



# AIDDATA

A Research Lab at William & Mary

## WORKING PAPER 104

February 2021

---

### Project Aid and Firm Performance

**Silvia Marchesi**

University of Milano Bicocca and LdA

**Tania Masi**

University of Milano Bicocca

**Saumik Paul**

Newcastle University and IZA

## Abstract

This paper evaluates the effect of development project aid from the World Bank and China on firms' sales growth using a large dataset of 110864 firms, mapped into six broad industrial clusters, spanning 121 countries between 2001 and 2016. We find, on average, no significant effect of the World Bank or Chinese ODA projects on the growth of firm sales. The outcome changes, however, when we differentiate across geographic regions and industrial sectors. Only Asian firms gain from the World Bank projects, whereas we do not find such differences for Chinese aid. Compared to sector-specific, region-specific aid from both sources positively affect firm performance. Moreover, firm operating in the transport sector seem to benefit from Chinese ODA projects, whereas firms operating in the mineral sector see their sales reduced after the Chinese intervention. To the best of our knowledge, this is the first study (1) to compare the effectiveness of the World Bank and Chinese aid on firm sales, and (2) to distinguish between project-specific and region specific aid and evaluate the contribution of both the World Bank and Chinese ODA projects through these channels.

**Keywords:** Aid effectiveness, World Bank projects, Chinese projects, Geo-coding, Firm growth

**JEL:** F35, O19, E24, E25

## Author Information

### **Silvia Marchesi**

University of Milano Bicocca and LdA

[silvia.marchesi@unimib.it](mailto:silvia.marchesi@unimib.it)

### **Tania Masi**

University of Milano Bicocca

[tania.masi@unimib.it](mailto:tania.masi@unimib.it)

### **Saumik Paul**

Newcastle University and IZA

[paulsaumik@gmail.com](mailto:paulsaumik@gmail.com)

The views expressed in AidData Working Papers are those of the authors and should not be attributed to AidData or funders of AidData's work, nor do they necessarily reflect the views of any of the many institutions or individuals acknowledged here.

## Acknowledgements

We thank (in alphabetical order) Gerda Asmus, Tito Cordella, Andreas Fuchs and Erasmus Kersting and Christopher Kilby for insightful comments and constructive suggestions. We are grateful to Erkan Gören, Alexander Moradi and Anastasia Ufimtseva for useful comments. We also thank participants in the 13th PEIO Annual Conference (Vancouver 2020) for their comments. The usual disclaimer applies.

## INTRODUCTION

Due to its severity, the COVID-19 pandemic has made developing countries in desperate need of assistance to face its consequences. It is the worst economic crisis since the Great Depression, which may make 2020 the first year since 1998 that the global rate of poverty increases. International financial institutions, such as the IMF and the World Bank, have responded with “decisive action,” pledging financial support in the hundreds of billions of dollars (Bolton *et al.* 2020; The United Nations 2020; World Bank 2020). Hence, in the wake of the Covid-19 crisis, the importance of foreign aid and hence the debate on its effectiveness is likely to be put, again, under scrutiny.

More generally, there has been 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 weakness especially in cross-country analysis. 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 (Bluhm *et al.* 2020; Chauvet and Ehrhart 2018; Cruzatti Dreher and Matzat 2020; Del Prete *et al.* 2019; Gehring *et al.* 2019; Dreher and Lohman 2015; Dreher *et al.* 2020b). Despite such promising developments in research, we think that there is still much to be understood on the identification of aid-effectiveness.<sup>1</sup> In particular, an area that is relatively less-researched is how various aid channels (e.g., projects related to different sectors) from heterogeneous donors, or through different lending categories, may affect aid effectiveness.

In this article, we build on the existing literature on aid effectiveness but we follow the more recent approaches by combining aid allocated at the regional level with measure of aid effectiveness evaluated at the firm level (see Chauvet and Ehrhart 2018).<sup>2</sup> As emphasized by Chauvet and Ehrhart (2018), there are two ways through which aid may influence firm performance: demand (increased demand financed by aid is met by firms' production), and supply (aid affects the productive capacity of firms). The literature on firm performance, in turn, points up three main kinds of constraints on firm growth in developing countries: the financing constraint (Beck *et al.* 2005; Harrison *et al.* 2004), lack of infrastructure, such as transport, energy, telecommunications, and water (see among others Bluhm *et al.* 2020; Jedwab and Moradi 2016; Rud 2012); the institutional environment (e.g., Fisman and Svensson 2007).<sup>3</sup>

In this paper, we collect information on firm sales and local business environment from multiple rounds of the World Bank Enterprise Survey (WBES),<sup>4</sup> conducted between 2003 and 2016 spanning a large sample of 121 countries. We use variation in the total number and the amount of aid projects from the World Bank (AidData 2017) and the Chinese official development assistance (Bluhm *et al.* 2020)<sup>5</sup> across the 484 first-

---

<sup>1</sup> For example, quite a few papers have argued that institutions, organizations, and policies are context-specific and that, for their successful implementation, conditional programs should suit better recipient countries' specific needs (e.g., Asmus *et al.* 2016, Basurto *et al.* 2020; Marchesi and Masi 2020).

<sup>2</sup> Chauvet and Ehrhart (2018) find that a 10 percent increase in aid could increase firm growth by around five to seven percent.

<sup>3</sup> As shown by Knack (2001) and Bräutigam and Knack (2004), foreign aid may induce an institution curse and weaken economic institutions. Furthermore, from a macroeconomic point of view, aid may also adversely impact firm growth if it induces Dutch disease, that is an appreciation of the real exchange rate detrimental to outward-looking firms (Rajan and Subramanian (2011)).

<sup>4</sup> In the online Appendix A we describe in detail the mapping of the aid data between sectors and regions.

<sup>5</sup> The AidData (2018) 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, in 149 countries around the world. We also use AidData (2018) dataset (see Dreher *et al.* 2020) to retrieve information on 3485 Chinese project financed with Chinese official development assistance (ODA) or other official flows (OOF), from 2000 to 2014, in 126 countries around the world. “ODA-like” projects are nominally intended to promote economic or social development and provided at level of concessionality which are

order administrative region (ADM1) level, spanning 121 countries between 2001 and 2014. In particular, we compare the effectiveness of the World Bank (both, IBRD and IDA) and the Chinese ODA projects across 110,864 firms mapped into six broad industrial clusters (food, mineral, manufacturing, wholesale and retail, transport, and other services). We then utilize several firm characteristics and the indicators of local business environment to gain insights on the causal channels of aid-effectiveness.<sup>6</sup>

The main advantage of using this type of data is that we are able to overcome the problems associated either with poor quality of GDP data in developing countries) or with the caveats about nightlights as a proxy for economic activity (e.g., see Henderson *et al.* 2012 and Chen and Nordhaus 2011). Moreover, our approach would allow us to perform a more accurate assessment of the effect of aid at the regional level by exploiting both project and firm heterogeneity to investigate aid effectiveness. Most importantly, we are able to shed some light on whether aid may crowd in or crowd out, at least to some extent, local economic activity.

Our empirical strategy primarily relies on a set of control variables (firm and region level) to account for the observable heterogeneity, fixed-effect estimators to control for firm-level time-invariant heterogeneity, and industry x time dummies to control for industry time-varying heterogeneity. To address the reverse causality and the existence of time-varying unobservable heterogeneity, we instrument the World Bank aid by an interaction term composed of the donor's aid budget and the recipient-specific probability of receiving aid from the respective donor (as in Lang 2016; Gehring and Lang 2020; Dreher *et al.* 2020a). The Chinese aid is instrumented by an interaction term that exploits exogenous time variation in China's production of steel and cross-sectional variation in the recipient countries' likelihood to receive Chinese aid (Bluhm *et al.* 2020; Dreher *et al.* 2020a, 2020b).

We refine the identification strategy further by applying a detailed firm-sector-region mapping that distinguishes between industrial sector-specific and region (ADM1)-specific development assistance projects provided by both the World Bank and China. We postulate that the region-specific aid affects firms from all sectors in a specific ADM1 region, whereas the sector-specific aid affects firms in a particular sector (food, mineral, other manufacturing, wholesale and retail, transport, communication, hotel and other services) within a region.

We find that neither the World Bank nor the Chinese projects, on average, contribute to the growth of firm sales. The outcome, however, changes into different directions when we examine the same relationship by geographic regions and industrial clusters. Only Asian firms gain from the World Bank projects, whereas we do not find any differences across regions in the case of Chinese ODA projects. Compared to sector-specific, region-specific aid from both sources positively affect firm performance. Moreover, firm operating in the transport sector seem to benefit from Chinese ODA projects, whereas firms operating in the mineral sector see their sales reduced after both donors intervention.<sup>7</sup> Hence, the outcomes at a disaggregated level refine our understanding of aid-growth relationships.

---

consistent with the ODA criteria established by the OECD-DAC. OOF-like projects either do not have an explicit developmental aim or have insufficient levels of concessionality to qualify as ODA (for more details see Bluhm *et al.* 2002 and Dreher *et al.* 2020).

<sup>6</sup> In this study, we focus on Official Development Assistance aid, which is provided by governments and multilateral institutions to developing countries' governments mostly with the aim to promote developmental objectives. Aid is thus not directly provided to firms.

<sup>7</sup> Specifically, one more project in Chinese aid increases sales in transport firms by 20 percent, while one percent change in both World Bank and Chinese aid reduces average sales of firms operating in the mineral sector by 1.9 and 0.7, respectively.

Finally, as the channels are concerned, we find some evidence that World Bank projects are more effective for firms that are either less financially constrained or with a better reputation (for example whose financial statements are certified by an external auditor). In the same vein, firms with better transport infrastructure or placed in a safer and politically more stable environments are also going to benefit more for World Bank projects (as in Burnside and Dollar 2000). As Chinese ODA projects are concerned, we find that they are more effective for firms that are financially constrained, with worse infrastructure in terms of electricity provision or with relative more corruption. Thus suggesting that these may all be channels of aid transmission. We also find that Chinese ODA projects are more effective in the case of regions with better transport infrastructure or a safer and more stable political environments. We should emphasize here that, contrary to Chinese aid which comes with few strings attached allowing recipient country leaders to use it for domestic political purposes (Dreher *et al.* 2020b), the World Bank provides financing which is subject to restrictive and specific procurement rules.<sup>8</sup>

Our findings appear to be inconsistent, and in some cases stand in sharp contrast, with the conclusions reached by the other studies (Chauvet and Ehrhart 2018; Isaksson and Kotsadam 2018; Dreher *et al.* 2020a). Chauvet and Ehrhart (2018), using a panel of 4355 firms in 29 countries from the same WBES dataset, find a positive effect of foreign aid on firm sales growth. In another study, Isaksson and Kotsadam (2018), comparing Chinese development projects with that from the World Bank on 29 African countries, find that World Bank projects stimulate local economic activities, but the Chinese projects do not (while they increase corruption). Finally, recent papers by Dreher *et al.* (2020a) and (2020b), using data on official financing from China to 138 countries between 2000 and 2014, find a short-term positive effect of Chinese projects on economic growth.<sup>9</sup>

There are three main reasons, which we believe, are responsible for these differences in the outcomes. First is the sample size. We use a sample of 110,864 firms spread across 121 countries that is much larger than the sample used by Chauvet and Ehrhart (2018) and Isaksson and Kotsadam (2018). Second is the quality of aid data. We use variation of aid disbursement across ADM1 regions, whereas Chauvet and Ehrhart (2018) use variation of aid at the country level. Third is the indicator of development outcome. While our measure of firm performance matches that of Chauvet and Ehrhart (2018), the other two studies by Isaksson and Kotsadam (2018) and Dreher *et al.* (2020a) (2020b) use satellite data on night time light as a proxy for local economic development. The main contribution that this paper makes is bringing together the most refined and disaggregated data on aid to evaluate the growth performance at the firm level.

This study relates to at least two streams of literature. First it is related to the vast literature on aid effectiveness. Broadly speaking, this 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.* 2018).<sup>10</sup> What is

---

<sup>8</sup> According to the *Guidelines for Procurement under IBRD Loans and IDA Credits and Grants*, the borrower is responsible for ensuring that project procurement is carried out in accordance with the *Loan Agreement and the procurement plan*. The plan defines the project procurement arrangements, including the organization, procedures, and review thresholds at all levels (government, local government and communities).

<sup>9</sup> Dreher *et al.* (2020a, 2020b) showed positive effect of aid on night-time illumination as a measure of aggregate outcome at the ADM1 level.

<sup>10</sup> 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., Clark and Dolan 2020, Dreher *et al.* 2009, Kaja and Werker 2010; Kilby 2009, 2013). In turn, when aid allocation is driven by political influence aid is likely to be effective (e.g., Dreher *et al.* 2013, Dreher *et al.* 2018; Kilby 2015). Finally, Dreher *et al.* (2020c) investigates whether Chinese Aid is Effective as Soft Power Instrument.

more, donors have also been criticized for a lack of "ownership" and underutilizing local knowledge in recipient countries (Dreher *et al.* 2017).<sup>11</sup> More specifically, our paper relates to studies that focus on project aid (in the case of World Bank projects: Denizer *et al.* 2013, Dreher *et al.* 2013, 2015, Feeny and Vuong 2017, Kilby 2013, 2015, Marchesi and Masi 2020, Öhler and Nunnenkamp 2014, Shin *et al.* 2017; in the case of Chinese projects: Bluhm *et al.* 2020, Cuzatti *et al.* 2020, Dreher and Fuchs 2015, Dreher *et al.* 2019, Dreher *et al.* 2020a, 2020b, Isaksson and Kotsadam 2018).<sup>12</sup>

Then, this paper also touches upon the literature on the firm productivity growth. The need for a disaggregated level approach to obtain a deeper and complete understanding of the dynamics of productivity growth is argued by many (Foster *et al.* 2001). Firm productivity in developing countries are characterized by widespread differences across and within countries in the capabilities of individual firms (Hsieh and Klenow 2009; IADB 2001; IGC 2019).<sup>13</sup> The performance of firms is generally affected by two sets of factors: internal (within the control of the firm or business) and external aspects of operating environment (Syverson 2011). Following the classification of aid projects that we use in this paper, a sector-specific aid (e.g., mineral) could potentially affect the internal factors, whereas a region-specific aid (e.g., infrastructure) has the potential to improve the external factors. We assume that aid projects influence firm productivity growth (growth of sales) through both reallocation of resources across firms (and sectors) and within firm efficiency gains (Dollar *et al.* 2005; Busso, *et al.* 2013; Macmillan *et al.* 2014).

This paper contributes to the current literature on aid and economic performance in several directions. 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. 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). Second, we contribute to studies that examine firm performance in aid aid-recipient countries. Chauvet and Ehrhart (2018) examined firm performance in 29 developing using variation of aid flow at the country level. We refine their identification strategy by allowing aid to vary across ADM1 regions within a country, and we extend the sample to 121 developing countries. Third, we extend the aid-effectiveness literature that uses aid flow at the ADM1 level by comparing the outcomes of aid projects between the World Bank and the Chinese ODA. Finally, this paper contributes to the literature on firm performance in developing countries. As recent studies document, firms in developing countries are typically small and unproductive and there exists a very few productive firms (Hsieh and Olken 2014, Eslava *et al.* 2019). Extending this line of the literature, we find that aid remains generally ineffective in reducing this gap.

We organize the rest of the paper in the following manner. In section 2, we describe data sources and how we combine data from different sources; in this section, we also discuss descriptive evidence on aid and firm performance. Section 3 illustrates the identification strategy and empirical model. Section 4 presents the

---

<sup>11</sup> Minasyan *et al.* (2017), for instance, demonstrate the importance of donor quality for aid effectiveness. For recent surveys of the aid effectiveness literature, see Doucouliagos (2009, 2019) and Dreher *et al.* (2018).

<sup>12</sup> To the extent that World Bank and Chinese projects may overlap, Hernandez (2017) provides evidence that recipients of Chinese aid receive World Bank loans with fewer conditions. Therefore, to the extent that World Bank conditionality facilitates the adoption of growth-promoting policy and institutional reforms, Chinese aid may slow economic growth by indirectly impeding these reforms.

<sup>13</sup> The average 90:10 TFP ratio is over 5:1 in China and India (Hsieh and Klenow 2009) and the average 90:10 labor productivity ratio in manufacturing sector in some Latin American countries is around 10:1 (IADB, 2017).

baseline results, while in section 5 we present the results of the model's extensions and some robustness analysis. In section 6, we analyse the outcomes on the channels. Finally, section 6 concludes.

## 2. BACKGROUND AND DATA DESCRIPTION

The empirical analysis in this paper relies on two datasets. We use the AidData (2017) comprising of 5880 World Bank projects in the International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA) lending lines, approved between 1994 and 2014 in 149 countries around the world. We also use AidData (specifically the dataset made available by Bluhm *et al.* 2020) to retrieve information on 3,485 Chinese project, worth \$273.6 billion, financed with Chinese official development assistance (ODA) or other official flows (OOF), between 2000 and 2014 in 126 countries around the world (see Bluhm *et al.* 2020).<sup>14</sup> Since the information on World Bank and Chinese aid projects are available at different administrative levels, we reconstruct them so that both Chinese and World Bank projects are geocoded at the first-order administrative region (ADM1) level.

To measure firm performance, we use an unbalanced panel data from the World Bank Enterprise Survey (WBES) data collected by the World Bank using face-to-face interviews with firm managers and owners of firms on issues pertinent to the business environment, performance and the productivity of their firms. The survey instruments specifically include questions on (1) infrastructure and services, (2) sales and supplies, (3) degree of competition, (4) institutional capacity and access to land, (5) sources of finance, (6) business development services, (7) business-government relations, (8) labor, (9) business environment and finally (9) firm performance.

We work with a sample of 110,864 firms spanning 121 countries between 2003 and 2016.<sup>15</sup> The original WBES dataset has information on 146,666 firms spread across 139 countries for the period from 2003 and 2018 (Paul and Isaka 2019). We had to drop 35802 firms either because of the missing observations or due to multiple locations.<sup>16</sup> Roughly 10% of the firms were successfully re-contacted, which produces an unbalanced panel dataset at the firm level. Figure 1 displays the locations of the World Bank aid projects and firms (surveyed in the WBES data).

Table A1 in the online Appendix A presents the group of industries (coded 1 to 6) from the WBES data. About 19% of the firms are in the wholesale and retail, hotels and restaurant, followed by almost 11% in the mineral sector, about 8% in the food sector and almost 5% in the transport, communication, IT and construction sector. The rest of the firms are classified into the "other manufacturing" (36%) and "other services" sectors (20%). The World Bank 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 ". We regroup 51 industrial sectors from the World Bank Enterprise survey data into the six broad categories sectors as discussed above (Table A2 in the online Appendix A).

---

<sup>14</sup>"ODA-like" projects, which are nominally intended to promote economic or social development and provided at levels of concessionality that are consistent with the ODA criteria established by the OECD-DAC; "OOF-like" projects, which are also financed by the Chinese government, but either have a non-developmental purpose (e.g., export promotion) or have insufficiently high levels of concessionality to qualify as ODA (e.g., loans at market rates). For more details see Bluhm *et al.* (2020).

<sup>15</sup> The list of countries in the sample is presented in Table A5 in the online Appendix A.

<sup>16</sup> More specifically, 11,946 firms were dropped because of missing location, while we had to discard 23,552 firms that operated in more than one ADM1. Finally, 304 firms were lost because we had to drop the last year of the survey, 2018. We should emphasize here that the survey refers to the fiscal year, hence the year 2018 is in fact the year 2017.

Table A3 in the online Appendix A shows the distribution of 110,864 firms across this broad classification of industries and the detailed mapping of 51 industrial sectors from the World Bank enterprise survey data into six broad categories of aid. The AidData provides information on the types of sector as designated recipient that indicates the part of the economy supported by the aid. The list contains 80 sectors, which we re-classify into a set of six broad categories of industries: food, mineral, other manufacturing, wholesale and retail, transport, communication and hotel and other services. In a similar manner, we reclassify these 80 sectors to make them comparable with the six WBES sector categories (Table A4 in the online Appendix A).

