sector-specific Needs, the Composition of Aid and its Effects on Growth, unpublished Manuscript
- Altonji, J. G. and Card, D. (1991). The effects of immigration on the labor market outcomes of less-skilled natives. In Immigration, Trade, and the Labor Market, pages 201–234. University of Chicago Press. 14
- Autor, D. H., Dorn, D., and Hanson, G. H. (2013). The china syndrome: Local labor market effects of import competition in the United States. American Economic Review, 103(6):2121–2168. 14
- Bernard, Andrew and Jensen, J., (2004), Why Some Firms Export, The Review of Economics and Statistics, 86, issue 2, p. 561-569.
- Bentolila, Samuel and Saint-Paul, Gilles, (2003), Explaining Movements in the Labor Share, The B.E. Journal of Macroeconomics, 3, issue 1, p. 1-33.
- Bluhm R., A. Dreher, A. Fuchs, B. Parks, A. Strange and M. Tierney. 2018. Connective Financing: Chinese Infrastructure. Projects and the Diffusion of Economic Activity in Developing Countries. *AidData Working Paper 64*.
- Böckerman, Petri, and Mika Maliranta, 2012. Globalization, Creative Destruction, and Labour Share Change: Evidence on the Determinants and Mechanisms from Longitudinal Plant-Level Data. *Oxford Economic Papers* 64(2): 259–280.
- Chauvet L. and H. Ehrhart. 2018. Aid and growth: evidence from firm-level data. *Journal of Development* Economics 135: 461–477.
- Clemens, Clemens, Steven Radelet, Rikhil Bhavnani and Samuel Bazzi, 2012, Counting chickens when they hatch: Timing and the Effects of Aid on Growth, *Economic Journal* 122, 561: 590-617.
- Dao, M. C., M. M. Das, Z. Koczan, and W. Lian. 2017. *Why is labor receiving a smaller share of global income? Theory and empirical evidence*. International Monetary Fund.
- Del Prete Davide, Michele Di Maio. Aminur Rahman. 2019. Firms amidst the War, mimeo.
- Denizer, Cevdet, Daniel Kaufmann and Art Kraay. 2013. Good countries or good projects? Macro and micro correlates of World Bank project performance. Journal of Development Economics, 105, 288-302.
- Doan, H. T. T. and G. Wan. 2017. Globalization and the Labor Share in National Income. ADBI Working Paper 639. Tokyo: Asian Development Bank Institute.
- Doucouliagos, H. and Paldam, M. (2009). The aid effectiveness literature: The sad results of 40 years of research. Journal of Economic Surveys, 23(3):433–461.
- Doucouliagos, H. Forthcoming. The Politics of International Aid. In Roger Congleton, Bernard Grofman, and Stefan Voigt (eds.), Oxford Handbook of Public Choice.
- Dreher, A., Sturm, J.-E., and Vreeland, J. R. 2009. Development aid and international politics. Journal of Development Economics, 88(1):1–18.
- Dreher, Axel, Andreas Fuchs, Roland Hodler, Bradley C. Parks, Paul A. Raschky and Michael J. Tierney, 2014, Aid on Demand: African Leaders and the Geography of China's Foreign Assistance, AidData Working Paper 3

- Dreher, A. and S. Lohmann. 2015. Aid and growth at the regional level Oxford Review of Economic Policy, 31(3-4): 420–446.
- Dreher Axel, Langlotz Sarah and Silvia Marchesi, 2017, "Information transmission and ownership consolidation in aid programs", Economic Inquiry, 55: 1671-1688.
- Dreher, A. and S. Langlotz. 2017. Aid and Growth: New Evidence Using an Excludable Instrument. Heidelberg University Discussion Paper No. 635.
- Dreher, Axel and Valentin Lang. 2016. The Political Economy of International Organizations. Cesifo Working Paper No. 6077.
- Dreher, A., Eichenauer, V. Z., and Gehring, K. 2018a. Geopolitics, aid, and growth: The impact of UN Security Council membership on the effectiveness of aid. World Bank Economic Review, 32(2):268–286.
- Dreher, A., Lang, V., Rosendorff, P., and Vreeland, J.-R. 2018b. Buying votes and international organizations: The dirty-work hypothesis, mimeo.
- Feeny, Simon and Vu Vuong. 2017. Explaining aid project and program success: Findings from Asian Development Bank Interventions. World Development 90: 329-34.
- Furceri Davide, Prakash Loungani and Jonathan D. Ostry. 2018. The Aggregate and Distributional effects of Financial Globalization: evidence from Macro and Sectoral data, IMF Working Paper 83.
- Galiani, S., Knack, S., Xu, L. C., and Zou, B. (2017). The effect of aid on growth: Evidence from a quasiexperiment. Journal of Economic Growth, 22(1).
- Gehring K. and V. F. Lang. 2018. Stigma or Cushion? IMF Programs and Sovereign Creditworthiness. CESifo Working Paper 7339.
- Gehring K, L. Kaplan and M. H. L. Wong. 2019. Aid and Conflict at the Sub-National Level: Evidence from World Bank and Chinese Development Projects in Africa. *AidData Working Paper 70.*
- Gollin, Douglas. 2002. Getting Income Shares Right. Journal of Political Economy 110(2): 458-474.
- Gomme, P. and P. Rupert. (2004). *Measuring Labor's Share of Income. Policy Discussion Paper* 7. Federal Reserve Bank of Cleveland.
- Guerriero, Marta. 2012. The Labour Share of Income around the World. Evidence from a Panel Dataset. http://piketty.pse.ens.fr/files/Guerriero2012.pdf (accessed 26 November 2018).
- Kaja, Ashwin and Eric Werker. 2010. "Corporate Misgovernance at the World Bank and the Dilemma of Global Governance." *World Bank Economic Review*, 24: 171-198.
- Kilby, C. 2009. The political economy of conditionality: An empirical analysis of World Bank loan disbursements. Journal of Development Economics, 89(1): 51-61.
- Kilby, C. 2013. The political economy of project preparation: An empirical analysis of World Bank projects. Journal of Development Economics 105: 211-225.
- Kilby, C. 2015. Assessing the impact of world bank preparation on project outcomes. Journal of Development Economics, 115:111–123.
- Krueger, Alan B. 1998. Measuring Labor's Share. American Economic Review 89(2): 45–51.
- Marchesi S. and T. Masi. 2019. Implementation level in World Bank projects: national vs. local allocation of power. DEMS Working Paper 399 and AidData Working Paper 60.
- Melitz, M. J. 2003. The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71(6): 1695–1725.

- Minasyan, A., Nunnenkamp, P., and Richert, K. (2017). Does aid effectiveness depend on the quality of donors? World Development, 100:16–30.
- Nunn, N. and Qian, N. (2014). US Food Aid and Civil Conflict. American Economic Review, 104(6):1630– 66.
- Öhler, Hannes and Peter Nunnenkamp. 2014. "Needs based Targeting or Favoritism? The Regional Allocation of Multilateral Aid within Recipient Countries." Kyklos 67(3): 420-446.
- Oishi, Y., and S. Paul. 2018. Sectoral Labor Income Share Dynamics: Cross-Country Evidence from a Novel Dataset. ADBI Working Paper 875. Tokyo: Asian Development Bank
- Ponticelli Jacopo and Andrea Presbitero. 2017. Financial Silk Road to Africa, mimeo.
- Shin, Wonkyu, Kim Youngwan and Sohn Hyuk-Sang. 2017. Do Different Implementing Partnerships Lead to Different Project Outcomes? Evidence from the World Bank Project-Level Evaluation Data. World Development 95: 268-284.
- Werker, E., F.Z. Ahmed, and C. Cohen. 2009. How is Foreign Aid Spent? Evidence from a Natural Experiment. American Economic Journal: Macroeconomics 1 (2): 225–244.

World Enterprise Analysis Unit. 2018. Firm Level Productivity Estimates. World Bank.

Zhou, Minghai. 2016. Labor's Share of Income: Another Key to Understand China's Income Inequality. Springer Singapore. https://www.springer.com/kr/book/9789811001727 (accessed 26 November 2018).

APPENDIX A

Mapping World Bank projects to World Bank Economic Survey data

This section describes the methodology that we follow to locate the firms from World Bank Enterprise Survey (WBES) data into each the region to which the World Bank development projects are tied up. Since geocoded data allows us to identify the specific region of each World Bank project within a country, as a first step we match regions from both data sets using the names of the regions. However, geocodes are not available from the WBES data. As a second-best approximation, we identify the latitude and longitude of the regions using the names of the regions that could not be directly matched from the names of the regions available in the World Bank project data. Once the regions from both datasets are fully matched, we then follow three steps to identify and allocate each World Bank project to specific firms within a region.

Step 1

First, we re-organize the world bank economic survey sectors into six broad categories of industries: food, mineral, other manufacturing, wholesale and retail, transport, communication and hotel and other services. The distribution of 136,507 firms across this broad classification of industries is given below.

Table AT. Distribution of firms across broad sectors in the WBES data							
WBES broad sector categories	Number	Percent					
Firms in food sector (=1)	11364	8%					
Firms in mineral sector (=2)	18977	14%					
Firms in other manufacturing sectors (=3)	51824	38%					
Firms in wholesale and retail sectors (=4)	24306	18%					
Firms in transport, communications (IT) and hotels (=5)	4162	3%					
Firms in other services sectors (=6)	25874	19%					

Table A1: Distribution of firms across broad sectors in the WBES data

We compute this table from the using the following mapping of a more disaggregated classification of sectors into these six broad categories.

		Number of		
Code	Sector	firms		WBES Broad categories
1	Basic Metals & Metal Products	988	2	Mineral
2	Basic Metals/Fabricated Metals/Machiner	856	2	Mineral
3	Chemicals & Chemical Products	3,357	2	Mineral
4	Chemicals, Non-Metallic Mineral, Plasti	158	2	Mineral
5	Chemicals, Plastics & Rubber	1,050	2	Mineral
6	Construction	1,323	6	Other services
7	Electronics	459	3	Other manufacturing
8	Electronics & Communications Equip.	1,140	3	Other manufacturing
9	Fabricated Metal Products	2,152	2	Mineral
10	Food	11,364	1	Food
11	Food/Leather/Wood/Tobacco/Rubber Produc	49	3	Other manufacturing
12	Furniture	923	3	Other manufacturing
13	Garments	5,665	3	Other manufacturing
14	Hospitality & Tourism	436	5	Transport, communication and hotels

Table A2: The WBES sectoral classification (disaggregated level)

15	Hotels & Restaurants	986	5	Transport, communication and hotels
16	IT & IT Services	1,415	5	Transport, communication and
17	Leather Products	692	3	Other manufacturing
18	Machinery & Equipment	2,160	3	Other manufacturing
19	Machinery & Equipment & Electronics	203	3	Other manufacturing
	Machinery & Equipment, Electronics &	78	•	
20	Ve	10	3	Other manufacturing
21	Manufacturing	16,554	3	Other manufacturing
22	Manufacturing Panel	321	3	Other manufacturing
23	Equipment	90	2	Mineral
24	Mining Related Manufacturing	45	2	Mineral
25	Motor Vehicles	794	3	Other manufacturing
26	Motor Vehicles & Transport Equip.	62	3	Other manufacturing
27	Non-Metallic Mineral Products	3,165	2	Mineral
28	Other Manufacturing	12,867	3	Other manufacturing
29	Other Services	24,323	6	Other services
30	Other Services Panel	228	6	Other services
31	Petroleum products. Plastics & Rubber	142	2	Mineral
32	Printing & Publishing	237	3	Other manufacturing
33	Rest of Universe	4,251	3	Other manufacturing
34	Retail	20,406	4	Wholesale and retail trade
35	Retail & IT	132	4	Wholesale and retail trade
36	Retail Panel	234	4	Wholesale and retail trade
37	Rubber & Plastics Products	1,877	2	Mineral
38	Services	5,097	2	Mineral
39	Services of Motor Vehicles	796	4	Wholesale and retail trade
40	Services of Motor	318		
40	venicles/wholesale/Re	2 720	4	Wholesale and retail trade
41	Textiles	2,739	3	Other manufacturing
42	Textiles & Garments	2,214	3	
43	l'extiles, Garments, Leather & Paper	40	3	Other manufacturing
44	Tourism	126	5	hotels
45		179	_	Transport, communication and
45	Iransport	-	5	hotels Transport communication and
46	Transport, Storage, & Communications	1,020	5	hotels
47	Wholesale	2,106	4	Wholesale and retail trade
48	Wholesale & Retail	314	4	Wholesale and retail trade
49	Wood Products	78	3	Other manufacturing
50	Wood Products & Furniture	171	3	Other manufacturing
51	Wood products, Furniture, Paper & Publi	127	3	Other manufacturing

As a second step we use the description of the world bank projects to identify whether they are regionspecific (related to all firms) or sector-specific (related to firms in a sector). There are in total 80 World Bank project sectors, which are again regrouped into seven WBES categories (we add region-specific projects as the seventh category that affects firms from all sectors in a region). The seven WBES categories are, as follows.