As a next step, we restrict the period of analysis to make data available from both datasets. The WBES data is available for the period from 2003 to 2018, whereas the information on the World Bank and Chinese projects is available from 1994 to 2014 and from 2000 to 2014, respectively. Following the standard practice in the aid literature, we use two-year lag assuming it takes about two years for a firm to potentially benefit from the time a World Bank or a Chinese project is committed. This allows us to evaluate any World Bank or Chinese development commitments taking place between 2001 and 2014, and the firm-level outcomes realized in the period from 2003 to 2016.

We combine the locations of the World Bank projects into the same administrative level of regions (ADM1) at which WBES data is available for. While AidData provides geocoded data of each World Bank and Chinese 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. Specifically, we proceed as follow. First, we corrected misspelled names and uncoded 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. To avoid any measurement issues, we discard firms that operates in more than one ADM1.

[Figure 1 is about here]

[Figure 2 is about here]

In the next step, we map each firm into an ADM1 region following the condition that the World Bank aid implemented in the same ADM1 two years before the WBES interview took place. Figure 1 shows the worldwide distribution of World Bank projects and firm displayed at the regional level. Green dots refer to WBES firms, while red dots are World Bank projects. Figure 2 shows a similar map with geography of the Chinese ODA, where green dots indicate the locations of ADM1 that received the Chinese project. A quick comparison of Figure 1 and 2 reveals that the distribution of the World Bank covers most of the developing countries worldwide, whereas the Chinese projects mostly concentrates in the Africa region. Over the past two decades, the concept and very nature of aid has changed with the emergence of new donors like China. China's flagship Belt and Road Initiative (BRI), dedicated to creating an infrastructure corridor from China to Europe through Central Asia, invests more than 1 trillion USD investment in building road, rail, port and pipeline projects across more than 60 countries (Perlez and Huang 2017). China's influence on international aid policy has been bolstered by the creation of Asian Infrastructure Investment Bank (AIIB). Alongside such strategic delegation of development projects by the donors, it is also true that the World Bank projects (670) outnumber the Chinese projects (286) by an overwhelming margin.



[Figure 3 is about here]

Figure 3 illustrates the distribution of all World Bank projects, regional and sectoral, respectively, by regions. As shown in Figure 3, almost 76 per cent (509 out of a total of 670) of the World Bank projects are in the IDA category, and the rest fall into the IBRD category. Even though the total number of aid projects is much lower in Europe (45) and Latin America (94) compared to Africa (272) and Asia (259), the percentage of IBRD projects are much higher in Europe (47%) and Latin America (73%) relative to that in Africa (3%) and Asia (30%). In terms of the World Bank lending channels, Latin America region shows a trend opposite to the rest of the world.

[Figure 4 is about here]

In Figure 4, we plot the distribution of regional and sectoral World Bank aid by geographic region. The proportion of regional aid is comparable (between 53 to 61 %) across the four geographic regions, with the highest proportion in Europe (61%) and the lowest in Africa (53%). Overall, Africa received the highest number of World Bank projects (272) between 2003 and 2016, followed by Asia (259). However, the ranking reverses with the total disbursement amount as Asia received almost twice the size of aid that flew into Africa from the World Bank (Figures, 7 and 8).

[Figure 5 is about here]

Turning to the Chinese aid, almost 72% of the Chinese projects are through the ODA lending channel (206 out of 286), and the rest follows the OOF channel (Figure 5). The Chinese OOF is mostly prevalent in Europe and Latin America, whereas lion's share of the Chinese aid goes to Africa and Asia. African countries are the largest recipients of Chinese development projects (about 60% of total projects). The geography of the Chinese ODA, regional Chinese ODA and sectoral ODA projects follows a pattern similar to that of the World Bank (Figure 6). However, the aid amount is disproportionately larger for Europe compared to other regions. Europe received the same aid amount (through 12 Chinese projects) that Africa received through a whopping number of 168 projects (Figure 7 and 8). A relatively higher average aid amount per project in Europe is an indication of the fact that the Chinese projects served different development objectives across regions. More specifically, the role of the China's unprecedented Belt and Road Initiative (BRI) with support from more than 1 trillion USD investment for an infrastructure corridor from China to Europe through Central Asia (Perlez and Huang 2017).

[Figure 6 is about here]

[Figure 7 is about here]

[Figure 8 is about here]

Finally, in Figure 9 we compare the distribution (Kernel density) of log sales between sectors. Distribution of firm sales do not significantly vary across sectors and overall, they follow a bell-shaped pattern. The log sales of manufacturing firms are largely concentrated around the mean. The concentration of firms in the

mineral sector appears to be at a slightly higher value of sales compared to the same in other sectors. Similarly, firms in the wholesale and retail trade stay in the opposite end.

[Figure 9 is about here]

### 3. THE EMPIRICAL MODEL

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

$$g_{i,j,h,s,(t,t-2)} = \alpha + \beta AID_{j,h,s,t-2} + \gamma X_{i,j,h,s,t} + \delta R_{h,s,t} + \tau_{j,t} + \mu_h + \varepsilon_{i,j,h,s,t} \quad (1)$$

where  $g$  is the annual growth rate of sales, computed over three years, between year  $t$  and  $t-2$ , of firm  $i$ , in industry  $j$ , region  $h$  and country  $s$ .  $AID$  represents the World Bank and the Chinese aid projects both at the regional and sectoral level (in terms of # projects and committed amount) tied to region  $h$ .<sup>17</sup> In Section 4.3, we consider regional and sectoral projects separately.  $X$  is a set of time-varying firm-level characteristics, while  $R$  is a set of time-varying regional-level variables (logged regional population and GDP).<sup>18</sup> We include industry  $\times$  year dummies,  $\tau_{j,t}$ , in order to control for industry time-varying heterogeneity and  $\varepsilon_{i,j,h,s,t}$  is the error term. Finally, we include either region or firm fixed effects.<sup>19</sup>

In this framework, the aid variable is measured at the local level whereas the outcome, sales growth, is measured at the firm level. As emphasized by Chauvet and Ehrhart (2018), there could be 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 aid projects are aggregated at the regional level, we cluster the standard errors at the same level.

We control for the lagged value of Sales, in logarithm, which is measured 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. We also control for the characteristics of firm ownership using two variables, State and Foreign. State is a dummy variable which is equal to one when part of (or all) the firm is owned by the state, while Foreign is a dummy variable which is equal to one when part of (or all) the firm is owned by a foreign individual or company. Finally, we include information on whether the firm is outward looking using Export, which is a dummy variable equal to one when the firm exports part of or all its sales, either directly or indirectly (as a supplier to exporting firms). The firm-level characteristics are measured in year  $t$  since we do not have their pre-determined value at year  $t-2$ . Definition and sources of the variables are listed in Table D1 in the online Appendix D.

Table D2 in the online Appendix D presents summary statistics for our sample of firms. To avoid extremely fast-growing firms driving the results, we excluded 823 firms whose sales fall into the 99th percentile. Also

<sup>17</sup> As reported by Bluhm *et al.* (2020), in the case of China, financial values are available for 65% of the projects limiting to some extent the power of our estimates.

<sup>18</sup> Regional GDP is measured considering the log of night-time lights (NOAA, National Geophysical Data Center, 1992-2013).

<sup>19</sup> In this case the equation would be:  $g_{i,j,h,s,(t,t-2)} = \alpha + \beta AID_{j,h,s,t-2} + \gamma X_{i,j,h,s,t} + \delta R_{h,s,t} + \tau_{j,t} + \mu_i + \varepsilon_{i,j,h,s,t}$ .

28,525 firms are discarded due to missing values for sales, 263 are discarded due to missing values for industry and, finally, 14,319 observations are missing due to the lack of controls.

### 3.1. Identification strategy for the World Bank aid projects

Equation (1) is estimated using the fixed-effect estimator, which allows us to control for firm-level time-invariant heterogeneity. To this firm fixed-effect setting, we add industry x time dummies in order to also control for industry time-varying heterogeneity. Our framework accounts for part of the observable heterogeneity -using a large set of control variables both at the firm and region level -and for the unobservable heterogeneity - using firm fixed effects and industry x year dummies. However, the estimated correlation between project 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.

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).

Specifically, we use the interaction of the donor's aid budget with the recipient-specific probability of receiving aid from the respective donor as instrument for both the World Bank (and Chinese aid). The source of exogenous variation in donor economic situations is then weighted by historical proximity between donors and recipient regions and our identification strategy exploits the differential effect of changes in WB liquidity (Lang 2016; Dreher *et al.* 2020a). As in Dreher *et al.* (2020a) we then 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."<sup>20</sup> Like a difference-in-differences approach, the differential effect of WB liquidity on WB projects to regions with high compared to low probability of receiving WB projects. The source of exogenous variation in the World Bank resources is then weighted by historical proximity between the World Bank and recipient regions, as follows:

$$IV_{h,t-2}^{IBRD/IDA} = IBRD/IDA Resources_{t-2} * Probability_h^{IBRD/IDA} \quad (2)$$

where  $Probability_h^{IBRD/IDA}$  is the share of years between 1994 and 2014 that region  $h$  received either IBRD or IDA aid (i.e.,  $\frac{1}{20} \sum_{t=1}^{20} A_{h,t}^{IBRD/IDA}$ , where  $A$  is a binary indicator variable that switches to one if subnational region  $h$  in country  $s$  received any IBRD or IDA funding in year  $t$ ) and  $IBRD/IDA Resources_{t-2}$  is the temporal variation in the IBRD's equity-to-loans ratio/IDA's "funding position". The IDA's funding position:

---

<sup>20</sup> Variation across time is given by the temporal variation in the IBRD's equity-to-loans ratio/IDA's "funding position"; while variation across regions is given by the share of years under an IBRD/IDA project, from 1994 to 2014.

measure of the IDA's capacity to commit to new financing of credits, grants and guarantees at any point in time. It is given by the sum of the "Net Investment Portfolio" and "Non-negotiable, non-interest-bearing demand obligations (on account of members' subscriptions and contributions)" then divided by the sum of the Bank's undisbursed commitments of development credits and grants. The IBRD's equity-to-loans ratio: measure of the IBRD's "ability to issue loans without calling its callable capital" (Bulow 2002).<sup>21</sup>

As described by Dreher *et al.* (2020a), the intuition of this approach is that of a difference-in-difference regression, where we investigate a differential effect of World Bank liquidity on the amount of World Bank projects to regions with a high compared to a low probability of receiving of World Bank projects. The identifying assumption is that firms' sales in regions with differing probabilities of receiving World Bank aid will not be affected differently by changes in World Bank liquidity, other than via the impact of aid, controlling for region and industry-year-fixed effects.

### 3.2. Identification strategy for the Chinese aid projects

In the case of Chinese aid, our instrumental variable is an interaction that exploits exogenous time variation in China's production of steel and cross-sectional variation in the recipient countries' likelihood to receive Chinese aid. Variation across regions is given by the share of years between 2000 and 2014 that region  $i$  received Chinese aid. Our exogenous source of time variation in Chinese funding is the (logged) annual amount of Chinese steel production (in thousand tons).<sup>22</sup> China is the world's leading producer and exporter of steel. The Chinese government considers steel to be a commodity of strategic importance and it has a track record of generating an oversupply of steel and looking for overseas markets where it can "dump" its steel (for more details see Dreher *et al.* 2020a, 2020b). For these reasons and because the majority of Chinese development projects require some form of construction activity, Chinese official financing commitments should increase with the production of steel in a given year. As discussed above, the source of exogenous variation in the Chinese resources is weighted by historical proximity between China and recipient regions, as follows:

$$IV_{h,t-2}^{CHN} = Steel_{t-3} * Probability_h^{CHN} \quad (3)$$

where  $Probability_h^{CHN}$  is the share of years between 2000 and 2014 that region  $h$  received Chinese aid (i.e.,  $\frac{1}{15} \sum_{t=1}^{15} B_{h,t}^{CHN}$  where  $B$  is a binary indicator variable that switches to one if subnational region  $h$  in country  $s$  received any ODA funding in year  $t$ ), which measures the propensity of region  $h$  to receive Chinese aid at year  $t$ , while  $Steel$  is the logged Chinese steel production in year  $t-3$ .

As illustrated by Dreher *et al.* (2020a), (2020b), the intuition of this approach is that of a difference-in-difference regression, where we investigate a differential effect of Chinese steel production on the amount of aid to regions with a high compared to a low probability of receiving Chinese aid. The identifying assumption is that growth in regions with differing probabilities of receiving Chinese aid will not be affected differently by changes in steel production, other than via the impact of aid, controlling for region and industry-year-fixed

<sup>21</sup> Increased lending can only be achieved in principle either through an increase in capital to support new loans, or through an increase in the funds that it borrows from the bond markets in order to make more loans (i.e. increase its leverage or the amount borrowed relative to the equity it holds). Given the limited equity injections over time, the lending disbursed by the IBRD has from the very beginning depended on being able to access financial markets and leverage its relatively thinly capitalized balance sheet.

<sup>22</sup> Data taken from the World Steel Association (2010, 2014).

effects. Since we control for these fixed effects, the interaction of the two variables results in an exogenous instrument under mild assumptions (Dreher *et al* 2020b).<sup>23</sup>

As a robustness check we use the net change in China's holdings of international reserves (obtained in the World Bank's World Development Indicators) as an additional instrument for Chinese aid. As emphasized by Dreher *et al.* (2020a) the intuition for using reserves in foreign currency is based on a similar logic to that of production inputs: China's need to address a domestic oversupply problem to avoid the risk of inflation and a currency revaluation. Larger net increases in China's foreign currency reserves increase the number of Chinese government-financed projects for the average recipient country one year later. The results are robust and they are presented in Table D4, in the online Appendix D.

Finally, as explained by Dreher *et al.* (2020b), one might be concerned that the interacted instrumental variable violates the exclusion restriction because steel production is correlated with some omitted variables, which differentially affect firm performance in regions with low and high probabilities of receiving Chinese aid. To address this threat, we tested for the most obvious country-level confounders, such as Chinese foreign direct investment (FDI) and trade flows with China. As shown in Table D4, in the online Appendix D, the results are robust to these additional controls. However, we cannot definitively rule out the presence of omitted variable bias.

## 4. BASELINE RESULTS

### 4.1. The World Bank projects

Table 1 presents the baseline outcomes for the World Bank aid projects. We consider growth in sales (the difference of the amount of firm sales, in log) as the dependent variable. In the first column of Table 1, Equation (1) is estimated using an OLS estimator without the firm fixed effects but including country dummies and industry x year dummies. Using the OLS estimator, we are able to use all the full sample of 60,843 firms. In column 2, results are presented for the same sample when aid is instrumented, with country and industry year dummies. Columns (3) and (4) display the results when firm fixed effects are accounted for and country dummies are dropped. The panel sample, in this case, is restricted to a group of 5,982 firms, which corresponds to about 10 percent of the observations in the OLS sample.<sup>24</sup> The coefficient of Sales at (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. Size is positive and significant suggesting that larger firms also tend to have a positive growth of sales. Moreover, inward-looking firms are also associated to lower growth rate, although the coefficient is very small. Finally, regions with higher population density are also more likely to have firms with positive growth rate.

[Table 1 is about here]

The coefficient of the number of World Bank aid projects, in the IV regression (Column 2), turns out to be negative but statistically insignificant. The last four columns (5 to 8) in Table 1 show outcomes for the log of World Bank aid amount by replicating the same model specifications described in columns 1 to 4. The

---

<sup>23</sup> Due to the nature of our data (i.e., surveys of firms) we cannot show pre-trend outcomes for regions with high versus low probability of receiving Chinese aid. Hence, to this end, we rely on the results shown by Dreher *et al.* (2020b), in Figure 2 of their paper.

<sup>24</sup> About 9,081 firms were re-contacted so that they have more than one year of information. Among them, 3,099 firms did not switch to other sectors or ADM1.

relationship between aid and the growth of firm sales remains negative but statistically insignificant. The estimated coefficients and their statistical significance for log sales (base year) and other the control variables remain unchanged when we use log of World Bank aid amount instead of the number of World Bank aid.

#### 4.2. The Chinese projects

In table 2, we present the baseline model results with the Chinese (ODA) aid. We focus on ODA projects (rather than both ODA and OOF) in order to better compare the results obtained using World Bank projects (ODA flows should be given to pursue developmental objectives).<sup>25</sup> Each column replicates the regression model specifications reported in Table 1. The number of observations remain the same. Unlike the World Bank projects, the OLS outcome (Column 1) on the number of Chinese ODA projects show positive and statistically significant effect on the growth of firm sales. This result is likely to be driven by selection bias as the estimated coefficient turns out to be negative and statistically insignificant in the IV estimation (Column 2). Contrary to the World Bank which targets aid to poorer regions, China seems to select richer ones instead.

Chinese projects produce similar catching-up effect as large firms grow at a slower pace compared to small firms. The outcomes on the ownership structure and participation in international trade remain unaltered as we switch from the number of World Bank projects to the number of Chinese ODA projects. However, the effect of aid on firm sales' growth turns out to be positive (but statistically insignificant) in both the OLS and IV regressions when we replace the number of the Chinese ODA projects with the log of total amount of Chinese ODA. To note, the aid-firm growth relationship in the IV estimation remains negative when we use the panel data for both the number of Chinese ODA (Column 4) and the amount of Chinese ODA (Column 8). Collating the baseline outcomes, it can be safely said that neither the World Bank aid nor the Chinese ODA, on average, contribute to the growth of firm sales.

[Table 2 is about here]

### 5. ROBUSTNESS AND EXTENSIONS

#### 5.1. IDA versus IBRD projects

As shown in Figure 3, almost 76 per cent (509 out of a total of 670) of the World Bank projects are in the IDA category, and the rest fall into the IBRD category. Even though the total number of aid projects is much lower in Europe (45) and Latin America (94) compared to Africa (272) and Asia (259), the percentage of IBRD projects are much higher in Europe (47%) and Latin America (73%) relative to Africa (3%) and Asia (30%). As a next step, we examine the effectiveness of IDA and IBRD projects separately. We follow the same order of model specifications as in Table 1 and 2, where the first four columns show outcomes on the number of aid projects, and the last four on the log total amount of aid. Panel A of Table 3 restricts the sample to ADM1 regions that received IBRD, and the number of firms drops to 46,362.

In a similar way, panel B of Table 3 restricts the sample to 53,412 firms spread across regions that received IDA. The estimated coefficients in both panels (A and B) conform to the baseline results (Table 1). As a final check, we compare firms that received only IDA against those that received only IBRD (Panel C). In columns (1) and (2), we find statistically significant OLS and IV evidence, at the ten and five percent level

---

<sup>25</sup> The results, available on request, are similar using data on all Chinese projects.

respectively, that the growth of firm sales receiving only IDA are lower compared to the same in firms that receive only IBRD. This outcome holds only for the number of projects, not for the log amount of total disbursement. Since IDA projects are more prevalent in Africa compared to the rest of the regions, this outcome can also be understood in light of comparing African firms against that from Europe and Latin America, as we do in the next section below.

[Table 3 is about here]

## **5.2. Macro-region-specific trends**

### **5.2.1 The World Bank projects**

We came across an interesting observation related to the World Bank projects across broad geographic regions. Africa received the highest number of World Bank projects (272) between 2003 and 2016, followed by Asia (259). However, the ranking reverses with the total disbursement amount as Asia received almost twice the size of aid that flew into Africa from the World Bank. This prompts us to compare the effectiveness of the number and the total amount of aid across geographic regions.

Panel A of Table 4 reports the outcomes for Africa. While aid-firm sales growth relationship is negative across the board, the coefficient of the number of projects is slightly larger than the aid amount. This gap disappears when we use the firm panel (compare column 4 and 8), and the causal effect of aid (both the number and amounts of projects) becomes negative and statistically significant at the five percent level. More specifically, one percent increase in World Bank aid reduces, on average, African firm sales by nine percent. This result is not completely obvious. We could think that World Bank interventions keeps unprofitable firms in the market hence, to some extent, preventing competition and negatively affecting overall performance in the region.

The opposite result is found for Asia. The relationship between aid and firms' sales growth turns out to be positive and it also becomes statistically significant, at the five percent level, in the IV regressions using firm panel (column 4 and 8). More specifically, one percent variation in World Bank aid increases, on average, firms' sales by almost four percent, while one more project increases firms' sales by almost two percent. For Europe and Latin America, the sample size drops to 19,989 and 7,467, respectively. We do not find any statistically significant causal relationship for these two regions, and the outcomes are broadly in line with the baseline outcomes (Table 1). Summing up, we do not find markedly different results between different measures of aid. However, based on the region-specific outcomes, we can observe a strong difference between the impact of World Bank projects on Asian versus African firms. Regression outcomes by broad industrial sectors can provide further insights, which we discuss in section 5.4.

[Table 4 is about here]

### **5.2.2. The Chinese projects**

We next compare the outcomes by geographic region for the Chinese ODA. The geography of the Chinese ODA follows a pattern similar to that of the World Bank aid when we consider the number of projects (Figure 6). However, the amount of aid amount is disproportionately larger for Europe compared to other regions. Europe received the same aid amount through 12 projects that Africa received through 168 projects. Unfortunately, however, the number of observations for regression at the region level drops significantly, as

a result we could only run the panel regressions for Africa (Table 5). None of the estimated coefficients, however, are found to be statistically significant.

[Table 5 is about here]

### **5.3. Sector-specific aid versus regional aid**

#### **5.3.1 The World Bank projects**

As discussed in greater detail in section 2, we classify the World Bank projects as regional when all types of firms in an ADM1 region are likely to benefit from it. Sectoral projects are classified into six clusters to ensure comparability across these groups and allow for sufficient degrees of freedom in the regressions (Table A3 in the online Appendix A). The proportion of regional aid is comparable (between 53 to 61 %) across the four geographic regions (Figure 4), with the highest proportion in Europe (61%) and the lowest in Africa (53%). Panel A of Table 6 reports the outcomes for sectoral aid. The sample size drops to 44,015 firms and to only 1672 firms for the panel regression. While the OLS estimates suggest a negative correlation (Columns 1 and 5), the causal effect from the IV estimates (Columns 2 and 6) turn out to be positive but statistically insignificant. In the firm panel specifications the coefficients are always negative but not statistically significant.<sup>26</sup>

[Table 6 is about here]

Panel B of Table 6 reports the results for regional World Bank aid. The number of observations for the cross-sectional analysis slightly improves for the regional aid and it increases by almost 25% for the panel estimation. The coefficients are generally not statistically significant, similarly to what we have shown in Panel A, except for the negative and significant coefficient displayed in the OLS specification of column 1. As a final step, we compare the aid effectiveness on firms that received only regional aid against firms that received only sectoral aid (Panel C of Table 6). The sample size reduces significantly, as we now have 22,914 firms for the cross-sectional analysis and only 636 firms for the panel analysis. The effect of regional aid on the growth of firm's sales, on average, is much stronger compared to sectoral aid, and the difference is statistically significant, at the one percent level, in the IV firm panel regressions (displayed in both columns 4 and 8). In particular, one percent variation in World Bank regional aid increases sales by two percent. This outcome is not likely to be driven by any geographic region as the proportion of regional aid does not differ across regions by a large margin.

#### **5.3.2. The Chinese projects**

The Chinese ODA are mapped into 24 sectors (as reported in the online Appendix B. Table B2). We reclassify them to match with the regional-sectoral classification that we have for the World Bank aid as shown in the online Appendix B. The regional Chinese ODA aid mostly comprises of projects related to social infrastructure and services, whereas the sectoral Chinese ODA aid comprises of projects that were directed to infrastructure, and various sectors including agriculture, fishing, forestry, mining, industry, trade, and tourism. Despite our attempt to make the regional and sectoral aid data comparable across the World Bank and the Chinese ODA, there remain differences as the follow different disbursement channels.

---

<sup>26</sup> When disaggregating among different aid sectors, and controlling for firm fixed effects, however, we find that the World Bank projects allocated to the Transport sector significantly increase firms' sales. Specifically, one percent increase in World Bank aid increases sales' growth by 36 percent. These results are presented in Table D4, in the online Appendix.



With this caveat in order, we next present the empirical results for the Chinese ODA regional and sectoral aid (Table 7). The panel A and panel B show the outcomes of sectoral aid and regional aid, respectively. The number of observations for these regressions are comparable to the analysis done with the World Bank aid (Table 6). The causal effect of both the regional and sectoral Chinese ODA aid on firm growth is always negative but not statistically significant. Finally, we compare firms that received only regional aid against firms that received only sectoral aid (panel C). The IV estimates show a statistically significant, at the one percent level, causal effect of regional Chinese ODA aid (relative to sectoral) on the growth of firm's sales. The results are then very similar to what we find with the World Bank aid even if the size of the impact is smaller: in this case one percent increase in Chinese ODA aid increases sales by one percent.

[Table 7 is about here]

#### 5.4. Sector-specific aid at the disaggregated level

We next examine the effect of both World Bank and Chinese aid on firm performance by disaggregating firms according to their industrial sector. Due to insufficient observations, however, we could only perform cross-sectional analysis. In the first four columns of Table 8, we report the outcomes for World Bank projects, whereas the last four columns show outcomes for the Chinese ODA aid. It is worth mentioning that the number of observations for each sector varies; the largest sample is for manufacturing firms (25,753) and the smallest is for transport sector (2,250).

Table C1 and C2, reported in the online Appendix C, show the distribution of both World Bank and Chinese ODA financial flows by industrial sector. As we can see, in the case of the World Bank, the most financed projects are those in the Transport sector, followed by the Mineral, Food and Wholesale sectors. As for Chinese ODA projects we can see that the Mineral sector is the one receiving most resources, followed by the Transport and Wholesale sectors.<sup>27</sup>

In the case of World Bank projects, we find that they do not generally have any effect for five firms' sectors out of six.<sup>28</sup> In fact, as reported in column 4 of Table 8 (that is when considering the World Bank project amount) we can see that World Bank flows negatively affect firms operating in the mineral sector.<sup>29</sup> As found above in the case of African firms, we find here a similar crowding out effect on the local economy, at least in the case of firms operating in the mineral sector. In the case of Chinese ODA projects, we find some interesting contrasts. For the mineral industry, the effect of both the number and the amount of Chinese ODA aid is negative and statistically significant at the ten percent level. Hence, we find evidence that both World Bank and Chinese ODA intervention crowds out local firms operating in the mineral sector. Nevertheless, the effect is quite small in quantitative terms, one percent change in both donors aid reduced sales in firms operating in the mineral sector by about two and one percent, respectively.

On the other hand, the number of Chinese ODA projects cause a positive and statistically significant (at the five percent level) increase in the growth of firm sales active in the transport sector. In this case the magnitude

<sup>27</sup> The distribution actually changes when we consider the number of projects instead of the committed amounts (see Table C3 and C4). All Table C1 to C4 refer to the raw data from the original samples.

<sup>28</sup> When matching World Bank projects belonging to the transport sector with firms operating in the same sector, however, we find a positive and significant effect of World Bank aid. Due to lack of sufficient observations, we could perform this type of matching only in this specific case. These results are presented in Table D4, in the online Appendix.

<sup>29</sup> The coefficient is significant only at the ten percent level.

is sizeable as one percent change in Chinese aid increases sales in transport firms by 40 percent.<sup>30</sup> This result is of interest to those who view heavy involvement of the Chinese ODA aid in infrastructure related activities especially in Africa (among other see Bluhm *et al.* 2020).

[Table 8 is about here]

### 5.5. Outcomes on sample restricted to treated regions

As a final robustness check, we restrict the sample to only treated ADM1 regions, i.e., regions that received aid. In this case, every region in the sample is a recipient of aid and it reduces the possible selection bias arising from firms placed in regions that do not receive aid. Results are reported in Table 9. Expectedly, the number of observations drops to 32,897 for the case of World Bank aid (Panel A) and to 12,351 for the case of Chinese ODA projects.

The estimated coefficients for the World Bank aid (the number and the amount of projects) are in line with the baseline outcomes (Table 1). The interpretation, however, changes in the current situation. An increase in the number or the amount of World Bank aid, for treated regions, does not significantly affects the firm performance. Turning to the Chinese ODA aid (Panel B), an increase in the number of Chinese ODA projects positively affects the growth of firm sales in all specifications. The results are statistically significant at the one and ten percent level, respectively, in the two IV specifications (see columns 2 and 4). The amount of Chinese ODA aid positively affects the growth of firm sales as well, but the results are statistically significant at the one percent level, only in columns 5 and 6. In quantitative terms we find that one percent increase in Chinese aid increases firms' sales by 2.4 percent.

The contrast between these outcomes and the baseline model results (Table 1 and 2) are suggestive of the importance of the selection process for the beneficiaries and characteristics of them. Since the results do not differ for the World Bank aid, the control group (non-beneficiaries) in the baseline regressions do not make much of a difference. This is certainly not the case for the Chinese ODA aid as the baseline model outcome, on average, shows a negative (albeit not significant) relationship between aid and firm performance. It is possible that non-beneficiaries of the Chinese aid and related factors could play a part here. To shed more light on this issue, we next examine the role of some firm characteristics and local business environment as potential channels of aid-effectiveness.

[Table 9 is about here]

## 6. THE CHANNELS

Until this point, besides demand factors (which would be difficult to measure in this setting), the analysis has implicitly assumed that aid influences firm productivity growth (growth of sales) through both internal (within the control of a firm or business) and external factors including various aspects of the operating environment (Dollar *et al.* 2005; Busso *et al.* 2013; Macmillan *et al.* 2014; Syverson 2011). Both channels could be related to the supply side factors as argued in the aid literature (Rajan and Subramanian 2007, 2011;

---

<sup>30</sup> As shown in Tables C2 and C4, in the online Appendix C, the highest number of Chinese projects is allocated to the Transport Sector, while the highest amount goes to the Mineral sector.

Chauvet and Ehrhart 2018). In this section we unravel this black box with the help of some firm level characteristics and indicators of firm operating environment.<sup>31</sup>

Following Chauvet and Ehrhart (2018), we investigate four channels through which aid may influence firm growth: (1) access to finance and financial reputation, (2) the Dutch disease, (3) infrastructure, and finally (4) institutional curse (as documented by Rajan and Subramanian (2007, 2011)).<sup>32</sup> Each of them is captured by a different firm characteristic. More specifically, the World Bank Enterprise Surveys (WBES) include questions on: sources of finance, quality of infrastructure and institutional capacity (among others).

In order to examine this heterogeneity, we re-estimate the baseline estimations interacting both World Bank and Chinese ODA projects with some specific firm characteristics that may influence their effects.<sup>33</sup> Equation (4) below is similar to Equation (1), except for the interaction term of aid with a set of relevant firm-level characteristics. The rest of the analysis uses the firm fixed-effect estimation presented in column 3 of Table 2 as the baseline result. This is the most conservative one given that it accounts for firm fixed effects.

$$g_{i,j,h,s,(t,t-2)} = \alpha + \beta AID_{h,s,t-2} + \theta CH_{i,j,h,s,t} + \lambda AID_{h,s,t-2} \times CH_{i,j,h,s,t} + \gamma X_{i,j,h,s,t} + \delta R_{h,s,t} + \tau_{j,t} + \mu_i + \varepsilon_{i,j,h,s,t} \quad (4)$$

We utilize a set of 11 variables from WBES for our analysis. As described in Table D3, in the online Appendix D, access to finance is measured using two variables, whether a firm has an overdraft facility, and if a firm faces any obstacle with access to finance. We then use three variables (a) if a firm has internationally-recognized quality certification, (b) whether a firm has a checking/saving account, and (c) if financial statements are certified by an external auditor to measure the financial reputation of a firm. In line with the existing literature, we postulate that a firm achieves growth in sales with better access to finance and credible financial reputation as aid flows in. The Dutch disease effect, measured by if a firm exports goods, examines if the firm has any adverse effect of aid on its export potential. The infrastructure channel is examined using two variables, whether a firm has any obstacle with electricity and transport, and finally the institution channel is composed of whether a firm has any obstacle due to political instability, due to crime, theft and disorder, and corruption. Unlike the previous studies, these channels vary across firms and represented as  $CH_{i,j,h,s,t}$  in equation 4.

### 6.1. The World Bank projects

Table 10 reports the outcomes on the channels using the World Bank aid data. In each of the 11 columns, we show the outcome on the interaction between development projects and a channel. The sample size of the panel observations includes slightly over 5,000 firms. The interactive terms are always positive and statistically significant with the exception of the interaction with “firms having an internationally-recognized quality certification” and the interaction with export (the Dutch disease channel).

<sup>31</sup> Rajan and Subramanian (2007, 2011), interact aid with indicators meant to capture whether the industries are more prone to exporting or rely more on institutions. This strategy was first implemented by Rajan and Zingales (1998). In keeping with Rajan and Zingales (1998), they find that aid adversely impacts industries that rely relatively more on institutions and are more outward looking.

<sup>32</sup> By Dutch disease we refer here to the apparent causal relationship between the increase of foreign aid and the decline of a country's export. The idea is that after the inflow of foreign aid, the country's exchange rate appreciates, hence depressing its terms of trade. More generally, it can also refer to any intervention resulting in a large inflow of foreign currency, including a sharp surge in natural resource prices or foreign direct investment.

<sup>33</sup> We chose to consider only the number of projects as, in the case of Chinese aid, financial values are available for about two third of the projects.

[Table 10 is about here]

Firms having an overdraft facility, a checking/saving account and a financial statements certified by an external auditor are all more likely to perform well when aid flows is in. The coefficient of the interaction of World Bank projects and firms finding no obstacle with respect to finance is also positive and significant at the one percent level, suggesting that firms with this type of facility are also benefitting from World Bank projects. To be able to comment this results, however, it should be kept in mind that this coefficient should be interpreted conditionally, as in any interaction model. The best way is to look at Figure 10, which shows the expected variation in firms' sales conditional on the indicator denoting access to finance. Panel A of Figure 10 shows that that the marginal effects of World Bank projects on firms' sales are positive and significant, at the ten percent level, for firms with at the average level of the indicator "Access to Finance". This can be seen because the lower confidence band is always above the zero horizontal line at least for values of "access to finance" greater than 2 (the mean of this sample being around 3.5).

Hence, World Bank projects are more effective for firms that are either less financial constrained or with a better reputation (for example whose financial statements are certified by External auditor). On the other hand, the coefficient of the interaction with the dummy denoting firms more open to exports is not statistically significant, denoting no Dutch disease effect due to World Bank aid.

As the role of infrastructure is concerned, Table 10 shows that that the coefficients of the interaction with the indicators "no obstacle with electricity" and "no obstacle with transport" are both positive and significant at the ten and five percent level, respectively. The marginal effects of both interaction are displayed in Panel B of Figure 10. However, for firms at the average level of the indicator "no obstacle with electricity", the marginal effects are significant for values of this indicator which are greater than 4 (the mean value for this sample being around 3.2). On the other hand, the marginal effect of World Bank projects on firms' sales is positive and significant, for firms declaring "no obstacle with respect to transport". In this case the lower confidence band is always above the zero horizontal line, at least for values of this indicator greater than 2 (the mean of this sample being around 3.6). Therefore, firms with overall better infrastructures are going to benefit more for World Bank projects.

Finally, we also find positive and significant coefficients, at the five and ten percent level, when interacting World Bank aid with the variable denoting "no obstacle with political instability", "no obstacle with crime, theft and disorder" and "no obstacle with corruption". Their marginal effects are displayed in the last Panel C of Figure 10. For firms at the average level of the indicator denoting no political instability and lack of crime, the marginal effects are significant for values of these indicators which are greater than 2 and 3 (the mean values for this sample being around 3, 4 and 3, 7, respectively). On the other hand, the marginal effect of World Bank projects on firms' sales is positive but not significant, for firms declaring no corruption, at lease for values of this indicator at the sample mean, which is about 3.3 (turning significant when the indicator is greater than 4.3). As in Burnside and Dollar (2000) we can conclude that World Bank aid not only is associated to no "institution curse", but is becomes beneficial for firms operating in a politically stable, safer and less corrupted environment.

To sum up, we find that World Bank projects are more effective for firms that are either less financial constrained or with a better reputation (for example whose financial statements are certified by External

auditor). In the same vein, firms with better transport infrastructure or placed in a safer and politically more stable environments are also going to benefit more for World Bank projects. As previously explained these results are consistent with the severe procurement rules which conditions the World Bank project arrangements.

[Figure 10 is about here]

## 6.2. The Chinese projects

Turning to the Chinese ODA aid, outcomes on the interaction between the channels and the aid are reported in Table 11. As discussed above, in each of the 11 columns, we show the outcome on the interaction between development projects and a channel. The sample size of the panel observations includes slightly over 5,000 firms.

[Table 11 is about here]

Table 11 reports the outcomes on the channels using the Chinese ODA aid data. In each of the 11 columns, when looking at the interaction terms we find that no coefficient is statistically significant at conventional level. The results, however, is different when looking at the marginal effects of some of the interactions.

[Figure 11 is about here]

Panel A of Figure 11 shows that that the marginal effects of Chinese ODA projects on firms' sales are decreasing but always positive and significant for any value of the indicator "Access to Finance". Hence, the positive effect of Chinese ODA on firms' sales is decreasing as firms became less in need of financing, which is line with the idea that one channel through which aid can be effective is through the relief of the financial constraint of the firms.

A similar results is detected when looking at the marginal effects of the interaction of Chinese ODA aid with the two indicators "no obstacle with electricity" and "no obstacle with transport", as displayed in Panel B. Their marginal effects are always positive but decreasing for the former while increasing for the latter. Therefore, similarly to the financial constraints above, in the case of infrastructure related to electricity we can conclude that aid effectiveness is higher for firms that experience some problems but lower for those which do not. In the case of the infrastructure related to the transport sector, the effect seems less intense (the slope is much lower and upward sloping).

The last Panel C of Figure 11 shows the marginal effects of the interactions with the three variables related to the quality of the Institutions (as perceived by the firms). For firms at the average level of the indicator denoting no political instability, the marginal effects are significant for values of these indicators which are greater than 2 (the mean values for this sample being around 3.3). These effects suggest that aid can enhance firms' sales to the extent that the region has reached some threshold level of political stability. The marginal effects of Chinese ODA projects on firms' sales are always positive and significant for any value of the variable denoting lack of crime. Specifically, the positive effect of Chinese ODA on firms' sales is (slightly) increasing in region that as perceived as safer. Hence, not only we find no evidence of institution curse but some evidence of a further channel of aid, to the extent that it may contribute to creating a safer environment.

Finally, the marginal effect of Chinese ODA projects on firms' sales is generally positive and significant (and slightly decreasing) for firms declaring to perceive no corruption. For firms at the upper bound of this indicator new find no significant effect. This result seems then to suggest that this may be a channel of aid effectiveness which is working only for firm with are not at the upper bound of this indicator. In this latter case the marginal effects turn out to be not significant.

Therefore, we find that Chinese ODA projects are more effective in the case of regions with better transport infrastructure or with a safer and more stable political environments (as perceived by the firms). At the same time, Chinese ODA projects turn out to be more effective for firms that are financially constrained, with worse infrastructure in terms of electricity provision or with relative more corruption. Thus suggesting that these may all be channels of aid transmission. These results are also consistent with the fact that Chinese aid (contrary to World Bank projects) comes with few strings attached and hence are more vulnerable to political capture.

[Table 11 is about here]

## 7. CONCLUSIONS

Over the past two decades, the concept and very nature of aid has changed with the emergence of new donors like China. While Chinese development projects have been found to generate short-term economic growth (Dreher *et al.* 2020), many see the Chinese Belt and Road initiative (BRI) as a way to secure commercial benefits for Chinese domestic firms (Kaplinsky *et al.* 2007; Kaplinsky and Morris 2009); let alone the prevalence of widespread corruption around Chinese projects sites (Isaksson and Kotsadam 2018).<sup>34</sup> We expect this paper to make a timely contribution to this debate and provide insightful information on the causal link between both the World Bank and Chinese aid and firm performance.