Table A3: Typ	ologies of WBP and WBES sector codes	
WBP project categories	WBES sector categories	Code
Region-specific	Firms in all sector	0
	Firms in food sector	1
	Firms in mineral sector	2
	Firms in other manufacturing sectors	3
Sector-specific	Firms in wholesale and retail sectors	4
	Firms in transport, communications (IT) and hotels	5
	Firms in other services sectors	6

We drop 18 out of 80 categories as they appear irrelevant to firm level activities (shaded rows in the table below). The rest of the 62 project categories are mapped into 7 WBES sector classification groups as shown in Table A4.

		Table A4. Mapping of Sectors between WDF and WDE	o uata
Code	sectors	Description of the World Bank project sectors	WBES categories
1	AB	Agricultural extension and research	1
2	AH	Crops	1
3	AI	Irrigation and drainage	1
4	AJ	Animal production	1
5	AT	Forestry	1
6	AZ	General agriculture, fishing and forestry sector	1
7	BC	Central government administration	0
8	BE	Compulsory pension and unemployment insurance	0
9	BG	Law and justice	0
10	BH	Sub-national government administration	0
11	BK	Compulsory health finance	0
12	BL	Public administration- Agriculture, fishing and forestry	Drop
13	BM	Public administration- Information and communications	5
14	BN	Public administration- Education	0
15	BO	Public administration- Financial Sector	0
16	BQ	Public administration- Health	0
17	BS	Public administration- Other social services	0
18	BT	Public administration- Industry and trade	4
19	BU	Public administration- Energy and mining	2
20	BV	Public administration- Transportation	5

Table A4. Mapping of sectors between WBP and WBES data

21	BW	Public administration- Water, sanitation and flood protection	Drop
22	ΒZ	General public administration sector	0
23	CA	Information technology	5
24	CD	Postal services	5
25	СТ	Telecommunications	5
26	CZ	General information and communications sector	5
27	EC	Pre-primary education	Drop
28	EL	Adult literacy/non-formal education	Drop
29	EP	Primary education	0
30	ES	Secondary education	0
31	ET	Tertiary education	0
32	EV	Vocational training	0
33	ΕZ	General education sector	Drop
34	FA	Banking	0
35	FB	Non-compulsory health finance	Drop
36	FC	Housing finance	Drop
37	FD	Non-compulsory pensions and insurance	Drop
38	FE	Micro- and SME finance	0
39	FG	Payments, settlements, and remittance systems	0
40	FH	SME Finance	0
41	FI	Microfinance	0
42	FK	Capital markets	0
43	FL	Other non-bank financial intermediaries	0
44	FR	Credit Reporting and Secured Transactions	0
45	FZ	General finance sector	0
46	JA	Health	Drop
47	JB	Other social services	Drop
48	LA	Energy efficiency in Heat and Power	2
49	LB	Mining and other extractive	2
50	LC	Oil and gas	2
51	LD	Power	2
52	LE	Renewable energy	2
53	LG	Thermal Power Generation	2
54	LH	Hydropower	2
55	LR	Other Renewable Energy	2
56	LS	Other Mining and Extractive Industries	2
57	LT	Transmission and Distribution of Electricity	2
58	LZ	General energy sector	2
59	TA	Roads and highways	5
60	тс	Urban Transport	5
61	ΤI	Rural and Inter-Urban Roads and Highways	5
62	TP	Ports, waterways and shipping	5
63	ΤV	Aviation	5
64	TW	Railways	5

65	ΤZ	General transportation sector	5
66	WA	Sanitation	Drop
67	WB	Solid waste management	Drop
68	WC	Water supply	Drop
69	WD	Flood protection	Drop
70	WS	Sewerage	Drop
71	WT	Wastewater Collection and Transportation	Drop
72	WV	Wastewater Treatment and Disposal	Drop
73	WZ	General water, sanitation and flood protection sector	Drop
74	YA	Agro-industry, marketing, and trade	1
75	YB	Agro-industry	1
76	YC	Housing construction	0
77	YD	Petrochemicals and fertilizers	1
78	YW	Other industry	4
79	YY	Other domestic and international trade	4
80	ΥZ	General industry and trade sector	4

Step 3

Next, we apply the above mapping to a feasible period of analysis. The World Bank Enterprise Survey data is available for the period from 2003 to 2018, whereas the information of the World bank projects is available from 1995 to 2014. Following the literature, we use two-years lag assuming it takes about two years for a firm to potentially benefit since a World Bank project is committed. This allows us to evaluate any World Bank development commitments took place between 2001 to 2014, and the firm-level outcomes realized in the period from 2003 to 2016. The table below shows the year in which WBES projects were undertaken and the number of firms surveyed in each round.