This paper examines the effectiveness of the World Bank (both, IBRD and IDA) and the Chinese ODA projects across 110,864 firms mapped into six broad industrial clusters (food, mineral, manufacturing, wholesale and retail, transport, and other services) from 121 countries between 2001 and 2016. We use the total number and the amount of aid projects from the World Bank and the Chinese official development assistance and the variation in the aid flow across sectors within a region (ADM1), across regions within a country, and the interactions of these factors over time identify the causal effect of project aid on the firm performance. Information on firm sales and local business environment is collected from multiple rounds of the World Bank Enterprise Survey (WBES) conducted between 2003 and 2018.

Following Lang (2016) and Dreher (2020b), our identification strategy exploits the differential effect of changes in WB liquidity and Chinese steel production on project allocation. We find neither the World Bank nor the Chinese projects, on average, contribute to the growth of firm sales. The outcome, however, changes into different directions when we examine the same relationship by geographic regions and industrial clusters. Only Asian firms gain from the World Bank projects, whereas we do not find any differences across regions for the Chinese ODA. Relative to sector-specific aid, region-specific aid from both donors positively affect firm performance. Moreover, firm operating in the transport sector seem to benefit from Chinese ODA

---

<sup>34</sup> Empirical research on Chinese aid allocation demonstrates that while Chinese ODA are negatively correlated with the per-capita income of recipient countries (Dreher and Fuchs 2015; Dreher *et al.* 2019), Chinese OOF (in Africa) tends to favor creditworthy countries (with higher loan repayment capacity) and countries that have higher levels of imports to China (Dreher *et al.* 2019).

projects. We also find evidence of some crowding out of local activity, especially in the case of both World Bank and Chinese ODA projects, in the case of firms operating in the mineral sector.

Some interesting results are detected when looking at the channels of aid transmission. In the case of World Bank projects we find that they are more effective for firms that are either less financially constrained or with a better reputation (for example whose financial statements are certified by External auditor). In the same vein, firms with better transport infrastructure or placed in a safer and politically more stable environments are also going to benefit more from World Bank projects. As Chinese ODA projects are concerned, we find that they are more effective for firms that are financially constrained, with worse infrastructure in terms of electricity provision or with relative more corruption. Thus suggesting that these may all be channels of aid transmission. We also find that Chinese ODA projects are more effective in the case of regions with better transport infrastructure or a safer and more stable political environments.

Evaluation of aid effectiveness at the firm level allows us to understand the nuanced channels through which aid affects firm performance. This study points to a null effect of aid on firm sales' growth, however it does not exclude the possibility of heterogeneous returns to factors of production because of slower growth of sales. In other words, if factor income shares are affected by aid-recipient status then aid may have a more persistent effects on income inequality and well-being through this channel. What is more, the mechanisms we have considered are not exhaustive and, most importantly, they are all confined to the short-to medium-term impact of aid. In the longer run, aid may also influence firm performance through human capital, a channel we cannot investigate in this paper due to data limitation. These are just a few of the several other possible directions in which firm-level analysis of aid can be extended, and we leave these tasks for the future research to accomplish.

## 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. <http://aiddata.org/research-datasets>
- Altonji Joseph G. and David Card. 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.
- 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
- Autor, D. H., D. Dorn and G. H Hanson. 2013. The China syndrome: Local labor market effects of import competition in the United States. *American Economic Review*, 103(6): 2121–2168.
- Basurto, Pia, Pascaline Dupas and Jonathan Robinson. 2015. Decentralization and Efficiency of Subsidy Targeting: Evidence from Chiefs in Rural Malawi. *Journal of Public Economics*, Elsevier, 185
- Beck, Thorsten, Asli Demirguc-Kunt and Vojislav Maksimovic. 2005. Financial and legal constraints to growth: does firm size matter? *Journal of Finance* 60(1): 137–177.
- Bernard, Andrew and J. Jensen. 2004. Why Some Firms Export, *The Review of Economics and Statistics*, 86(2): 561-569.
- Bluhm Richard, Axel, Dreher, Andreas Fuchs, Bradley C. Parks, Austin Strange and Michael J. Tierney. 2020. Connective Financing: Chinese Infrastructure Projects and the Diffusion of Economic Activity in Developing Countries. CEPR Discussion Paper 14818.
- Bolton, P, L C Buchheit, P-O Gourinchas, M. Gulati, C-T Hsieh, U. Panizza and B. Weder di Mauro. 2020. “Born Out of Necessity: A Debt Standstill for Covid-19”, CEPR Policy Insight No. 103
- Bräutigam, D.A., S. Knack. 2004. Foreign aid, institutions, and governance in Sub-Saharan Africa. *Economic Development and Cultural Change*, 52 (2): 255–285.
- Busso, M., L. Madrigal, and C. Pagés. 2013. Productivity and Resource Misallocation in Latin America. *The BE Journal of Macroeconomics*, 13(1): 903–932.
- Burnside Craig and David Dollar. 2000. Aid, Policies and Growth. *American Economic Review* 90: 847-868.
- Chauvet Lisa and Hélène Ehrhart. 2018. Aid and growth: evidence from firm-level data. *Journal of Development Economics* 135: 461–477.
- Chen, X. and W. D. Nordhaus. 2011. Using luminosity data as a proxy for economic statistics. *Proceedings of the National Academy of Sciences*, 108(21): 8589–8594
- Henderson, J. V., A. Storeygard, and D. N. Weil. 2012. Measuring economic growth from outerspace. *American Economic Review*, 102(2): 994–1028.
- 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.
- Cuzatti John C., Axel, Dreher and Johannes Matzat. 2020. Chinese Aid and Health at the Country and Local Level. AidData Working Paper 97



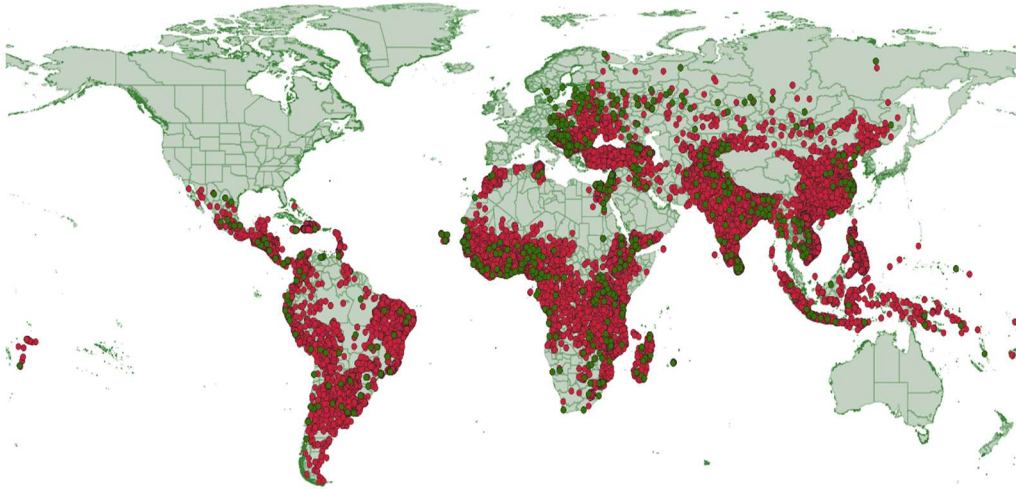
- Del Prete Davide, Michele Di Maio. Aminur Rahman. 2019. Firms amidst the War, mimeo.
- Denizer, Cevdet, Daniel Kaufmann and Art Kraay. 2013. Good countries or good projects? Macro and micro correlates of World Bank project performance. *Journal of Development Economics*, 105: 288-302.
- Doan, H. T. T. and G. Wan. 2017. Globalization and the Labor Share in National Income. ADBI Working Paper 639. Tokyo: Asian Development Bank Institute.
- Dollar, D., M. Hallward-Driemeier, and T. Mengistae. 2005. Investment Climate and Firm Performance in Developing Economies. *Economic Development and Cultural Change*, 54(1): 1–31.
- Doucouliaios Hristos and Martin Paldam. 2009. The aid effectiveness literature: The sad results of 40 years of research. *Journal of Economic Surveys*, 23(3):433–461.
- Doucouliaios Hristos. 2019. The Politics of International Aid. In Roger Congleton, Bernard Grofman, and Stefan Voigt (eds.), *Oxford Handbook of Public Choice*.
- Dreher, Axel, Jan-Egbert Sturm and James Vreeland. 2009. "Development Aid and International Politics: Does membership on the UN Security Council influence World Bank decisions?" *Journal of Development Economics*, 88: 1-18.
- Dreher, Axel, Stephan Klasen, James Raymond Vreeland and Eric Werker. 2013. The costs of favoritism: is politically driven aid less effective? *Economic Development and Cultural Change*, 62(1): 157-191.
- Dreher, Axel and Steffen Lohmann. 2015. Aid and growth at the regional level. *Oxford Review of Economic Policy*, Volume 31(3--4): 420—446
- Dreher, Axel, Sarah Langlotz and Silvia Marchesi. 2017. Information transmission and ownership consolidation in aid programs. *Economic Inquiry*, 55(4): 1671-1688.
- Dreher, A. and S. Langlotz. 2017. Aid and Growth: New Evidence Using an Excludable Instrument. *Canadian Journal of Economics*, forthcoming
- Dreher, Axel, Vera Eichenauer and Kai Gehring. 2018. Geopolitics, Aid and Growth: The Impact of UN Security Council Membership on the Effectiveness of Aid. *World Bank Economic Review*, 32: 268-286
- Dreher Axel, Andreas Fuchs, Roland Hodler, Bradley C. Parks, Paul A. Raschky, Michael J. Tierney. 2019. African Leaders and the Geography of China's Foreign Assistance. *Journal of Development Economics* 140: 44-71.
- Dreher, Axel and Valentin Lang. 2019. The Political Economy of International Organizations, in: R. Congleton, B. Grofman and S. Voigt (eds.), *The Oxford Handbook of Public Choice*, pp. 607-652, Oxford University Press.
- Dreher, Axel, Valentin F. Lang and Sebastian Ziaja. 2018. Foreign aid, in: T. Risse, T. Börzel and A. Draude (eds.), *The Oxford Handbook of Governance and Limited Statehood*, pp. 394-415, Oxford University Press.
- Dreher Axel, Andreas Fuchs, Bradley C. Parks, Austin Strange, Michael J. Tierney. 2020a. Aid, China, and Growth: Evidence from a New Global Development Finance Dataset. *American Economic Journal: Economic Policy*, forthcoming.

- Dreher Axel, Andreas Fuchs, Roland Hodler, Bradley C. Parks, Paul A. Raschky, Michael J. Tierney. 2020b. Is Favoritism a Threat to Chinese Aid Effectiveness? A Subnational Analysis of Chinese Development Projects. *World Development*, forthcoming
- Dreher Axel, Andreas Fuchs, Bradley C. Parks, Austin M. Strange, Michael J. Tierney and Lukas Wellner 2020c. Is China Winning? Chinese Aid as Effective Soft Power Instrument. Mimeo
- Feeny, Simon and Vu Vuong. 2017. Explaining aid project and program success: Findings from Asian Development Bank Interventions. *World Development* 90: 329-34.
- Fisman Raymond. and Jakob Svensson, 2007. Are corruption and taxation really harmful to growth? firm level evidence. *Journal of Development Economics*, 83 (1): 63–75.
- Galiani, S., S. Knack, L. C. Xu and B. Zou. 2017. The effect of aid on growth: Evidence from a quasi-experiment. *Journal of Economic Growth*, 22(1).
- Gehring Kai and Valentin F. Lang. 2018. Stigma or Cushion? IMF Programs and Sovereign Creditworthiness. *Journal of Development Economics*, forthcoming.
- 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*.
- Harrison Ann E., Inessa Love and Margaret S. McMillan. 2004. Global capital flows and financing constraints. *Journal of Development Economics*, 75 (1): 269–301.
- Hernandez, Diego. 2017. Are "New" Donors Challenging World Bank Conditionality? *World Development*, 96: 529—549.
- Hsieh, Chang-Tai and Peter J. Klenow. 2009. Misallocation and Manufacturing TFP in China and India. *Quarterly Journal of Economics*, 124(4): 1403-1448.
- IADB. 2016. Firm Innovation and Productivity in Latin America and the Caribbean: The Engine of Economic Development.
- IGC, 2019 Firms, trade, and productivity, Evidence Paper.
- Isaksson Ann-Sofie and Andreas Kotsadam. 2018. Chinese aid and local corruption. *Journal of Public Economics*, 159(C): 146-159
- Jedwab Remi and Alexander Moradi. 2016. The permanent effects of transportation revolutions in poor countries: evidence from Africa. *The Review of Economic and Statistics*, 98 (2): 268–284.
- 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.
- Kaplinsky Raphael, Dorothy McCormick and Mike Morris. 2007. Impacts and Challenges of a Growing Relationship between China and Sub Saharan Africa. Mimeo
- Kaplinsky Raphael and Mike Morris. 2009. Chinese FDI in Sub-Saharan Africa: Engaging with Large Dragons. *The European Journal of Development Research*, 21:551–569
- Kilby Christopher. 2009. The political economy of conditionality: An empirical analysis of World Bank loan disbursements. *Journal of Development Economics*, 89(1): 51-61.
- Kilby Christopher. 2010. Supervision and performance: the case of World Bank projects. *Journal of Development Economics*, 62(1): 233-259.

- Kilby Christopher. 2013. The political economy of project preparation: An empirical analysis of World Bank projects. *Journal of Development Economics* 105: 211-225.
- Kilby Christopher. 2015. Assessing the impact of World Bank preparation on project outcomes. *Journal of Development Economics*, 115:111–123.
- Knack Stephen. 2001. Aid dependence and the quality of governance: cross-country empirical tests. *Southern Economic Journal*, 68 (2), 310–329.
- Krueger Alan B. 1998. Measuring Labor's Share. *American Economic Review*, 89(2): 45–51.
- Lang Valentin. 2016. The Economics of the Democratic Deficit: The Effect of IMF Programs on Inequality. University of Heidelberg Department of Economics Discussion Paper 617. Heidelberg, Germany: Heidelberg University
- Marchesi Silvia, Laura Sabani and Axel Dreher. 2011. Read my Lips: The Role of Information Transmission in Multilateral Reform Design. *Journal of International Economics* 84: 86-98.
- Marchesi Silvia and Tania Masi. 2020. Delegation of Implementation in project aid. *The Review of International Organizations*, forthcoming
- Melitz Mark. J., 2003. The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 71(6): 1695–1725.
- McMillan, M., D. Rodrik, and Í. Verduzco-Gallo. 2014. Globalization, Structural Change, and Productivity Growth, With an Update on Africa. *World Development* 63: 11–32.
- Minasyan Anna, Peter Nunnenkamp and K. Richert. 2017. Does aid effectiveness depend on the quality of donors? *World Development*, 100:16–30.
- Nunn, Nathan and Qian, Nancy. 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.
- Rajan Raghuram and Arvind Subramanian. 2007. Does aid affect governance? *American Economic Review*, 97 (2): 322–327.
- Rajan Raghuram and Arvind Subramanian. 2008. Aid and growth: what does the cross-country evidence really show? *The Review of Economic and Statistics*, 90 (4): 643–665.
- Rajan Raghuram and Arvind Subramanian. 2011. Aid, Dutch disease, and manufacturing growth. *Journal of Development Economics*, 94 (1): 106–118.
- Rajan, Raghuram and Luigi Zingales, 1998. Financial dependence and growth. *American Economic Review*, 88 (3): 559–586.
- Rud, J.P., 2012. Electricity provision and industrial development: evidence from India. *Journal of Development Economics*, 97 (2): 352–367.
- 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.

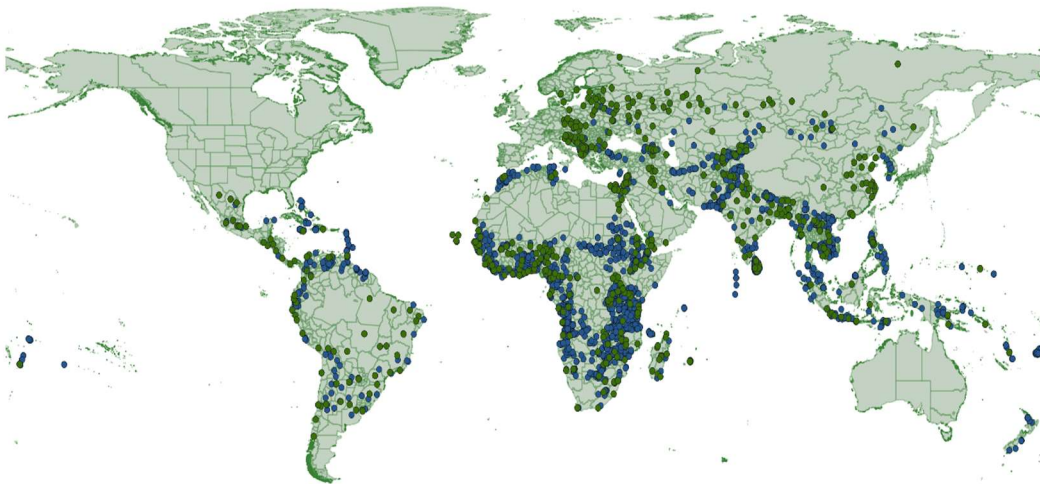
- Syverson, C. 2011. What Determines Productivity? *Journal of Economic Literature*, 49(2): 326–365.
- The United Nations. 2020. Funding the fight against COVID-19 in the world’s poorest countries Department of Global Communications (DGC)
- Werker Eric, Faisal Z. Ahmed, and Charles Cohen. 2009. How is Foreign Aid Spent? Evidence from a Natural Experiment. *American Economic Journal: Macroeconomics* 1 (2): 225–244.
- World Bank/IMF. 2020. World Bank/IMF Spring Meetings 2020: Development Committee Communiqué
- 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).

**Figure 1. World Bank project and firm distribution across countries**



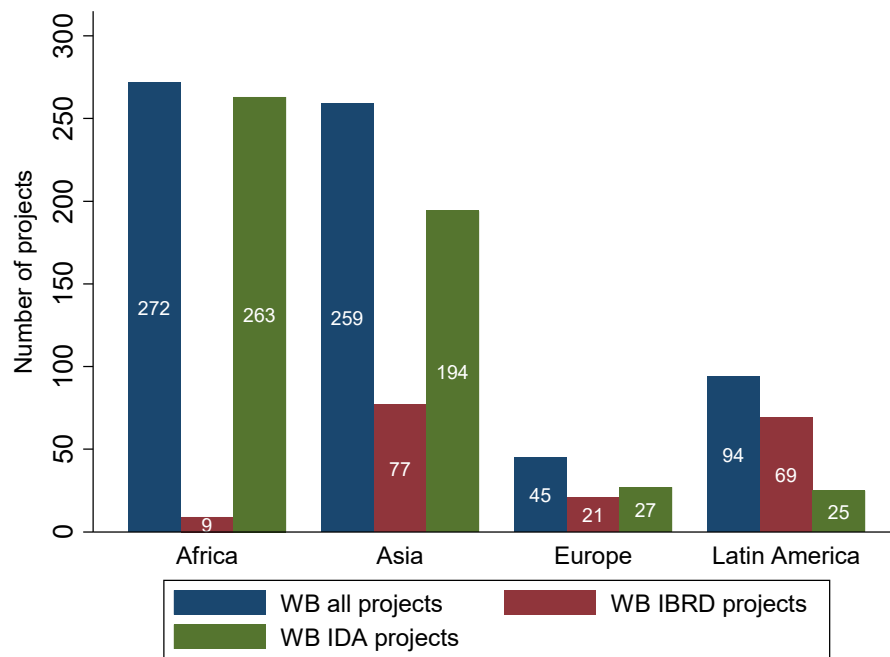
*Note:* Green dots refer to WBES firms, while red dots are the World Bank projects.

**Figure 2: Chinese Project and firm distribution across countries**

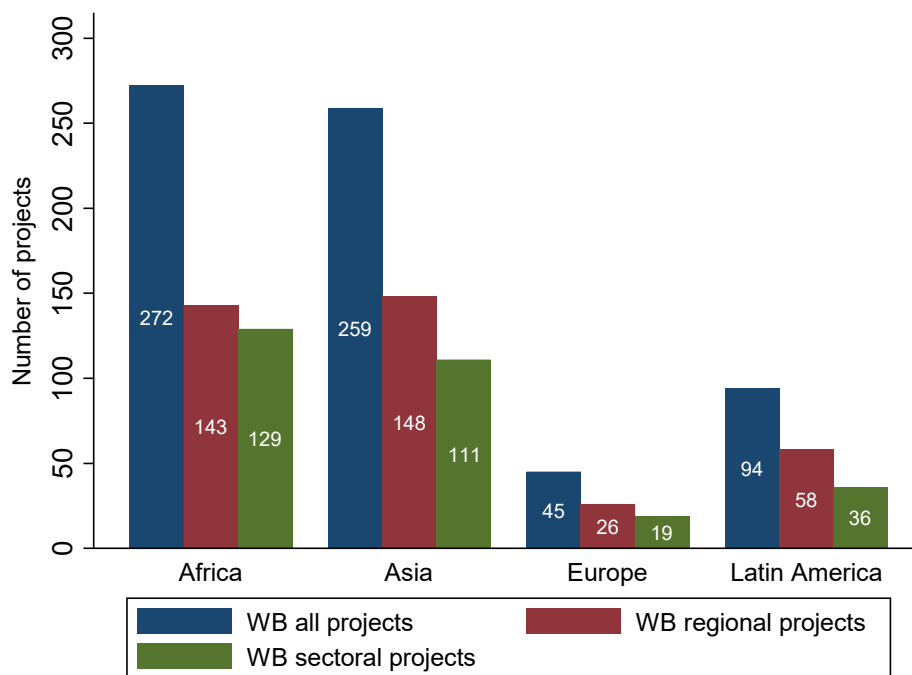


*Note:* Green dots refer to WBES firms, while blue dots are the Chinese projects.

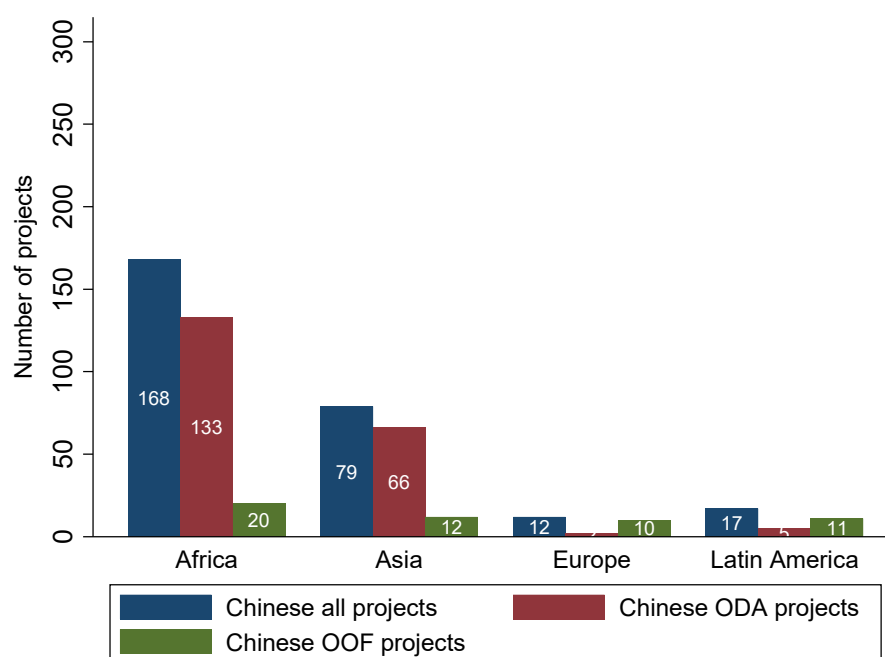
**Figure 3. World Bank IBRD and IDA projects by region**



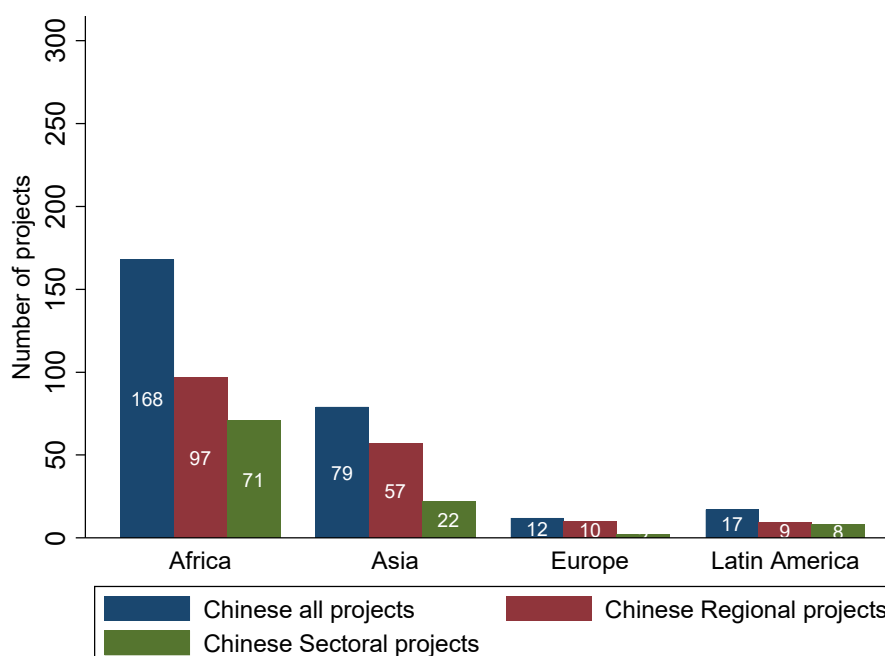
**Figure 4. World Bank projects by region and sector**



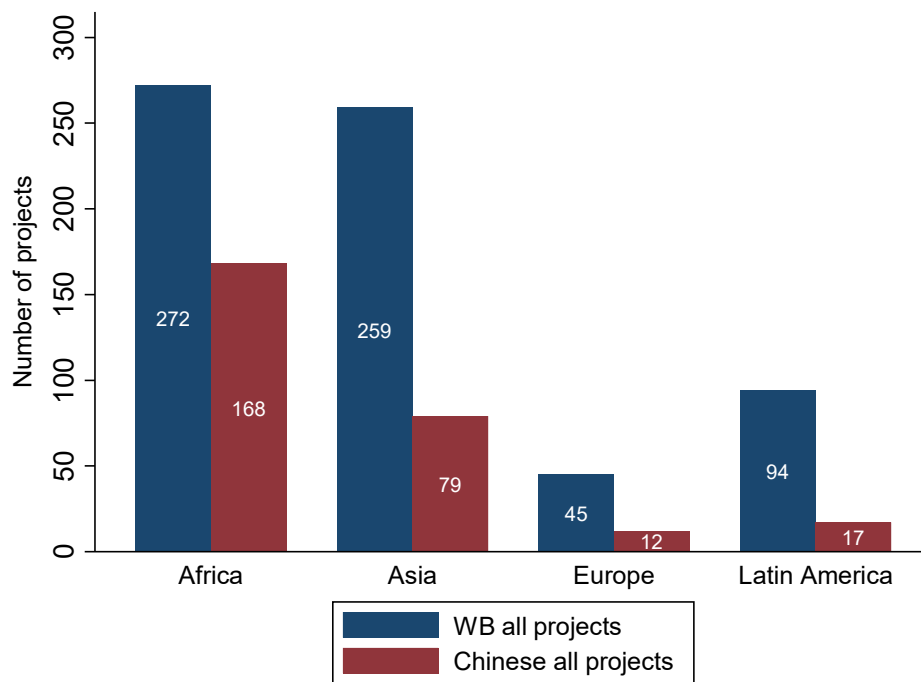
**Figure 5. Chinese ODA and OOF projects by region**



**Figure 6. Chinese projects by region and sector**



**Figure 7: World Bank and Chinese number of project by region**



**Figure 8: World Bank and Chinese project amounts (in million USD) by region**

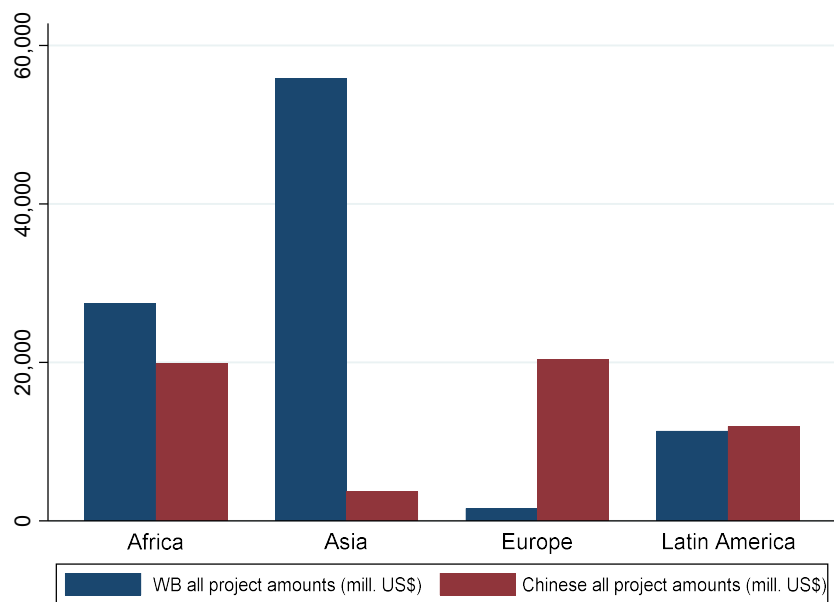




Figure 9. Distribution of sales by sectors

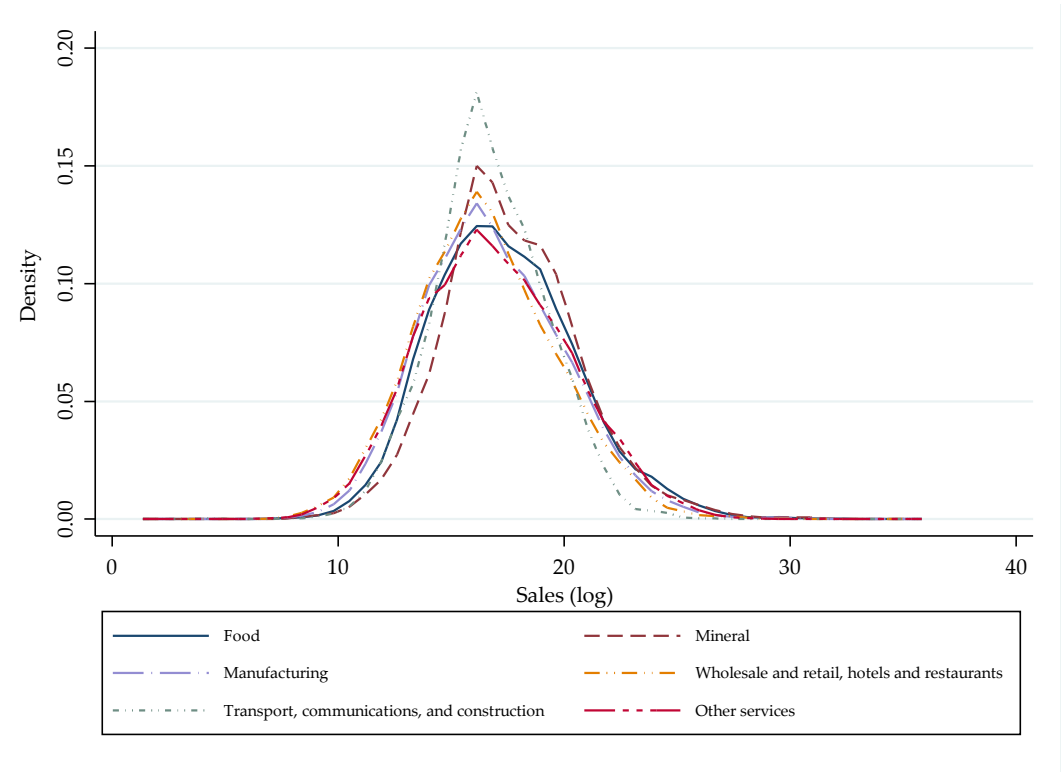
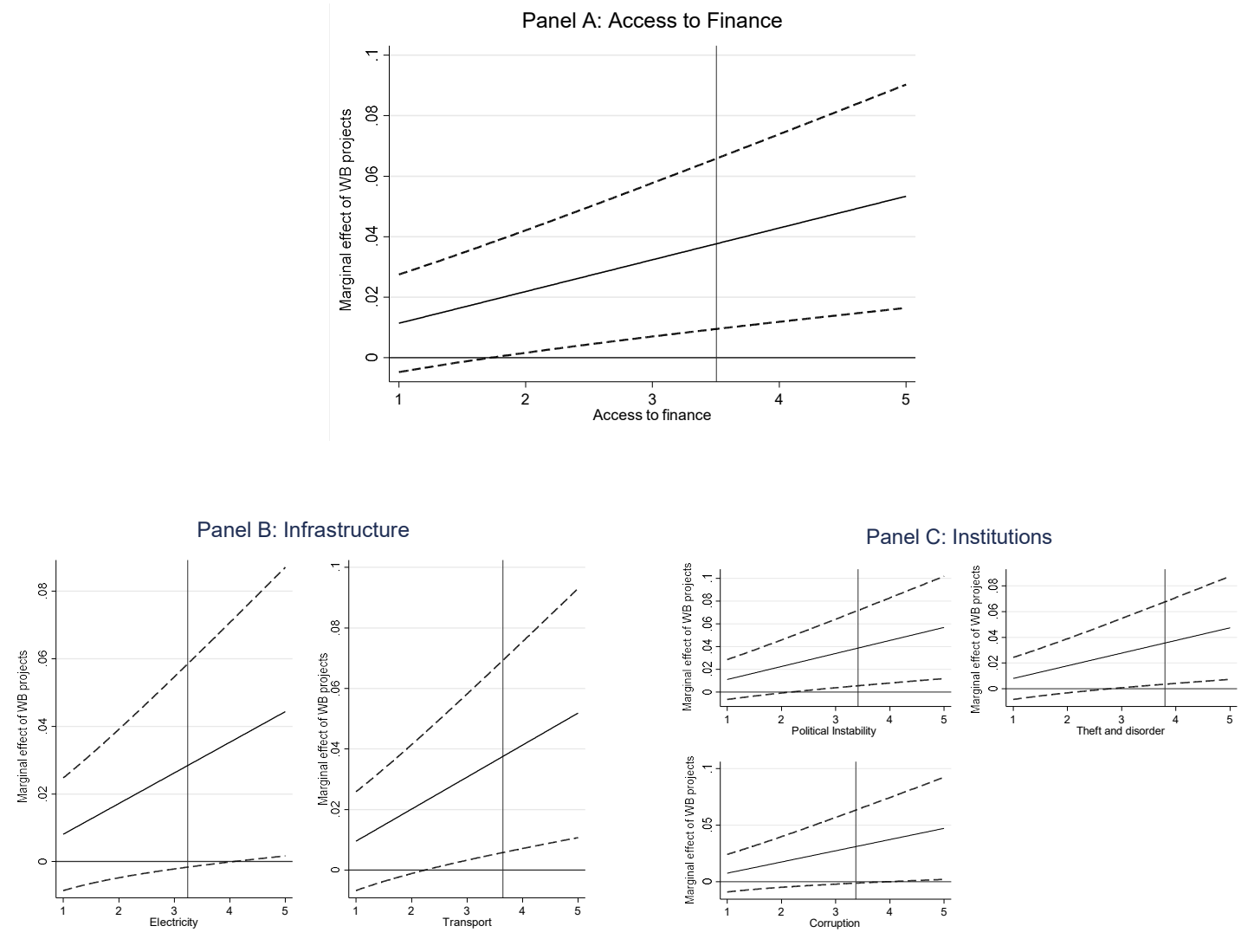
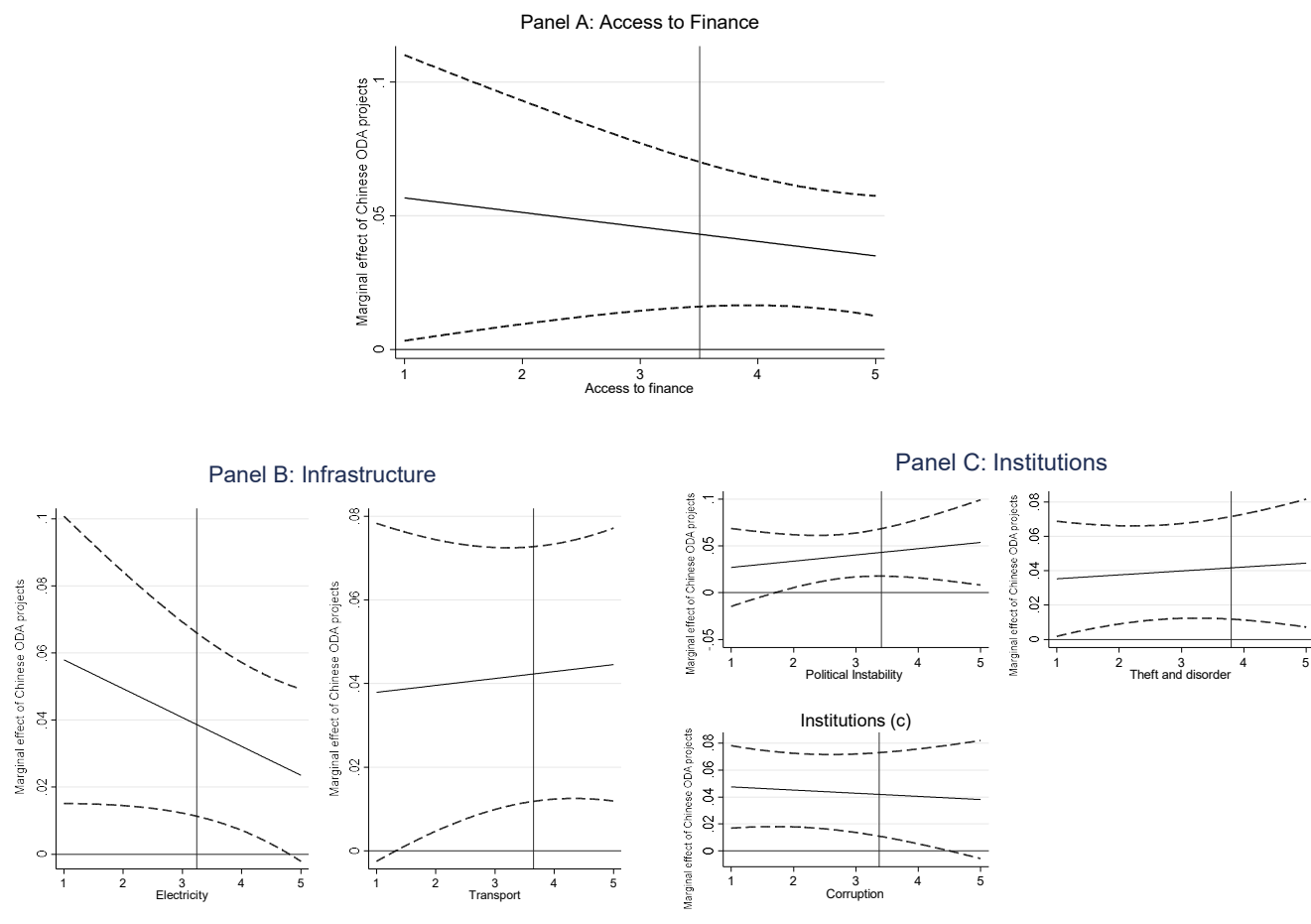


Figure 10. World Bank aid and measures of access to finance and reputation as channels



**Figure 11. Chinese aid, and measures of access to finance and reputation as channels**



**Table 1. Firm sales growth and World Bank total aid**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Total # WB projects	-0.028** (-2.399)	-0.022 (-0.751)	-0.014 (-1.311)	-0.040 (-1.135)				
Log amount of WB projects					-0.005 (-0.974)	-0.008 (-0.863)	-0.001 (-0.072)	-0.016 (-1.279)
Log Sales (base year)	-0.095*** (-17.291)	-0.095*** (-17.226)	-0.135*** (-9.747)	-0.136*** (-9.871)	-0.095*** (-16.663)	-0.095*** (-16.772)	-0.134*** (-9.625)	-0.135*** (-9.716)
State ownership (Yes/No)	-0.000 (-0.010)	-0.000 (-0.008)	-0.149* (-1.940)	-0.149* (-1.944)	0.000 (0.013)	0.000 (0.021)	-0.149* (-1.942)	-0.149** (-1.968)
Foreign ownership (Yes/No)	0.065*** (8.274)	0.065*** (8.379)	0.033 (1.153)	0.033 (1.189)	0.065*** (7.981)	0.065*** (8.096)	0.033 (1.132)	0.032 (1.107)
Exports goods (Yes/No)	0.043*** (6.637)	0.043*** (6.681)	0.019 (0.956)	0.017 (0.825)	0.043*** (6.612)	0.043*** (6.658)	0.020 (1.011)	0.017 (0.858)
Firm Size	0.172*** (19.039)	0.172*** (19.020)	0.125*** (5.874)	0.125*** (5.958)	0.172*** (18.293)	0.172*** (18.411)	0.125*** (5.869)	0.124*** (5.749)
Log regional population	-0.158 (-0.579)	-0.150 (-0.561)	-0.123 (-0.239)	-0.192 (-0.387)	-0.130 (-0.458)	-0.140 (-0.503)	-0.089 (-0.168)	-0.163 (-0.313)
Log regional GDP	0.101 (0.605)	0.100 (0.604)			0.096 (0.557)	0.095 (0.549)		
Constant	2.503 (0.967)		3.912 (0.513)		2.125 (0.778)		3.454 (0.445)	
Observations	67,204	67,204	8,039	8,039	67,204	67,204	8,039	8,039
R-squared	0.222	0.126	0.252	0.173	0.221	0.125	0.251	0.248
Region FE	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES
Industry X year FE	YES	YES	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			3,938	3,938			3,938	3,938

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Firm size takes three values (1 = less than 20 employees, and 3 = more than 100 employees). Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Regional population and GDP are measured at the ADM1 level. Regression model in each column controls for Industry X year fixed effects. Firm fixed effects are included in columns (3), (4), (7) and (8), while columns (1), (2), (5) and (6) control for region fixed effects.