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Afghanistan						647		526		•				
2	Albania					304		175				360			
3	Angola				425				360						
4	Antigua and								151						
4	Barbuda	•	•	•	•	•	•	•	151	•	•	•	•	•	•
5	Argentina				1,063				1,054						
6	Armenia							374				360			
7	Azerbaijan							380				390			
8	Bahamas								150						
9	Bangladesh					1,504				250		1,442			
10	Barbados								150		•				
11	Belarus						273					360			
12	Belize								150						
13	Benin		197					150							150
14	Bhutan							250						253	
15	Bolivia				613				362						
16	Bosnia and							261				260			
10	Herzegovina	•	•	•	•	·	•	301	•	•	•	300	·	•	•
17	Botswana				342				268						
18	Brazil	1,642						1,802				•			
19	Bulgaria					1,015		288				293			
20	Burkina Faso				139			394							
21	Burundi				270								157		
22	Cambodia											472			373
23	Cameroon				207			363							361
24	Cape Verde				98			156							
25	Central African									150					
25	Republic	•	•	•	•	•	•	·	•	150	•	•	•	•	•
26	Chad		•	•	•			150			•			•	•
27	Chile		•	•	1,017			•	1,033		•	•		•	•
	People's														
28	Republic of		•	•	•			•		•	2,700			•	•
	China														
29	Colombia				1,000			· .	942						
30	Congo				•			151			•				
31	Costa Rica		•	•			•		538		•		•	•	•
32	Croatia					633		159				360			
33	Czech Republic							250				254			
34	Côte d'Ivoire							526							361

Table A5: World Bank Enterprise survey years (2003 – 2016), by country

35	DRC				340				359			529			
36	Djibouti											266			
37	Dominica								150						
20	Dominican								260						250
30	Republic	•	•	•	•	•	•	•	300	•	•	•	•	•	359
39	Ecuador	453			658				366						
40	Egypt				•							2,897			1,814
41	El Salvador				693				360						719
42	Eritrea							179							
43	Estonia							273				273			
44	Eswatini				307										150
45	Ethiopia									644				848	
46	Fiji							164							
47	FYR Macedonia							366				360			
48	Gabon							179							
49	Gambia				174										
50	Georgia						373					360			
51	Ghana					494						720			
52	Grenada								153						
53	Guatemala				522				590						
54	Guinea				223										150
55	Guinea Bissau				159										
56	Guyana								165						
57	Honduras	450			436				360						332
58	Hungary							291				310			
59	India												9,281		
60	Indonesia							1,444						1,320	
61	Iraq									756			-		
62	Israel											483			
63	Jamaica								376						
64	Jordan											573			
65	Kazakhstan							544				600			
66	Kenya					657						781			
67	Kosovo						•	270				202			
68	Kyrgyz Republic							235				270			
69	Lao PDR							360			379				368
70	Latvia							271				336			
71	Lebanon								•			561			
72	Lesotho							151							150
73	Liberia							150							
74	Lithuania							276				270			

75	Madagascar							445				532			
76	Malawi							150			-		523		
77	Malaysia													1,000	
78	Mali	155				490			360						185
79	Mauritania				237								150		
80	Mauritius							398							
81	Mexico				1,480				1,480						
82	Micronesia							68							
83	Moldova							363				360			
84	Mongolia							362				360			
85	Montenegro							116				150			
86	Morocco											407			
87	Mozambique					479									
88	Myanmar	•											632		607
89	Namibia				329								580		
90	Nepal							368				482			
91	Nicaragua	452			478				336		-				333
92	Niger			125				150							
93	Nigeria					1,891		3,157					2,676		
94	Pakistan					935						1,247			
95	Panama				604				365						
06	Papua New													65	
90	Guinea	•	•	•	•	·	•	•	•	·	•	•	·	05	•
97	Paraguay				613				361					•	
98	Peru	•			632				1,000		•	•			
99	Philippines							1,326						1,335	
100	Poland							455				542			
101	Romania	•				•		541	•			540		•	
102	Russian							1 004			4 220				
102	Federation	•	•	•	·	•	•	1,004	•	·	4,220	•	•	•	•
103	Rwanda				212					241					
104	Samoa							109	•					•	•
105	Senegal					506							601		
106	Serbia					•		388				360			
107	Sierra Leone					•		150							
108	Slovak Republic							275				268			
109	Slovenia	•	•	•		•		276	•			270		•	
110	Solomon Islands							•	•					151	
111	South Africa	603				937		•	•			•	•		
112	South Sudan								•	•			738		
113	Sri Lanka									610					

111	St. Kitts and								150						
114	Nevis	•	•	·	•	•	•	·	150	•	•	•	•	•	•
115	St. Lucia								150						
116	St. Vincent and								15/						
110	the Grenadines	•	•	•	•	•	•	•	154	•	•	•	•	·	•
117	Sudan												662		
118	Suriname								152						
119	Sweden												600		
120	Tajikistan						360					359			
121	Tanzania				419							813			
122	Thailand					•									1,000
123	Timor-Leste							150						126	
124	Togo							155							150
125	Tonga							150							
126	Trinidad and								370						
120	Tobago	•	•	•	•	•	•	•	570	•	•	•	·	•	•
127	Tunisia											592			
128	Turkey						1,152					1,344			
129	Uganda				563							762			
130	Ukraine						851					1,002			
131	Uruguay				621				607						
132	Uzbekistan						366	-				390			
133	Vanuatu							128							
134	Venezuela				120				320						
135	Viet Nam			1,150				1,053						996	
126	West Bank and											121			
150	Gaza	•	•	•	•	•	•	•	•	·	•	434	•	•	•
137	Yemen								477			353			
138	Zambia					484						720			
139	Zimbabwe									599					600

Turning to the World bank projects, Table A1.6 shows the distribution of projects by country for the period from 2001 to 2014. However, there is one more hurdle that we had to overcome. Since the number of projects are more than one in many cases, and these projects could be different types (sector or region specific), we created unique year-sector dummies for each region. This gives a total of 75 possible year-sector combinations from 15 years and World Bank interventions in 5 possible ways (region-specific, food sector, mineral sector, wholesale and retail trade sector and transport communication and hotels sector).

	Table A	0. 9901		K FIOJ	eci uai	a (200	1 - 20	14), Dy	counti	у				
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Afghanistan		4	8	5	5	6	8	5	8	6	5	1	6	
Albania	2	5	4	3	3	4	3	3	1		2	2	1	4
Algeria	4	2	1											
Angola			3	1	1		1	2		2	1		1	
Antigua and Barbuda													1	
Argentina	3		3	4	5	7	8	6	3	8	4			1
Armenia	3	2	1	8	3	4	5	1	8	6	4	4	4	6
Azerbaijan	3	3	2	2	5	5	2	11	2	1	4	1	3	3
Bangladesh	3	4	5	8	2	4	8	14	3	8	9	5	7	7
Barbados	1							1						
Belarus	1					1	1	1	2	3			1	3
Belize	1									1				1
Benin	1	3		3	2	2	2	3	2	4	5	2	4	4
Bhutan			1	1	1	1	3	2	1	2		2		1
Bolivia	4	1	4	2	2	1	5	3	1		4	2		3
Bosnia and Herzegovina	6	4	3	4	4	2	6	1	2	2	1	3		4
Botswana								1	2					
Brazil	10	10	8	10	10	9	5		15		4	15	9	7
Bulgaria	3	1	3	1	1		4	2	2					
Burkina Faso	3	4	3	3	3	4	4	4	3	3	6	3	5	4
Burundi	2	2	2	4		2	2	4	5	3	3	3	1	1
Cabo Verde	2	2	2		2	2	2	2	1	2	1	2	1	1
Cambodia	3	3	4		2	1	3	5	1	3				
Cameroon	1	3	1	1	1	2	1	4	2	2	2	1	2	3
Central African Republic	1					1	1	1	3	2	1	1		2
Chad	2	1	3	2			2			1	2	1	1	4
Chile		2	3	1	3		3	1	1			1		
China	5	6	7	8	11	10	7	14	11	17	12	11		14
Colombia	6	3	6	5	8	3	6	8	6	3	3	4	2	3
Comoros	2			1		1				2	1	1	3	1
Congo, Democratic Republic of	1	2	2	4	4		3	5	2	7	4	1	6	6

 Table A6: World Bank Project data (2001 – 2014), by country

Congo, Republic of	2	2	1	3			2	1	2	2		2	2	4
Costa Rica	1				1	1		2	1			1		
Cote d'Ivoire		2					1	4	3	2	2	1	3	3
Croatia	2	2	2	1	5	3	4	3	1	2	4	1	1	3
Djibouti	1	1	3	1	2		1	1	1	2	1	4	2	3
Dominica		1		1			1							1
Dominican Republic	1	1	1	3	1	1	1	2	5	2	2			1
Ecuador	2	2	2	2	1	5	1						2	
Egypt, Arab Republic of		1	2	1	2	4	2	4	4	8	1	2	1	2
El Salvador	1	1			6				4	1	4			
Eritrea	1	1	2	1	1			2						
Estonia														
Ethiopia	4	6	3	9		5	8	8	4	5	3	6	4	6
Gabon					1	1								1
Gambia, The	2	1			1	2	1		1	3		1	1	3
Georgia	5	3	2	3	3	6	2	4	5	2	1	5	2	5
Ghana	3		4	6	3	3	7	4	4	7	7	5	3	5
Grenada		2	1	1	1			2	1	1	1			1
Guatemala	1	3	2		1	4	2	2	3	1	1	1		1
Guinea	3	2		1	1	2	2	1			1	4	1	4
Guinea-Bissau		1		3		1		1	2	2	3			3
Guyana		2		1	1	1				1	1			2
Haiti					4	3	4	5	6	6	4	2	3	4
Honduras	5	1	3	5	6		2	4	2	2	4	2	3	1
Hungary									1					
India	9	13	7	14	5	11	14	7	13	21	15	13	11	13
Indonesia	5	2	5	5	8	4	6	5	10	9	8	9	5	3
Iran, Islamic Republic of			2	3	2									
Iraq					1	2	1	1		1			1	
Jamaica	2	4				1	1	3	3	1	2		1	6
Jordan	1	2	1	1	1	1	1	4	3			1	2	1
Kazakhstan	1		1	1	3		2	2	2	4	1	1	1	2
Kenya	3	1	4	6		3	5		4	6	3	6	4	4

Kiribati											2	1	1	1
Korea, Republic of														
Kosovo			4		3	2	5			3	2		1	2
Kyrgyz Republic	2		3	5	1	4	1	7	5	2	5	3	3	3
Lao People's Democratic Republic	2	3	2	2	4	3	3	5	1	7	3	5	3	4
Latvia		2							1	1	1			
Lebanon	1	2	2				1		1	2		2	2	3
Lesotho	1		1	2	1	1	1	1	2	2	3		3	2
Liberia						2	4	1	5	4	5	3	3	3
Lithuania Macedonia, former Yugoslav	1	1										_		
Republic of	4	2	1	3	4	2	3	2	3	1	1	2		3
Madagascar	4	2	4	3	4	5	6	5			1	3		4
Malawi	1	2	3	4	3	2	3	2	3	4	4	6	2	1
Malaysia														
Maldives				1	1	2		2	1	1	1		1	1
Mali	2		2	3	4	2	4	2	3	3	5		7	2
Marshall Islands													1	1
Mauritania	3		2	2	1	3		2		1	2	1	1	1
Mauritius	1	1				1		1	4	1		2	2	
Mexico	3	6	4	6	7	3	2	9	6	10	2	6	1	4
Micronesia, Federated States of														3
Moldova	1	2	5	2	3	4	2	3	4	3	3	3	2	4
Mongolia	3	2	1	1	2	4	1	3	2	4	2	1		4
Montenegro		1	1	3	1	1	2	2	2	1	1	1	1	1
Morocco	2	2	2	2	4	3	2	2	1	8	3	4	7	5
Mozambique	4	2	4	3	3	2	6	2	3	8	5	3	10	5
Myanmar												1	2	5
Namibia							1	1						
Nepal	1	1	3	5	2	1	6	5	4	3	5	3	7	3
Nicaragua	5	1	2	4	2	4		5	1	5	2	3	2	4
Niger	2	1	4	1	1	3	3	3	3		4	3	5	3
Nigeria	3	4	4	3	4	3	5	6	6	3	4	8	5	7