**Table 2. Firm sales growth and the Chinese ODA**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Total number of Chinese ODA	0.030** (2.108)	-0.001 (-0.034)	0.008 (0.434)	-0.046 (-1.181)				
Log total amount of Chinese ODA					0.004 (1.021)	-0.000 (-0.034)	0.003 (1.057)	-0.008 (-1.098)
Log Sales (base year)	-0.097*** (-22.268)	-0.095*** (-18.859)	-0.135*** (-9.709)	-0.131*** (-8.916)	-0.096*** (-18.963)	-0.095*** (-18.162)	-0.135*** (-9.874)	-0.132*** (-8.930)
State ownership (Yes/No)	-0.000 (-0.025)	0.000 (0.002)	-0.149* (-1.940)	-0.148* (-1.945)	-0.000 (-0.001)	0.000 (0.001)	-0.147* (-1.894)	-0.157** (-2.036)
Foreign ownership (Yes/No)	0.067*** (9.097)	0.064*** (8.351)	0.034 (1.156)	0.027 (0.937)	0.066*** (8.493)	0.064*** (8.314)	0.034 (1.173)	0.029 (1.020)
Exports goods (Yes/No)	0.045*** (7.149)	0.043*** (6.908)	0.020 (1.021)	0.020 (0.977)	0.043*** (6.850)	0.043*** (6.818)	0.020 (0.995)	0.021 (1.052)
Firm Size	0.175*** (25.031)	0.172*** (20.395)	0.125*** (5.832)	0.126*** (5.973)	0.173*** (20.737)	0.172*** (19.609)	0.124*** (5.863)	0.127*** (5.925)
Log regional population	-0.128 (-0.448)	-0.114 (-0.414)	-0.097 (-0.185)	-0.029 (-0.058)	-0.105 (-0.354)	-0.115 (-0.423)	-0.078 (-0.147)	-0.111 (-0.239)
Log regional GDP	0.118 (0.683)	0.096 (0.559)			0.096 (0.522)	0.097 (0.576)		
Constant	1.869 (0.695)		3.507 (0.455)		1.735 (0.618)		3.370 (0.432)	
Observations	67,204	67,204	8,039	8,039	67,204	67,204	8,039	8,039
R-squared	0.223	0.125	0.251	0.161	0.221	0.125	0.252	0.158
Region FE	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES
Industry X year FE	YES	YES	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			3,938	3,938			3,938	3,938

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Firm size takes three values (1 = less than 20 employees, and 3 = more than 100 employees). Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Regional population and GDP are measured at the ADM1 level. Regression model in each column controls for Industry X year fixed effects. Region fixed effects are included in regression model shown in columns (1), (2), (5), (6), while Firm fixed effects are included in columns (3), (4), (7) and (8).

**Table 3. Firm sales growth and World Bank aid by types (IBRD and IDA)**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<b>Panel A: IBRD</b>								
Total # of IBRD projects	-0.016** (-2.469)	-0.021 (-0.802)	-0.006 (-0.666)	-0.018 (-0.659)				
Log amount of IBRD projects					-0.004 (-1.183)	-0.006 (-0.888)	0.001 (0.289)	-0.006 (-0.730)
Observations	46,362	46,362	4,600	4,600	46,362	46,362	4,600	4,600
R-squared	0.238	0.128	0.277	0.180	0.238	0.128	0.277	0.276
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.001
Panel observations			2,235	2,235			2,235	2,235
<b>Panel B: IDA</b>								
Total # of IDA projects	-0.032 (-1.287)	-0.026 (-0.592)	-0.034 (-1.079)	-0.065 (-0.700)				
Log total amount of IDA projects					-0.010 (-0.753)	-0.016 (-0.586)	-0.004 (-0.159)	-0.034 (-0.677)
Observations	53,412	53,412	5,554	5,554	53,412	53,412	5,554	5,554
R-squared	0.240	0.130	0.268	0.179	0.240	0.130	0.266	0.261
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.002
Panel observations			2,739	2,739			2,739	2,739
<b>Panel C: IDA versus IBRD</b>								
Total # of IDA projects	-0.050* (-1.661)	-0.196** (-2.081)	-0.002 (-0.070)	-0.147 (-1.334)				
Log total amount of IDA projects					0.002 (0.094)	-0.423 (-1.045)	0.030 (1.518)	-0.287 (-0.777)
Observations	32,897	32,897	3,346	3,346	32,897	32,897	3,346	3,346
R-squared	0.206	0.104	0.258	0.127	0.204	-0.094	0.261	-0.180
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			1,667	1,667			1,667	1,667

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Panel regressions are not available for Panel D due to insufficient observations. Region fixed effects are included in regression model shown in columns (1), (2), (5), (6), while Firm fixed effects are included in columns (3), (4), (7) and (8). Regression model in each column controls for Industry X year fixed effects.

**Table 4. Firm sales growth and World Bank aid by macro regions**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	World Bank aid = Total # of AID projects				World Bank aid = Log total amount of Aid			
Panel A: Africa								
World Bank aid	-0.052** (-1.993)	-0.033 (-0.989)	-0.091** (-2.588)	-0.196** (-2.165)	-0.025* (-1.820)	-0.020 (-0.765)	-0.054** (-2.597)	-0.090** (-2.191)
Observations	24,191	24,191	2,101	2,101	24,191	24,191	2,101	2,101
R-squared	0.267	0.131	0.355	0.166	0.267	0.131	0.357	0.177
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.026		0.013
Panel observations			1,050	1,050			1,050	1,050
Panel B: Asia								
World Bank aid	0.014 (1.289)	0.043 (1.540)	0.049** (2.424)	0.090** (2.329)	0.007 (1.164)	0.005 (0.676)	0.025** (2.100)	0.036** (2.182)
Observations	15,557	15,557	2,401	2,401	15,557	15,557	2,401	2,401
R-squared	0.232	0.113	0.220	0.166	0.232	0.115	0.218	0.168
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			1,189	1,189			1,189	1,189
Panel C: Latin America								
World Bank aid	-0.019*** (-3.293)	-0.031 (-0.873)	-0.012 (-1.392)	-0.011 (-0.398)	-0.008** (-2.117)	-0.008 (-1.010)	-0.004 (-1.079)	-0.004 (-0.443)
Observations	19,989	19,989	3,167	3,167	19,989	19,989	3,167	3,167
R-squared	0.190	0.146	0.339	0.284	0.189	0.146	0.338	0.283
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.011		0.030
Panel observations			1,514	1,514			1,514	1,514
Panel D: Europe								
World Bank aid	-0.011 (-0.300)	0.023 (0.418)	-0.029 (-0.792)	0.054 (0.813)	-0.001 (-0.094)	0.002 (0.120)	-0.002 (-0.220)	0.016 (0.770)
Observations	7,467	7,467	370	370	7,467	7,467	370	370
R-squared	0.214	0.154	0.385	0.281	0.214	0.154	0.384	0.287
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.057		0.028
Panel observations			185	185			185	185

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Region fixed effects are included in regression model shown in columns (1), (2), (5) and (6), while Firm fixed effects are included in columns (3), (4), (7) and (8). Regression model in each column controls for Industry X year fixed effects.

**Table 5. Firm sales growth and the Chinese ODA by macro regions**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	Chinese aid = total # of Chinese ODA projects				Chinese aid = Log total amount of Chinese ODA			
Panel A: Africa								
Chinese aid	0.029 (1.605)	0.026 (0.982)	0.010 (0.455)	0.011 (0.234)	0.007 (1.408)	0.006 (0.903)	0.002 (0.385)	0.002 (0.236)
Observations	24,191	24,191	2,101	2,101	24,191	24,191	2,101	2,101
R-squared	0.268	0.132	0.346	0.170	0.268	0.132	0.346	0.170
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			1,050	1,050			1,050	1,050
Panel B: Asia								
Chinese aid	-0.002 (-0.288)	0.006 (0.435)			-0.000 (-0.132)	0.001 (0.437)		
Observations	15,557	15,557			15,557	15,557		
Kleibergen-Paap LM stat (p-value)		0.000				0.000		
R-squared	0.232	0.114			0.232	0.114		
Panel C: Latin America								
Chinese aid	0.012 (1.093)	-0.001 (-0.083)			0.001 (0.910)	-0.000 (-0.083)		
Observations	19,989	19,989			19,989	19,989		
Kleibergen-Paap LM stat (p-value)		0.000				0.000		
R-squared	0.189	0.145			0.189	0.145		
Panel D: Europe								
Chinese aid	0.112 (1.088)	-0.253 (-0.565)			0.104 (0.471)	0.047 (1.076)		
Observations	7,467	7,467			7,467	7,467		
Kleibergen-Paap LM stat (p-value)		0.003				0.003		
R-squared	0.214	0.152			0.214	0.155		

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Regression model in each column controls for Industry X year fixed effects. Region fixed effects are included in regression model shown in columns (1), (2), (5) and (6), while Firm fixed effects are included in columns (3), (4), (7) and (8), however due to insufficient observations panel regressions are only feasible for Africa sample.



**Table 6. Firm sales growth, sectoral and regional World Bank aid**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<b>Panel A: Sectoral Aid</b>								
Total # of sectoral WB projects	-0.037 (-0.853)	0.089 (0.960)	-0.037 (-0.646)	-0.148 (-1.345)				
Log total amount of sectoral WB projects					-0.004 (-0.312)	0.020 (0.917)	-0.009 (-0.525)	-0.036 (-1.421)
Observations	44,015	44,015	3,415	3,415	44,015	44,015	3,415	3,415
R-squared	0.268	0.136	0.316	0.312	0.268	0.137	0.316	0.313
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.001		0.001
Panel observations			1,672	1,672			1,672	1,672
<b>Panel B: Regional Aid</b>								
Total # of regional WB projects	-0.025** (-2.054)	0.025 (0.460)	-0.004 (-0.291)	0.030 (0.623)				
Log total amount of regional WB projects					-0.005 (-0.818)	0.002 (0.191)	0.002 (0.194)	0.011 (0.693)
Observations	47,513	47,513	4,076	4,076	47,513	47,513	4,076	4,076
R-squared	0.224	0.128	0.199	0.194	0.223	0.129	0.199	0.197
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.017		0.031
Panel observations			2,010	2,010			2,010	2,010
<b>Panel C: Sectoral versus Regional Aid (sample restricted to firms that received either regional or sectoral aid)</b>								
Total # of regional WB projects	0.080 (1.298)	0.065 (0.661)	0.042** (2.240)	0.064*** (2.755)				
Log total amount of regional WB projects					0.034 (1.636)	0.048 (1.159)	0.014** (2.438)	0.021*** (2.861)
Observations	22,914	22,914	1,273	1,273	22,914	22,914	1,273	1,273
R-squared	0.239	0.134	0.346	0.345	0.240	0.135	0.346	0.345
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			636	636			636	636

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Region fixed effects are included in regression model shown in columns (1), (2), (5) and (6), while Firm fixed effects are included in columns (3), (4), (7) and (8). Regression model in each column controls for Industry X year fixed effects.

**Table 7. Firm sales growth, sectoral and regional Chinese aid**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<b>Panel A: Sectoral Aid</b>								
Total number of Chinese sectoral ODA	-0.012 (-0.812)	-0.034 (-0.853)	-0.023* (-1.810)	-0.024 (-0.949)				
Log total amount of Chinese sectoral ODA					-0.001 (-0.124)	-0.008 (-0.923)	-0.003 (-0.900)	-0.006 (-0.952)
Observations	58,301	58,301	5,188	5,188	58,301	58,301	5,188	5,188
R-squared	0.231	0.131	0.272	0.272	0.231	0.131	0.272	0.272
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
Panel observations			2,542	2,542			2,542	2,542
<b>Panel B: Regional Aid</b>								
Total number of Chinese regional ODA	0.045** (2.425)	-0.070 (-1.227)	0.025 (1.113)	-0.042 (-1.337)				
Log total amount of Chinese regional ODA					0.007* (1.907)	-0.010 (-1.175)	0.006*** (3.057)	-0.007 (-1.100)
Observations	66,029	66,029	7,812	7,812	66,029	66,029	7,812	7,812
R-squared	0.227	0.108	0.256	0.246	0.226	0.114	0.260	0.237
Kleibergen-Paap LM stat (p-value)		0.001		0.001		0.001		0.001
Panel observations			3,825	3,825			3,825	3,825
<b>Panel C: Regional versus Sectoral Aid (sample restricted to firms that received either regional or sectoral aid)</b>								
Total number of Chinese regional ODA	0.026*** (2.870)	0.918*** (8.098)	0.124*** (4.433)					
Log total amount of Chinese regional ODA					0.011*** (3.072)	0.010*** (3.135)	0.047*** (4.433)	
Observations	10,078	10,078	2,232		10,078	10,078	2,232	
R-squared	0.268	0.133	0.456		0.268	0.133	0.456	
Kleibergen-Paap LM stat (p-value)		0.000				0.000		
Panel observations			1,898				1,898	

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Region fixed effects are included in regression model shown in columns (1), (2), (5) and (6), while Firm fixed effects are included in columns (3), (4), (7) and (8). Regression model in each column controls for Industry X year Fixed effects. IV regressions for the panel sample could not be performed due to insufficient observations.

**Table 8. Firm sales growth and aid (the World Bank and Chinese ODA) by broad industrial sectors**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	Aid = total # of WB projects		Aid = Log amount of WB Aid		Aid = total # of Chinese ODA		Aid = Log amount of Chinese ODA	
Panel A: Food								
Aid	-0.029*** (-2.810)	0.005 (0.121)	-0.006 (-1.175)	0.003 (0.264)	0.036*** (3.794)	0.008 (0.043)	0.006* (1.744)	0.001 (0.042)
Observations	6,475	6,475	6,475	6,475	6,475	6,475	6,475	6,475
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.085		0.085
R-squared	0.225	0.098	0.224	0.098	0.268	0.101	0.265	0.099
Panel B: Mineral								
Aid	0.006 (0.313)	-0.021 (-0.603)	-0.008 (-1.106)	-0.019* (-1.749)	-0.014 (-0.920)	-0.054* (-1.776)	-0.002 (-0.606)	-0.007* (-1.782)
Observations	6,121	6,121	6,121	6,121	6,121	6,121	6,121	6,121
Kleibergen-Paap LM stat (p-value)		0.001		0.001		0.000		0.000
R-squared	0.225	0.109	0.224	0.109	0.247	0.108	0.247	0.109
Panel C: Manufacturing								
Aid	-0.035** (-2.261)	-0.016 (-0.434)	-0.006 (-1.035)	-0.004 (-0.304)	0.037** (2.054)	-0.081 (-0.634)	0.005 (1.110)	-0.011 (-0.815)
Observations	25,753	25,753	25,753	25,753	25,753	25,753	25,753	25,753
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.012		0.012
R-squared	0.228	0.147	0.228	0.147	0.237	0.105	0.235	0.133
Panel D: Wholesale and retail trade								
Aid	-0.022* (-1.703)	-0.025 (-0.878)	-0.002 (-0.347)	-0.010 (-0.961)	0.033 (1.591)	-0.200 (-0.487)	0.002 (0.360)	-0.018 (-0.770)
Observations	12,001	12,001	12,001	12,001	12,001	12,001	12,001	12,001
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.133		0.133
R-squared	0.219	0.133	0.218	0.132	0.273	0.030	0.271	0.115
Panel E: Transport								
Aid	0.065 (0.566)	0.288 (1.398)	-0.015 (-0.833)	-0.010 (-0.587)	0.094 (1.672)	0.396** (2.434)	0.004* (1.811)	0.084 (1.224)
Observations	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
Kleibergen-Paap LM stat (p-value)		0.018		0.002		0.005		0.005
R-squared	0.219	0.178	0.218	0.179	0.353	0.173	0.352	0.139
Panel F: Other								
Aid	-0.020 (-1.395)	-0.038 (-1.083)	0.000 (0.029)	-0.017 (-1.153)	0.006 (0.463)	-0.079 (-0.909)	0.000 (0.010)	-0.012 (-0.996)
Observations	14,604	14,604	14,604	14,604	14,604	14,604	14,604	14,604
Kleibergen-Paap LM stat (p-value)		0.000		0.000		0.000		0.000
R-squared	0.227	0.115	0.226	0.114	0.244	0.094	0.244	0.108

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Regression model in each column controls for Industry X year fixed effects and region fixed effects.

**Table 9. Firm sales growth, the World Bank and Chinese aid (sample restricted to firms that received aid)**

Dependent variable: Annual growth rate of sales	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<b>Panel A: World Bank Aid</b>								
Total number of WB Aid	-0.047** (-2.152)	-0.100 (-1.631)	-0.023 (-1.170)	-0.099 (-1.547)				
Log total amount of WB Aid					0.001 (0.022)	-0.673 (-1.127)	0.085** (2.155)	-0.341 (-1.009)
Observations	32,897	32,897	5,503	3,346	32,897	32,897	5,503	3,346
R-squared	0.207	0.119	0.259	0.151	0.204	-0.051	0.265	0.084
Kleibergen-Paap LM stat (p-value)		0,000		0,003		0,328		0,148
Panel observations			3,824	1,667			3,824	1,667
<b>Panel B: Chinese Aid</b>								
Total number of Chinese ODA	0.071*** (8.348)	0.071*** (8.341)	0.046** (2.669)	0.048* (1.957)				
Log total amount of Chinese Aid					0.019*** (3.403)	0.024*** (7.194)	-0.004 (-0.532)	0.013 (1.394)
Observations	12,351	12,351	876	876	12,351	12,351	876	876
R-squared	0.278	0.141	0.507	0.078	0.277	0.138	0.506	0.063
Kleibergen-Paap LM stat (p-value)		0,092		0,111		0,079		0,079
Panel observations			438	438			438	438

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned, foreign-owned and exporting firms (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Region fixed effects are included in regression model shown in columns (1), (2), (5) and (6), while Firm fixed effects are included in columns (3), (4), (7) and (8). Regression model in each column controls for Industry X year fixed effects.