Pakistan	4	5	5	8	11	7	10	3	10	4	8	8	3	6
Panama	2					1	6	3	1	1	3		2	
Papua New Guinea	1	1					2	1		2	4		1	2
Paraguay		1	2		4	1		2	2	1	1		1	
Peru	2	2	6	6	4	4	2	2	6	8	3	3	4	1
Philippines	2	4	3	1	3	4	3	3	4	3	4	2	2	5
Poland	3			3	1	2	1	1	1	1	1	1	1	1
Romania	3	4	3	6	3	4	2		1		3	1	1	2
Russian Federation	4	3	4	1	3	1	2	1		2		1	3	
Rwanda	3	2	1	3	3	2	2	3	5	2	5	3	4	6
Samoa		1	1	1			1	1		3		1	3	2
Sao Tome and Principe				2				1	1	1	1	1	2	1
Senegal	1	2	1	5	1	7	1	2	3	6	3	4	5	3
Serbia		7	4	4	4		5	1	5		1		1	3
Seychelles									1	1		1	1	2
Sierra Leone	2	1	4	2	4	1	2	2	4	3	4	2	4	2
Slovak Republic	1	1	3		1	1								
Slovenia														
Solomon Islands							1	2		3		1	2	4
South Africa		1								1				
South Sudan													2	3
Sri Lanka	3	3	3	5	3		2	5	5	4	3	2	1	5
St. Kitts and Nevis		2	1											
St. Lucia	1	2		2	1		2	1		1	1			
St. Vincent and the Grenadines		2		2							1			1
Swaziland											2			
Tajikistan	2	3	1	1	4	6	2	2	3	5	3	7	1	1
Tanzania	6	3	6	8	3	6	7	3	7	9	5	5	5	7
Thailand			1							2				
Timor-Leste			1	1	1	1	3	1		2	1		1	
Тодо								2	3	2	4	2	2	2
Tonga		1	1		1			1		2	3	1	1	2
Trinidad and Tobago			1											

Tunisia	4	2		3	2	2	2		3	4	2	1		5
Turkey	3	2		5	8	5	4	5	4	5	4	1	3	4
Turkmenistan														
Tuvalu											1		2	1
Uganda	8	5	4	3		3	5	4	4	3	3	2	3	3
Ukraine	4	2	4	1	4	2	3	2	3		2	2		6
Uruguay	2	3	2		3	1	5		2	1	3	4		1
Uzbekistan	1	1	1	1		1		1	3	1	3	3	2	2
Vanuatu Venezuela, Republica Bolivariana de	1													
Vietnam	5	3	4	7	10	4	9	9	10	11	15	10	11	9
Yemen, Republic of	2	3	2	4	2	2	3	6	5	7	1	1	6	8
Zambia	2	3	2	3	1	3	1	2	2	4	2	2	2	1
Zimbabwe														

	Survey Year														Total		
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	1 otdi
Afghanistan	0	0	0	0	0	647	0	526	0	0	0	410	0	0	0	0	1,583
Albania	0	0	0	0	304	0	175	0	0	0	360	0	0	0	0	0	839
Angola	0	0	0	425	0	0	0	360	0	0	0	0	0	0	0	0	785
Antigua and Barbuda	0	0	0	0	0	0	0	151	0	0	0	0	0	0	0	0	151
Argentina	0	0	0	1,063	0	0	0	1,054	0	0	0	0	0	0	991	0	3,108
Armenia	0	0	0	0	0	0	374	0	0	0	360	0	0	0	0	0	734
Azerbaijan	0	0	0	0	0	0	380	0	0	0	390	0	0	0	0	0	770
Bahamas	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
Bangladesh	0	0	0	0	1,504	0	0	0	250	0	1,442	0	0	0	0	0	3,196
Barbados	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
Belarus	0	0	0	0	0	273	0	0	0	0	360	0	0	0	0	0	633
Belize	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
Benin	0	197	0	0	0	0	150	0	0	0	0	0	0	150	0	0	497
Bhutan	0	0	0	0	0	0	250	0	0	0	0	0	253	0	0	0	503
Bolivia	0	0	0	613	0	0	0	362	0	0	0	0	0	0	364	0	1,339
Bosnia and Herzegovina	0	0	0	0	0	0	361	0	0	0	360	0	0	0	0	0	721
Botswana	0	0	0	342	0	0	0	268	0	0	0	0	0	0	0	0	610
Brazil	1,642	0	0	0	0	0	1,802	0	0	0	0	0	0	0	0	0	3,444
Bulgaria	0	0	0	0	1,015	0	288	0	0	0	293	0	0	0	0	0	1,596

Table A7 Country Composition Table from World Bank Enterprise Survey data

Burkina Faso	0	0	0	139	0	0	394	0	0	0	0	0	0	0	0	0	533
Burundi	0	0	0	270	0	0	0	0	0	0	0	157	0	0	0	0	427
Cambodia	0	0	0	0	0	0	0	0	0	0	472	0	0	373	0	0	845
Cameroon	0	0	0	207	0	0	363	0	0	0	0	0	0	361	0	0	931
Cape Verde	0	0	0	98	0	0	156	0	0	0	0	0	0	0	0	0	254
Central African Republic	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	150
Chad	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	153	303
Chile	0	0	0	1,017	0	0	0	1,033	0	0	0	0	0	0	0	0	2,050
People's Republic of China	0	0	0	0	0	0	0	0	0	2,700	0	0	0	0	0	0	2,700
Colombia	0	0	0	1,000	0	0	0	942	0	0	0	0	0	0	993	0	2,935
Congo	0	0	0	0	0	0	151	0	0	0	0	0	0	0	0	0	151
Costa Rica	0	0	0	0	0	0	0	538	0	0	0	0	0	0	0	0	538
Croatia	0	0	0	0	633	0	159	0	0	0	360	0	0	0	0	0	1,152
Czech Republic	0	0	0	0	0	0	250	0	0	0	254	0	0	0	0	0	504
Côte d'Ivoire	0	0	0	0	0	0	526	0	0	0	0	0	0	361	0	0	887
DRC	0	0	0	340	0	0	0	359	0	0	529	0	0	0	0	0	1,228
Djibouti	0	0	0	0	0	0	0	0	0	0	266	0	0	0	0	0	266
Dominica	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
Dominican Republic	0	0	0	0	0	0	0	360	0	0	0	0	0	359	0	0	719

Ecuador	453	0	0	658	0	0	0	366	0	0	0	0	0	0	361	0	1,838
Egypt	0	0	0	0	0	0	0	0	0	0	2,897	0	0	1,814	0	0	4,711
El Salvador	0	0	0	693	0	0	0	360	0	0	0	0	0	719	0	0	1,772
Eritrea	0	0	0	0	0	0	179	0	0	0	0	0	0	0	0	0	179
Estonia	0	0	0	0	0	0	273	0	0	0	273	0	0	0	0	0	546
Eswatini	0	0	0	307	0	0	0	0	0	0	0	0	0	150	0	0	457
Ethiopia	0	0	0	0	0	0	0	0	644	0	0	0	848	0	0	0	1,492
Fiji	0	0	0	0	0	0	164	0	0	0	0	0	0	0	0	0	164
FYR Macedonia	0	0	0	0	0	0	366	0	0	0	360	0	0	0	0	0	726
Gabon	0	0	0	0	0	0	179	0	0	0	0	0	0	0	0	0	179
Gambia	0	0	0	174	0	0	0	0	0	0	0	0	0	0	0	151	325
Georgia	0	0	0	0	0	373	0	0	0	0	360	0	0	0	0	0	733
Ghana	0	0	0	0	494	0	0	0	0	0	720	0	0	0	0	0	1,214
Grenada	0	0	0	0	0	0	0	153	0	0	0	0	0	0	0	0	153
Guatemala	0	0	0	522	0	0	0	590	0	0	0	0	0	0	345	0	1,457
Guinea	0	0	0	223	0	0	0	0	0	0	0	0	0	150	0	0	373
Guinea Bissau	0	0	0	159	0	0	0	0	0	0	0	0	0	0	0	0	159
Guyana	0	0	0	0	0	0	0	165	0	0	0	0	0	0	0	0	165
Honduras	450	0	0	436	0	0	0	360	0	0	0	0	0	332	0	0	1,578
Hungary	0	0	0	0	0	0	291	0	0	0	310	0	0	0	0	0	601
India	0	0	0	0	0	0	0	0	0	0	0	9,281	0	0	0	0	9,281
Indonesia	0	0	0	0	0	0	1,444	0	0	0	0	0	1,320	0	0	0	2,764

Iraq	0	0	0	0	0	0	0	0	756	0	0	0	0	0	0	0	756
Israel	0	0	0	0	0	0	0	0	0	0	483	0	0	0	0	0	483
Jamaica	0	0	0	0	0	0	0	376	0	0	0	0	0	0	0	0	376
Jordan	0	0	0	0	0	0	0	0	0	0	573	0	0	0	0	0	573
Kazakhstan	0	0	0	0	0	0	544	0	0	0	600	0	0	0	0	0	1,144
Kenya	0	0	0	0	657	0	0	0	0	0	781	0	0	0	0	0	1,438
Kosovo	0	0	0	0	0	0	270	0	0	0	202	0	0	0	0	0	472
Kyrgyz Republic	0	0	0	0	0	0	235	0	0	0	270	0	0	0	0	0	505
Lao PDR	0	0	0	0	0	0	360	0	0	379	0	0	0	368	0	0	1,107
Latvia	0	0	0	0	0	0	271	0	0	0	336	0	0	0	0	0	607
Lebanon	0	0	0	0	0	0	0	0	0	0	561	0	0	0	0	0	561
Lesotho	0	0	0	0	0	0	151	0	0	0	0	0	0	150	0	0	301
Liberia	0	0	0	0	0	0	150	0	0	0	0	0	0	0	151	0	301
Lithuania	0	0	0	0	0	0	276	0	0	0	270	0	0	0	0	0	546
Madagascar	0	0	0	0	0	0	445	0	0	0	532	0	0	0	0	0	977
Malawi	0	0	0	0	0	0	150	0	0	0	0	523	0	0	0	0	673
Malaysia	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	0	1,000
Mali	155	0	0	0	490	0	0	360	0	0	0	0	0	185	0	0	1,190
Mauritania	0	0	0	237	0	0	0	0	0	0	0	150	0	0	0	0	387
Mauritius	0	0	0	0	0	0	398	0	0	0	0	0	0	0	0	0	398
Mexico	0	0	0	1,480	0	0	0	1,480	0	0	0	0	0	0	0	0	2,960
Micronesia	0	0	0	0	0	0	68	0	0	0	0	0	0	0	0	0	68
Moldova	0	0	0	0	0	0	363	0	0	0	360	0	0	0	0	0	723

Mongolia	0	0	0	0	0	0	362	0	0	0	360	0	0	0	0	0	722
Montenegro	0	0	0	0	0	0	116	0	0	0	150	0	0	0	0	0	266
Morocco	0	0	0	0	0	0	0	0	0	0	407	0	0	0	0	0	407
Mozambique	0	0	0	0	479	0	0	0	0	0	0	0	0	0	0	0	479
Myanmar	0	0	0	0	0	0	0	0	0	0	0	632	0	607	0	0	1,239
Namibia	0	0	0	329	0	0	0	0	0	0	0	580	0	0	0	0	909
Nepal	0	0	0	0	0	0	368	0	0	0	482	0	0	0	0	0	850
Nicaragua	452	0	0	478	0	0	0	336	0	0	0	0	0	333	0	0	1,599
Niger	0	0	125	0	0	0	150	0	0	0	0	0	0	0	151	0	426
Nigeria	0	0	0	0	1,891	0	3,157	0	0	0	0	2,676	0	0	0	0	7,724
Pakistan	0	0	0	0	935	0	0	0	0	0	1,247	0	0	0	0	0	2,182
Panama	0	0	0	604	0	0	0	365	0	0	0	0	0	0	0	0	969
Papua New Guinea	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	65
Paraguay	0	0	0	613	0	0	0	361	0	0	0	0	0	0	364	0	1,338
Peru	0	0	0	632	0	0	0	1,000	0	0	0	0	0	0	1,003	0	2,635
Philippines	0	0	0	0	0	0	1,326	0	0	0	0	0	1,335	0	0	0	2,661
Poland	0	0	0	0	0	0	455	0	0	0	542	0	0	0	0	0	997
Romania	0	0	0	0	0	0	541	0	0	0	540	0	0	0	0	0	1,081
Russian Federation	0	0	0	0	0	0	1,004	0	0	4,220	0	0	0	0	0	0	5,224
Rwanda	0	0	0	212	0	0	0	0	241	0	0	0	0	0	0	0	453
Samoa	0	0	0	0	0	0	109	0	0	0	0	0	0	0	0	0	109
Senegal	0	0	0	0	506	0	0	0	0	0	0	601	0	0	0	0	1,107