**Table 10. The Channels, firm sales growth, the World Bank aid**

CHANNEL =	Firm has an overdraft facility	No obstacle with access to finance	Firm has internationally- recognized quality certification	Firm has a checking /saving account	Financial statements certified by External auditor	Exports goods	No obstacle with electricity	No obstacle with transport	No obstacle with political instability	No obstacle with crime, theft and disorder	No obstacle with corruption
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Total # WB projects	0.001 (0.103)	0.001 (0.102)	-0.004 (-0.414)	-0.001 (-0.122)	-0.005 (-0.606)	-0.014 (-1.305)	-0.001 (-0.113)	-0.001 (-0.119)	-0.000 (-0.038)	-0.002 (-0.220)	-0.002 (-0.278)
Total # WB projects × CHANNEL	0.055*** (3.718)	0.010*** (2.691)	0.000 (0.026)	0.042** (2.305)	0.041** (2.422)	0.002 (0.093)	0.009* (1.929)	0.011** (2.331)	0.011** (2.363)	0.010** (2.237)	0.010* (1.940)
CHANNEL	0.015 (0.675)	-0.002 (-0.294)	-0.030 (-1.161)	-0.033 (-0.937)	0.013 (0.624)	0.018 (0.778)	-0.005 (-0.958)	-0.010 (-1.319)	0.002 (0.250)	-0.003 (-0.490)	-0.004 (-0.782)
Constant	3.999 (0.740)	2.747 (0.490)	5.457 (1.005)	5.303 (0.945)	5.738 (1.033)	4.081 (0.533)	5.215 (0.933)	5.177 (0.920)	6.123 (1.069)	5.554 (0.971)	5.610 (0.989)
Observations	7,822	7,661	7,822	7,822	7,822	10,083	7,822	7,822	7,716	7,822	7,822
R-squared	0.280	0.289	0.274	0.280	0.278	0.252	0.277	0.280	0.279	0.280	0.279
Panel observations	5,103	5,053	5,103	5,103	5,103	5,982	5,103	5,103	5,093	5,103	5,103

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned and foreign-owned (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Firm fixed effects are included in each model, and regression model in each column controls for Industry X year fixed effects.

**Table 11. The Channels, firm sales growth, the Chinese aid**

CHANNEL =	Firm has an overdraft facility	No obstacle with access to finance	Firm has internationally-recognized quality certification	Firm has a checking / saving account	Financial statements certified by External auditor	Firm exports goods	No obstacle with electricity	No obstacle with transport	No obstacle with political instability	No obstacle with crime, theft and disorder	No obstacle with corruption
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Total # of Chinese ODA	0.032 (1.383)	0.062 (1.570)	0.049** (2.518)	0.034 (1.032)	0.038* (1.698)	0.010 (0.486)	0.067** (2.136)	0.036 (1.273)	0.020 (0.585)	0.033 (1.341)	0.050** (2.200)
Total # of Chinese ODA × CHANNEL	0.027 (1.431)	-0.005 (-0.683)	-0.036 (-1.539)	0.009 (0.304)	0.006 (0.384)	-0.006 (-0.411)	-0.009 (-1.369)	0.002 (0.287)	0.007 (0.602)	0.002 (0.340)	-0.002 (-0.323)
CHANNEL	0.030 (1.438)	0.007 (1.013)	-0.010 (-0.391)	-0.021 (-0.540)	0.028 (1.418)	0.024 (1.125)	0.002 (0.331)	-0.005 (-0.712)	0.004 (0.500)	0.000 (0.059)	0.002 (0.247)
Constant	4.436 (0.795)	2.546 (0.450)	4.910 (0.866)	5.117 (0.902)	5.331 (0.941)	3.479 (0.451)	5.271 (0.919)	5.168 (0.905)	5.662 (0.960)	5.147 (0.895)	5.018 (0.873)
Observations	7,822	7,661	7,822	7,822	7,822	10,083	7,822	7,822	7,716	7,822	7,822
R-squared	0.283	0.292	0.282	0.280	0.281	0.251	0.281	0.280	0.280	0.280	0.280
Panel observations	5,103	5,053	5,103	5,103	5,103	5,982	5,103	5,103	5,093	5,103	5,103

*Notes:* Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Each regression model controls for log sales in baseline year (t-2), state-owned and foreign-owned (dummy variables), and firm size, which takes three values (1 = less than 20 employees, and 3 = more than 100 employees) at the firm level. Region level controls include log population and log GDP measured at the ADM1 level. Base year sales are measured at t-2, however firm specific control variables are measured at t. Dependent variable is the annual growth rate of sales between period t-2 to t. Firm fixed effects are included in each model, and regression model in each column controls for Industry X year fixed effects.

## **ONLINE APPENDICES**

**ONLINE APPENDIX A: World Bank Aid Data and the World Bank Enterprise Survey**

**ONLINE APPENDIX B: Chinese Aid Data**

**ONLINE APPENDIX C: Additional Figures**

**ONLINE APPENDIX D: Summary statistics, variable definition and additional results**

## APPENDIX A. World Bank Aid Data and the World Bank Enterprise Survey

### A.1 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 110,864 firms across this broad classification of industries is given in Table A1 below.

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

WBES broad sector categories	Number	Percent
Firms in food sector (=1)	9,534	8.6%
Firms in mineral sector (=2)	11,749	10.6%
Firms in other manufacturing sectors (=3)	40,511	36.6%
Firms in wholesale and retail sectors, hotels and restaurant (=4)	21,307	19.3%
Firms in transport, communications (IT) and construction (=5)	5,285	4.8%
Firms in other services sectors (=6)	22,211	20%

*Notes:* The total number of firms is 110597 as 267 observations are lost due to missing industry code.

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

We compute this table using the mapping presented in Table A2 of a more disaggregated classification of sectors into these six broad categories.

#### Step 2

As a second step we use the description of the World Bank projects to identify whether they are region-specific (related to all firms) or sector-specific (related to firms in a sector). As shown in Table A3, 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 summarized in Table A4.

#### 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 2016, whereas the information of World Bank and projects is available from 1995 to 2014 and the information of Chinese projects is available from 2000 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, or Chinese, project is committed. This allows us to evaluate any development commitments taking place between 2001 and 2014, and the firm-level outcomes realized in the period from 2003 to 2016. The two tables A5 and A6 below then show the year in which World Bank (and Chinese) projects were undertaken and the number of firms surveyed in each round.



**Table A2: The WBES sectoral classification (disaggregated level)**

Code	Sector	WBES Broad categories
1	Basic Metals & Metal Products	2 Mineral
2	Basic Metals/Fabricated Metals/Machinery	2 Mineral
3	Chemicals & Chemical Products	2 Mineral
4	Chemicals, Non-Metallic Mineral, Plastic	2 Mineral
5	Chemicals, Plastics & Rubber	2 Mineral
6	Construction	6 Other services
7	Electronics	3 Other manufacturing
8	Electronics & Communications Equip.	3 Other manufacturing
9	Fabricated Metal Products	2 Mineral
10	Food	1 Food
11	Food/Leather/Wood/Tobacco/Rubber Product	3 Other manufacturing
12	Furniture	3 Other manufacturing
13	Garments	3 Other manufacturing
14	Hospitality & Tourism	5 Transport, communication and hotels
15	Hotels & Restaurants	5 Transport, communication and hotels
16	IT & IT Services	5 Transport, communication and hotels
17	Leather Products	3 Other manufacturing
18	Machinery & Equipment	3 Other manufacturing
19	Machinery & Equipment & Electronics	3 Other manufacturing
20	Machinery & Equipment, Electronics	3 Other manufacturing
21	Manufacturing	3 Other manufacturing
22	Manufacturing Panel	3 Other manufacturing
23	Minerals, Metals, Machinery & Equipment	2 Mineral
24	Mining Related Manufacturing	2 Mineral
25	Motor Vehicles	3 Other manufacturing
26	Motor Vehicles & Transport Equip.	3 Other manufacturing
27	Non-Metallic Mineral Products	2 Mineral
28	Other Manufacturing	3 Other manufacturing
29	Other Services	6 Other services
30	Other Services Panel	6 Other services
31	Petroleum products, Plastics & Rubber	2 Mineral
32	Printing & Publishing	3 Other manufacturing
33	Rest of Universe	3 Other manufacturing
34	Retail	4 Wholesale and retail trade
35	Retail & IT	4 Wholesale and retail trade
36	Retail Panel	4 Wholesale and retail trade
37	Rubber & Plastics Products	2 Mineral
38	Services	2 Mineral
39	Services of Motor Vehicles	4 Wholesale and retail trade
40	Services of Motor Vehicles/Wholesale/Re	4 Wholesale and retail trade
41	Textiles	3 Other manufacturing
42	Textiles & Garments	3 Other manufacturing
43	Textiles, Garments, Leather & Paper	3 Other manufacturing
44	Tourism	5 Transport, communication and hotels
45	Transport	5 Transport, communication and hotels
46	Transport, Storage, & Communications	5 Transport, communication and hotels
47	Wholesale	4 Wholesale and retail trade
48	Wholesale & Retail	4 Wholesale and retail trade
49	Wood Products	3 Other manufacturing
50	Wood Products & Furniture	3 Other manufacturing
51	Wood products, Furniture, Paper & Public	3 Other manufacturing

**Table A3. Mapping of sectors between WBP and WBES data**

Code	Sectors	Description	World Bank Projects		WBES categories
			Definition	Coded activities	
1	AB	Agricultural extension and research	All activities to strengthen the technological or knowledge base within the agricultural sector (which encompasses the value chains for all crops and agricultural research and development).	Agricultural research and development, competitive grant and innovation grant schemes for research and extension input, participatory research and technology development, agricultural training, extension and advisory services, capacity building of private sector, etc.	1
2	AH	Crops	Activities that enable annual and perennial crop production, through the provision of inputs and the supply of crop management services, be it manual or mechanized.	All activities in crop production, from land preparation until harvesting.	1
3	AI	Irrigation and drainage	Used to capture support to abstraction, transfer, storage, conveyance, distribution, and application of agricultural water and drainage of water used for agricultural production.	Investments in agricultural water delivery systems of any type and technology, including both greenfield, rehabilitation and modernization projects.	1
4	AJ	Animal production	This sector describes every aspect of the productive process involving domesticated animals (and farmed wildlife) along the value chains.	Grazing systems, the mixed crop-and-livestock systems, the semi-intensive systems found in LIC peri-urban.	1
5	AT	Forestry	This code captures all the activities related to management of natural forests, plantation (from small- to large-scale) as well as tree planting in agricultural farms.	Participatory Forest Management, management of Production Forests, Production of Non-Timber Forest Products, Forest Conservation and Biodiversity Protection, etc.	1
6	AZ	General agriculture, fishing and forestry sector	Use only if no other Agriculture, Fishing and Forestry sector is appropriate or for activities that span more than five sectors.	If a project covers three sectors under Agriculture, Fishing and Forestry, two sectors under Transportation and two sectors under Information and Communications Technology then use the Other Agriculture, Fishing and Forestry sector code to reflect the three sectors, etc.	1
7	BC	Central government administration	Administrative units (ministries, departments, and agencies) that are financed, regulated and controlled by the central or national government. The political authority of the central government extends over the entire territory of the country.	Institutional structure: reforms to civil service laws and regulations; functional, organizational, and business process reviews; organizational restructuring, downsizing or right-sizing efforts; Management: Delivery units and strengthening the centre of government; compensation reform, etc.	0
8	BE	Compulsory pension and unemployment insurance	Policy, overarching social protection systems approaches, and other country dialogue which promotes (i) resilience by helping individuals, households and communities better insure against, different types of risk; (ii) equity by reducing poverty and destitution; and (iii) opportunity by building and protecting human capital and improving skills and access to jobs.	Reform in social assistance, insurance and services sector policy and strategy; Administration of government social assistance, insurance and services programs; Institutional capacity building in social assistance, insurance and services ministries and public agencies; Social assistance, insurance and services sector studies, surveys and assessments led by the relevant ministries or public agencies, etc.	0
9	BG	Law and justice	Law and justice institutions include those that declare law (legislatures, government agencies); enforce law (prosecutors, regulators, police, prisons), apply law to individual instances (courts, ombudsmen), and advocate for and within the law (legal defence, legal aid, CSOs, the Legal Bar).	Improving the efficiency, quality and accountability of law and justice institutions, including courts, ministries of justice, prosecution, police, legal aid <i>Legal and regulatory reform</i> : establishing, assessing and strengthening legal and regulatory frameworks; supporting consultative processes and regulatory impact assessment.	0
10	BH	Sub-national government administration	The term <i>subnational government</i> refers to all tiers of government and public entities below the federal or central government. Subnational government includes states or provinces, counties, cities, and towns, as well as public utility companies, school districts, and other special-purpose subnational government entities.	Advising on intergovernmental fiscal system reforms such as expenditure and revenue assignment, and fiscal transfer system; Building core institutional capacities related to administrative areas including: human resources, public financial management such as PEFA, and procurement, at the subnational level; Increasing transparency in subnational financial management through increased standardization and harmonization of accounting and reporting system, etc.	0
11	BK	Compulsory health finance	Activities supporting the public administration of the health sector at national and sub-national levels.	Reform in health sector policy and strategy. Administration of government health sector programs; Institutional capacity building in health ministries and public agencies, etc.	0
12	BL	Public administration-Agriculture, fishing and forestry	Activities supporting public administration of Agriculture, Fishing and Forestry sector.	Administration of government agricultural programs; Institutional capacity building in agricultural ministries and public agencies, etc.	1
13	BM	Public administration-Information and communications	This code refers to supporting the public administration of the ICT sector, primarily through assistance to the central agency in charge of ICT programs and policies.	Reform of ICT sector strategies and policies; Institutional capacity building, skill development related activities specifically targeted to the Ministry and government agencies in charge of ICT.	5
14	BN	Public administration-Education	Activities that support public administration of the education sector. These can include most central government activities like education policy	Development of education policies, strategies, legislation, and / or regulations; Institutional capacity building in education ministries and public agencies;	0

			development, institutional capacity building, sector assessments/research, human resources management, school consolidations, and public-private partnerships.	Education sector research studies, surveys and assessments. Education management information systems (EMIS); Financial management; Decentralization; Human resources management, etc.	
15	BO	Public administration-Financial Sector	Financial sector is the set of institutions, instruments, markets, as well as the legal and regulatory framework that permit transactions to be made by extending credit.	Strengthening financial stability and building countries' capacity for crisis management, Reform in finance sector policy and strategy; Central bank strengthening and capacity building.	0
16	BQ	Public administration-Health	Activities supporting the public administration of the health sector at national and sub-national levels.	Reform in health sector policy and strategy; Administration of government health sector programs; Institutional capacity building in health ministries and public agencies, including training and learning provided to staff.	0
17	BS	Public administration-Other social services	Policy, overarching social protection systems approaches, and other country dialogue which promotes (i) resilience by helping individuals, households and communities better insure against, different types of risk; (ii) equity by reducing poverty and destitution; and (iii) opportunity by building and protecting human capital and improving skills and access to jobs.	Reform in social assistance, insurance and services sector policy and strategy; Administration of government social assistance, insurance and services programs; Institutional capacity building in social assistance, insurance and services ministries and public agencies; Social assistance, insurance and services sector studies, surveys and assessments led by the relevant ministries or public agencies, etc.	0
18	BT	Public administration-Industry and trade	Activities that support client governments in designing and implementing government trade policies, strategies and deliver services.	Administration of government industry and trade sector programs; Reform in industry and trade sector policy and strategy.	4
19	BU	Public administration-Energy and mining	Public administration (PA) in the Energy and Extractives sector seeks to support government in the formulation and implementation of government policies. PA also plays a crucial role that policies formulated lead result in calculated use of resources to attain their goals on sustainable development.	Reform in energy and extractives sector policy and strategy; Administration of government energy and extractives sector programs; Institutional capacity building in energy and extractives ministries and public agencies; Energy and extractives sector studies, surveys and assessments led by the relevant ministries or public agencies.	2
20	BV	Public administration-Transportation	Projects, components or activities which support capacity building within transport agencies, institutional capacity building, or improvement of the regulatory enabling environment in the transport sector more broadly.	Support for capacity building in the Ministry of Transport; Reform in transportation sector policy and strategy; Administration of government transportation sector programs.	5
21	BW	Public administration-Water, sanitation and flood protection	Used to capture activities supporting public administration of Water, Sanitation and Waste Management. This includes technical assistance, capacity building, training and other support activities provided to sector ministries and other government bodies.	Reforms in water, sanitation and waste management sector policy and strategy; Administration of the government water, sanitation and waste management programs; Institutional capacity building in relevant water or sanitation public agencies.	0
22	BZ	General public administration sector	Activities that are not covered by the following sector codes: central government; sub-national government; and law and justice.	Activities that are not covered by the following sector codes: central government; sub-national government; and law and justice.	0
23	CA	Information technology	This code refers to procurement or deployment of ICT Services and Applications provided to government agencies or to end beneficiaries such as businesses, citizens, government employees, students and health care workers.	System automation and modernization, system integration, information management systems (IMS), digital platforms, cloud computing, data centres, cyber security, e-government applications, mobile applications, portals, e-service delivery, digital content development, digitization, content management systems, ITS, GIS, sector specific applications, digital ID, Open Data, etc.	5
25	CT	Telecommunications	IT infrastructure refers to the composite hardware, software, network resources and services required for the existence, operation and management of an enterprise IT environment. It allows an organization to deliver IT solutions and services to its clients.	Deployment of broadband networks through regional and national backbone networks, submarine cables, shared infrastructure and alternative networks; Smart Transport and Energy smart grids; LAN/WAN networks among government agencies and public institutions (e.g. schools, hospitals and rural communities); Technical assistance	5
24	CD	Postal services	Applies to other broad cross-cutting ICT uses and ICT topics, which may not be linked directly to "ICT Infrastructure", "ICT Services", or "Public Administration - Information and Communications Technologies".	ICT capacity building such as Computer literacy training and ICT skill training; General analytical work on ICT (e.g. ICT taxation, Global ICT sector assessment/trend monitoring).	5
26	CZ	General information and communications sector			
27	EC	Pre-primary education	Early Childhood Education (ECE) targets children below the age of entry into primary education. These programs may be referred to in many ways such as early childhood development, play school, reception, pre-primary, or pre-school.	Development of Early Childhood Education policies and programs, Teacher recruitment, deployment, and in-service training programs for ECE, ECE curriculum and learning materials, Management and supervision of ECE institutions, etc.	0
28	EL	Adult literacy/non-formal education	Adult Basic and Continuing Education specifically targets individuals who are regarded as adults (over 18 years old) to improve their literacy/numeracy skills, develop technical or professional qualifications, enrich their knowledge with the purpose to complete a level of formal education, or	Adult literacy and numeracy programs, Second chance education programs for adults, Life skills and personal finance training for adults, Entrepreneurship and business skills programs for adults outside of the vocational training system.	0