Serbia	0	0	0	0	0	0	388	0	0	0	360	0	0	0	0	0	748
Sierra Leone	0	0	0	0	0	0	150	0	0	0	0	0	0	0	152	0	302
Slovak Republic	0	0	0	0	0	0	275	0	0	0	268	0	0	0	0	0	543
Slovenia	0	0	0	0	0	0	276	0	0	0	270	0	0	0	0	0	546
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0	151	0	0	0	151
South Africa	603	0	0	0	937	0	0	0	0	0	0	0	0	0	0	0	1,540
South Sudan	0	0	0	0	0	0	0	0	0	0	0	738	0	0	0	0	738
Sri Lanka	0	0	0	0	0	0	0	0	610	0	0	0	0	0	0	0	610
St. Kitts and Nevis	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
St. Lucia	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	150
St. Vincent and the Grenadines	0	0	0	0	0	0	0	154	0	0	0	0	0	0	0	0	154
Sudan	0	0	0	0	0	0	0	0	0	0	0	662	0	0	0	0	662
Suriname	0	0	0	0	0	0	0	152	0	0	0	0	0	0	0	0	152
Sweden	0	0	0	0	0	0	0	0	0	0	0	600	0	0	0	0	600
Tajikistan	0	0	0	0	0	360	0	0	0	0	359	0	0	0	0	0	719
Tanzania	0	0	0	419	0	0	0	0	0	0	813	0	0	0	0	0	1,232
Thailand	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
Timor-Leste	0	0	0	0	0	0	150	0	0	0	0	0	126	0	0	0	276
Тодо	0	0	0	0	0	0	155	0	0	0	0	0	0	150	0	0	305
Tonga	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	150

Trinidad and Tobago	0	0	0	0	0	0	0	370	0	0	0	0	0	0	0	0	370
Tunisia	0	0	0	0	0	0	0	0	0	0	592	0	0	0	0	0	592
Turkey	0	0	0	0	0	1,152	0	0	0	0	1,344	0	0	0	0	0	2,496
Uganda	0	0	0	563	0	0	0	0	0	0	762	0	0	0	0	0	1,325
Ukraine	0	0	0	0	0	851	0	0	0	0	1,002	0	0	0	0	0	1,853
Uruguay	0	0	0	621	0	0	0	607	0	0	0	0	0	0	347	0	1,575
Uzbekistan	0	0	0	0	0	366	0	0	0	0	390	0	0	0	0	0	756
Vanuatu	0	0	0	0	0	0	128	0	0	0	0	0	0	0	0	0	128
Venezuela	0	0	0	120	0	0	0	320	0	0	0	0	0	0	0	0	440
Viet Nam	0	0	1,150	0	0	0	1,053	0	0	0	0	0	996	0	0	0	3,199
West Bank and Gaza	0	0	0	0	0	0	0	0	0	0	434	0	0	0	0	0	434
Yemen	0	0	0	0	0	0	0	477	0	0	353	0	0	0	0	0	830
Zambia	0	0	0	0	484	0	0	0	0	0	720	0	0	0	0	0	1,204
Zimbabwe	0	0	0	0	0	0	0	0	599	0	0	0	0	600	0	0	1,199
Total	3,755	197	1,275	14,994	10,329	4,022	22,819	15,205	3,250	7,299	26,729	17,010	6,094	8,162	5,222	304	146,666

Source: the Authors

APPENDIX B

Labor income share in the Manufacturing Sector

Panel A of Figure 8 illustrates the distribution for the observation whose value is from 0 to 1, because only 0.49% of the values are beyond this range. The mean value of LIS1 is 0.22, and its distribution is skewed to the left. In Panel B of Figure 8, high- and lower-middle-income economies show the highest labor income share, and Latin America and the Caribbean are the highest across regions (Figure 8, Panel C).



Figure 8: LIS Distribution and Comparison by Income Group and Regions







Panel C: LIS3 across Regions

In figure 9, we find a negative relationship between labor income share and firm size: the more a firm grows, the lower labor income share becomes. Even comparing by income group and region, this correlation does not change (Figure 9 panels B and C).

Figure 9. LIS by Firm Size











Private domestic firms have the highest labor income share at the aggregate level and by income group while, across regions, state-owned firms show the highest in Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, and South Asia (Figure 10).



Figure 10. LIS by Ownership Type

Panel A. LIS by Ownership



Panel B. LIS2 by Ownership and Income Group

Panel C. LIS2 by Ownership across Regions

Labor income share in the Services Sector

Panel A of Figure 11 shows that the average of LIS in the service sector, 0.23, is almost the same as that in the manufacturing sector, 0.22, although the sector comparison should be cautiously made because the labor income share gap across sectors may merely capture the input effects. If the manufacturing sector procures more materials or intermediate goods than the service sector, which are not deducted from sales in definition 3, LIS3 might reflect the sector difference in procurement. In the service sector, lower-middle-income economies have the highest labor income share, while no obvious differences are not found among the other three groups (Figure 11, Panel B). Coming to regions Latin American and South-Asian countries have the highest labor income share, East Asian countries have the least, while no obvious differences are not found among the other three groups the other three regions.



Figure 11. LIS Distribution and Comparison by Income Group and Regions (Services)

Panel A. LIS Distribution (Services)



Panel B. LIS by Income Group (Services)

Panel C. LIS across Regions (Services)

LIS in the service sector does not seem to vary by firm size, even after dividing the sample into income groups and regions (Figure 12). The gap in LIS across firm sizes is greatest in South Asia (Figure 12, Panel C. By ownership structure, LIS in the service sector has the lowest value in state-owned firms and the second lowest in private domestic firms. Moreover, state-owned firms have the highest LIS in high-income economies as well as in South Asia (Figure 13, Panels B and C), where we can observe a heterogeneous ownership–LIS relationship in the services sector.



Figure 12: LIS3 by Firm Size (Service)

Panel A. LIS by Firm Size (Services)



Panel B. LIS by Firm Size and Income Group (Services)

C. LIS by Firm Size and Regions (Services)



Figure 13. LIS3 by Ownership Type (Service)





Panel B. LIS by Ownership and Income Group (Services) C. LIS by Ownership across Regions (Services)