			to acquire, refresh or update their knowledge, skills and competencies in a particular field.		
29	EP	Primary education	Primary education programs are typically designed to provide students with fundamental skills in reading, writing and mathematics and establish a solid foundation for learning in preparation for lower secondary education. They focus on learning at a basic level of complexity with little, if any, specialization.	Programs to improve access and equity in primary education including girls' education, education in rural areas, special education, second chance or re-integration programs for children who left school before completing primary education, targeted incentives for primary attendance, etc.	0
30	ES	Secondary education	Secondary education programs include both lower/junior secondary and upper/senior secondary education and general secondary vocational tracks. Programs at this level are typically designed to build on the learning outcomes from primary education and are usually organized around a more subject-oriented curriculum that introduces theoretical concepts across a broad range of subjects.	Teacher recruitment, deployment, and in-service training programs for secondary education, Secondary education curriculum and learning materials, Learning assessments at the secondary education level. Management and supervision of secondary education institutions.	0
31	ET	Tertiary education	Tertiary education builds on upper secondary education and provides learning activities in specialized fields of education. The content of programs at the tertiary level is more complex, advanced, and specialized than in lower educational levels	Tertiary education policy review, research, and development; Programs to improve access and equity in tertiary education including scholarships/loans; Competitive grants to fund university development plans; Training of university professors; Training of university administrators.	0
32	EV	Vocational training	Workforce Development activities support the policies and institutions that affect the supply of and demand for skills. Vocational training programs are designed for learners to acquire the knowledge, skills and competencies specific to a particular occupation, trade, or class of occupations or trades.	Skills/Workforce Development policy review, research and development; Financing vocational training through vouchers to students, grants to training institutions, etc.; Training of vocational instructors; Training of administrators of vocational training institutions; Development of occupational standards/vocational curricula.	0
33	EZ	General education sector	Activities that do not fit under any other education sector can be included under the Other Education.	Establishment, staffing, and operation of Project Management Units for World Bank Projects; Monitoring and Evaluation of World Bank Project Activities; Communications with stakeholders involved in World Bank Projects; World Bank Project Reporting.	0
34	FA	Banking	The term "banking institution" as used in this part shall be construed to mean any bank, trust company, bank and trust company, stock savings bank, or mutual savings bank, which is now or may hereafter be organized under the laws of this state/country.	Credit lines through financial institutions; Financial market infrastructures development and modernization. Monitoring and reduction of remittance costs; Financial sector strengthening through bank restructuring and resolution, as well as crisis management and preparedness; Strengthening of financial sector institutions.	0
36	FC	Housing finance			0
38	FE	Micro- and SME finance			0
40	FH	SME Finance			0
41	FI	Microfinance			0
35	FB	Non-compulsory health finance	Insurance is a practice or arrangement by which a company or government agency provides a guarantee of compensation for specified loss, damage, illness, or death in return for payment of a premium.	Effective and inclusive insurance markets, strategic reforms to insurance systems, etc.	0
37	FD	Non-compulsory pensions and insurance			
42	FK	Capital markets	The key objectives of capital markets programs are (i) to build capital markets as an alternative and/or complementary source of financing to support critical sectors such as corporate, SMEs, housing, and infrastructure, thus supporting economic growth; and (ii) to transfer risks across different participants of the financial sector thereby to support the stability of the financial system.	Government debt market development. Non-government debt market development. Capital market instruments (e.g. mutual funds, REITs, securitized products, etc.). Capital markets infrastructure. Capital markets regulation and supervision. Capital markets institutional capacity building. Capital markets and corporates.	0
39	FG	Payments, settlements, and remittance systems	Other NBFIs (i.e., cooperatives, microfinance institutions, remittances companies etc.) projects involve developing, applying and adapting international standards to ensure a sound and inclusive legal, regulatory and supervisory framework for NBFIs in developing economies.	Regulation and supervision of deposit-taking and non-deposit taking NBFIs; Payment system oversight reform and development; Competition and level playing field; Expansion of NBFI access points and delivery channels; Financial consumer protection regulation and supervision for NBFIs; Strategy development and implementation for NBFIs. Enabling legal and regulatory environment for NBFIs;	0
43	FL	Other non-bank financial intermediaries			
44	FR	Credit Reporting and Secured Transactions			
45	FZ	General finance sector			
46	JA	Health	Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.	Advisory services for health strategy development/health reforms; Health research; Monitoring and evaluation of health activities, Training and learning activities for the health sector.	0
47	JB	Other social services	Social protection is commonly understood as "all public and private initiatives that provide income or consumption transfers to the poor, protect the vulnerable against livelihood risks and enhance the social status and rights of the marginalized.	Social protection systems coordination and strengthening of tools applied across programs, including targeting mechanisms, payment systems, registries of beneficiaries; Institutional reform and capacity building to improve social protection systems, and coordinate programs and policies, including governance and accountability.	0

49	LB	Renewable Energy Generation	Biomass, a renewable energy source derived from organic matter such as wood, crop waste, or garbage.	Bio-energy (power or heat) generated from solid biomass, biogases and liquid biofuels; Sustainable biomass fuel wood use and fuels produced from organic wastes; Combined heat and power (CHP) plant based on solid biomass, liquid biofuels or organic wastes (e.g. straw); Biogas-based power plant; bio digesters.	2
52	LE	Renewable energy			2
55	LR	Other Renewable Energy			2
50	LC	Oil and gas	Oil is a viscous liquid derived from petroleum, especially for use as a fuel or lubricant. Gas is an air-like fluid substance which expands freely to fill any space available, irrespective of its quantity.	Oil and Gas Policy, Laws and Regulations; Revenue Mobilization and Oil and Gas; Oil and Gas and integrated landscape planning; Public Private Partnerships in Oil and Gas; Accountability and Good Governance in Oil and Gas.	2
51	LD	Power	Non-renewable fossil fuels includes (crude oil, natural gas, coal, oil shales and tar sands). Non-renewable energy is energy produced by burning fossil fuels such as coal.	Electricity generation from oil, gas, coal or other fossil fuel or nuclear sources. High-efficiency thermal power plants, including super or ultra-critical, combined cycle gas turbines; Rehabilitation of existing fossil fuelled power plants, including fuel substitution to a cleaner fossil fuel, or partial substitution to biomass, biogas or biofuel.	2
53	LG	Thermal Power Generation			
54	LH	Hydropower	Hydropower is a renewable source of energy which uses the force or energy of moving water to generate power. This power, or 'hydroelectricity', is generated when falling water is channelled through water turbines.	Investments in hydroelectric power plants of any capacity per facility, including both greenfield and rehabilitation projects. This includes all types of hydro power plants (e.g. storage, run-of river, pumped storage facilities).	2
57	LT	Transmission and Distribution of Electricity	Energy Transmission, or electric power transmission, is the bulk movement of electrical energy from a generating site, such as a power plant, to an electrical substation. The interconnected lines which facilitate this movement are known as a transmission network.	Refurbishment or expansion of capacity; Improving reliability of electricity transmission; Interconnection lines at transmission voltages; Improvement of transmission system operations, control.	2
48	LA	Energy efficiency in Heat and Power	Use only if no other Energy and Mining sector is appropriate	Technical assistance, capacity building, training and other support activities provided to sector ministries and other government bodies not used in other Energy and Mining sector codes.	2
56	LS	Other Mining and Extractive Industries			
58	LZ	General energy sector			
59	TA	Roads and highways			
60	TC	Urban Transport	Urban Transport are Infrastructure, services, technologies, and administration involved in moving people, vehicles or goods in urban or metropolitan settings.	Urban and metropolitan transport planning, including travel surveys, models and studies; Public transport, including urban rail and bus systems, bus rapid transit and other passenger or mass transit systems; Intelligent transport systems including traffic control and management systems, signage, and travel information and ticketing platforms.	5
61	TI	Rural and Inter-Urban Roads and Highways	Rural and Inter-Urban Roads includes projects, components or activities which focus on the construction, rehabilitation, maintenance or administration of road assets, road sector policy reform, capacity building of road agencies, or road freight services.	Road construction, rehabilitation or maintenance projects or components within a project; Capacity building within the road agency responsible for a country or locality's road network; Road Safety interventions intended to improve the safety of road users (pedestrians, bicyclists, or those in vehicles).	5
62	TP	Ports, waterways and shipping	Ports are towns or cities with a harbour where ships load or unload, especially one where customs officers are stationed. While a waterway is any navigable body of water. A shipping route consists of one or several waterways. Waterways can include rivers, lakes, seas, oceans, and canals.	Improvement, rehabilitation or maintenance of port or waterway infrastructure, including capacity to handle increased cargo, and interface with other forms of land transport; Support to improve the capacity of port or river authorities to better manage port or waterway transport, including modernization of port or waterway processes, policy reform, and/or performance.	5
63	TV	Aviation	Aviation is the practical aspect or art of aeronautics, being the design, development, production, operation and use of aircraft, especially heavier than air aircraft. The aviation industry involves all aspects of aviation, including airlines and training centres, vendors and regulatory authorities.	Construction or rehabilitation of airport infrastructure; Lending or advisory activities for improvement of airport management and/or operations; Aviation safety and security infrastructure and oversight; Support to the enabling environment for air transport, including regulatory reform, capacity building, etc.	5
64	TW	Railways	Railway is a railroad, especially one operated over a limited area Projects, components or activities which focus on the construction, rehabilitation, maintenance or operation of railways or the reform of the railway sector, including sector policy, regulation, and governance of the companies or agency responsible for providing railway services.	Railway construction projects, including expanding the railway network or increasing the capacity of existing network, or analysis of railway needs and technical assistance; Railway institutional reform, such as capacity building, or advisory activities related to railway reform; Railway components of multimodal transport interventions.	5
65	TZ	General transportation sector	Projects, components or activities which do not fit clearly within one of the modal transport sector codes, or the Public Administration Code.	Improvement of transport services along development corridors; Support to improving the financial enabling environment for transport as a sector.	5
66	WA	Sanitation	Used to capture support for sanitation systems development or rehabilitation	Investments in on-site and off-site sanitation systems of any type or technology, including both greenfield and rehabilitation projects and/or institutional	0
71	WT	Wastewater Collection and Transportation			0

72	WV	Wastewater Treatment and Disposal		capacity building support to sanitation-related service providers.	0
67	WB	Solid waste management		Solid waste transportation and transfer services, solid waste treatment services, solid waste disposal services, etc.	0
68	WC	Water supply	Water Supply is used to capture support for source works, collection, treatment, transmission and distribution of water to household, industrial, commercial or other users	Investments in water supply systems including both greenfield and rehabilitation projects, and/or institutional capacity building support to water service providers.	0
69	WD	Flood protection	Used to capture support to water supply, sanitation or waste management systems development or rehabilitation, which do not fall under the Water Supply, Sanitation or Waste Management sector codes.	Used to capture support to water supply, sanitation or waste management systems development or rehabilitation, which do not fall under the Water Supply, Sanitation or Waste Management sector codes.	0
70	WS	Sewerage			0
73	WZ	General water, sanitation and flood protection sector			0
74	YA	Agro-industry, marketing, and trade	The processing, storage, other logistics and/or sale by private sector actors, of agricultural inputs and agricultural products (raw, semi processed or processed) destined for domestic, regional or global markets and the provision of agricultural services by the private sector.	Market diagnostics; Support to value chains analyses where these contain specific characterization of end markets; Support to the development of agricultural services by the private sector or through public-private partnerships (PPP); Brokerage or facilitation of offtake contracts or agreements between producers, their organizations, or SMEs, and commercial buyers; Agribusiness SME development.	1
75	YB	Agro-industry			
76	YC	Housing construction	Activities that directly support residential housing construction or reconstruction (i.e., real estate development, post-disaster or post-conflict housing construction or reconstruction, new construction for households be resettled).	Construction/reconstruction of housing after conflict or disaster, including associated infrastructure; Construction of housing for households to be resettled, including associated infrastructure; Real estate development, particularly advisory services, policy and regulatory frameworks, leveraging the value in land for development; Policies, regulatory frameworks and finance for housing construction.	5
79	YY	Other domestic and international trade	The act or process of buying, selling, or exchanging commodities, at either wholesale or retail, within a country or between countries: domestic trade; and or foreign trade.	Streamlining non-tariff measures; Modernizing services regulations & trade; Addressing poverty and labor impacts of trade policies and shocks; Supporting global and regional integration, including free trade agreement negotiations and World Trade Organization accession; Modernizing border management. Enhancing connectivity between firms, markets, and consumers. Promoting pro-competition sector policies.	4
77	YD	Petrochemicals and fertilizers	Agribusiness - Area of trade and competitiveness to expand market opportunities in agriculture and enable a country's private sector to develop these opportunities all along the value chain for inclusive economic growth.	Diagnostics to help map the constraints to competitiveness and private sector investment and integration along agribusiness value chains; advisory and financing support to help governments expand market opportunities and enable private initiatives in agribusiness through improved competitiveness and market integration; Investment promotion in agribusiness	1
78	YW	Other industry			4
80	YZ	General industry and trade sector			4

Notes: The 80 World Bank sector are mapped into 7 WBES sector classification groups as shown in Table A4.

**Table A4: Typologies of WBP and WBES sector codes**

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

Finally, the dataset contains both Investment Projects and Development Policy Lending. In particular, among regional projects there are about 3000 Investment Projects and 1000 Development Policy Lending, while among sectoral projects there are about 2050 Investment Projects and only 250 Development Policy Lending.

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

		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 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 Herzegovina	.	.	.	.	.	.	361	.	.	.	360	.	.	.
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 Republic	.	.	.	.	.	.	.	.	150	.	.	.	.	.
26	Chad	.	.	.	.	.	.	150	.	.	.	.	.	.	.
27	Chile	.	.	.	1,017	.	.	.	1,033	.	.	.	.	.	.
28	People's Republic of China	.	.	.	.	.	.	.	.	.	2,700	.	.	.	.
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
35	DRC	.	.	.	340	.	.	.	359	.	.	529	.	.	.
36	Djibouti	.	.	.	.	.	.	.	.	.	.	266	.	.	.
37	Dominica	.	.	.	.	.	.	.	150	.	.	.	.	.	.
38	Dominican Republic	.	.	.	.	.	.	.	360	.	.	.	.	.	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	.	.	.	.	.	.
96	Papua New Guinea	.	.	.	.	.	.	.	.	.	.	.	65	.
97	Paraguay	.	.	.	613	.	.	361	.	.	.	.	.	.



98	Peru	.	.	.	632	.	.	.	1,000	.	.	.	.	.	1,335	.
99	Philippines	.	.	.	.	.	.	1,326	.	.	.	.	.	.	.	.
100	Poland	.	.	.	.	.	.	455	.	.	.	542	.	.	.	.
101	Romania	.	.	.	.	.	.	541	.	.	.	540	.	.	.	.
102	Russian 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	.	.	.	.	.	.
114	St. Kitts and Nevis	.	.	.	.	.	.	.	150	.	.	.	.	.	.	.
115	St. Lucia	.	.	.	.	.	.	.	150	.	.	.	.	.	.	.
116	St. Vincent and 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 Tobago	.	.	.	.	.	.	.	370	.	.	.	.	.	.	.
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	.
136	West Bank and Gaza	.	.	.	.	.	.	.	.	.	.	434	.	.	.	.
137	Yemen	.	.	.	.	.	.	.	477	.	.	353	.	.	.	.
138	Zambia	.	.	.	.	484	.	.	.	.	.	720	.	.	.	.
139	Zimbabwe	.	.	.	.	.	.	.	.	599	.	.	.	.	.	600

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

	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
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						
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
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	1	1												
Macedonia, former Yugoslav Republic	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
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								
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	
Togo								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
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	1													
Venezuela	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

Notes: Turning to the World Bank projects, Table A6 below shows the distribution of projects by country for the period from 2001 to 2014.

## **APPENDIX B. Chinese Aid Data**

**Step 1:** Definition Chinese regional sectoral:

### **REGIONAL**

Chinese aid project, social:

Binary variable indicating the presence of at least one Chinese project in the social sector in an ADM1 region. Includes only projects that are in implementation or completed. “Social Infrastructure & Services” includes health, education, governance, and water supply and sanitation projects.

### **SECTORAL**

Chinese aid project, economic:

Binary variable indicating the presence of at least one Chinese project in the economic sector in an ADM1 region. Includes only projects that are in implementation or completed. “Economic Infrastructure & Services” category includes transportation infrastructure projects (e.g., roads, railways, and airports), energy production and distribution projects, and information and communication technology (ICT) projects (e.g., broadband internet and mobile phone infrastructure).

Chinese aid project, production:

Binary variable indicating the presence of at least one Chinese project in the production sector in an ADM1 region. Includes only projects that are in implementation or completed. “Production Sector” includes agriculture, fishing, forestry, mining, industry, trade, and tourism projects.

In turn, the 24 Chinese sectors are mapped into 7 WBES sector classification groups as shown in Table B1 below.

**Table B1. Mapping of sectors between Chinese projects and WBES data**

<b>Chinese projects</b>	<b>WBES Categorise</b>
Action Relating to Debt	0
Agriculture, Forestry and Fishing	1
Banking and Financial Services	0
Business and Other Services	6
Communications	5
Developmental Food Aid/Food Security	1
Education	0
Emergency Response	0
Energy Generation and Supply	2
General Budget Support	0
General Environmental Protection	0
Government and Civil Society	0
Health	0
Industry, Mining, Construction	2
Non-food commodity assistance	0
Other Social infrastructure and service	0
Population Policies / Programmes	0
Support to Non-governmental Organizations	0
Trade and Tourism	4
Transport and Storage	5
Water Supply and Sanitation	0
Women in Development	0
Other Multisector	
Unallocated / Unspecified	

**Table B1: Chinese Project data (2001 – 2014), by country**

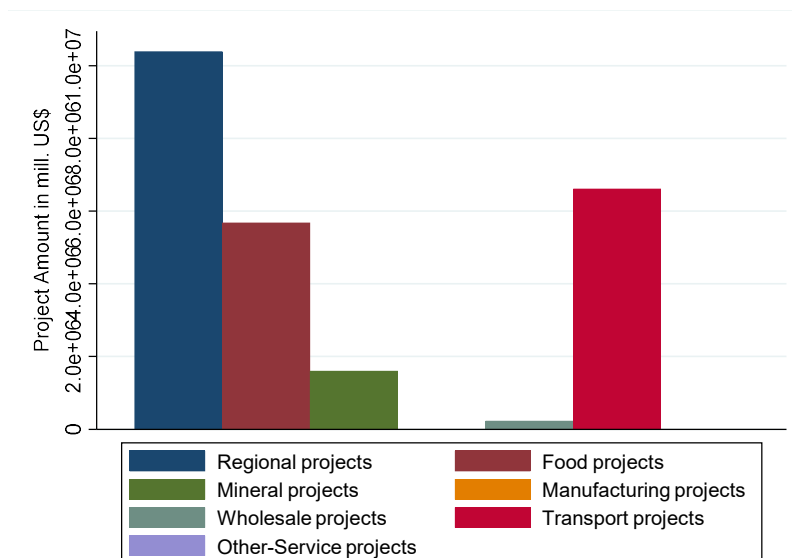
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Afghanistan	3	3	5	3	1	1	3	3	3	2	2	2	3	1
Albania	1	0	0	1	0	0	1	1	1	5	3	1	2	1
Algeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angola	2	14	1	3	61	74	20	13	0	0	3	2	2	7
Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Argentina	0	0	0	0	0	1	0	0	0	0	0	0	3	14
Bahamas, The	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bahrain	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bangladesh	1	4	0	2	0	7	4	7	5	4	2	3	6	3
Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belarus	0	1	1	0	0	1	1	1	5	1	1	4	4	0
Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bosnia and Herzegovina	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Botswana	0	0	4	18	1	5	4	4	9	9	5	1	0	5
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brunei Darussalam	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Burundi	0	2	0	3	1	2	8	17	7	1	2	5	0	8
Cabo Verde	0	5	10	4	5	7	47	0	0	0	0	0	0	0
Cambodia	12	4	4	3	1	5	27	29	34	23	42	32	44	9
Cameroon	1	0	0	0	0	0	0	6	10	10	11	13	4	10
Central African Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chad	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colombia	0	0	0	0	1	2	1	2	2	7	8	1	2	1
Comoros	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congo, Dem. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congo, Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Djibouti	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecuador	0	0	1	0	0	0	0	0	7	4	6	1	4	4
Egypt, Arab Rep.	0	0	0	0	0	0	0	0	4	1	0	10	0	0
Equatorial Guinea	0	0	0	0	0	0	0	0	22	1	0	0	0	0
Eritrea	1	0	3	0	0	1	5	1	0	0	1	0	3	0
Ethiopia	5	1	9	0	5	12	12	9	0	0	23	0	24	5
Fiji	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gambia, The	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	2	1	1	0	0	0	9	0	0	0	0	1	1
Ghana	2	3	10	22	3	24	11	9	8	20	4	20	6	2
Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haiti	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indonesia	1	1	3	10	12	5	13	7	7	5	4	1	6	13
Iran, Islamic Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iraq	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jordan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kazakhstan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenya	9	4	6	5	15	11	25	17	14	24	11	22	7	23
Korea, Dem. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Korea, Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyrgyz Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lao PDR	1	10	3	5	2	2	7	9	17	3	11	26	9	10

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lebanon	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lesotho	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liberia	0	0	2	2	8	17	6	14	4	8	19	12	6	10
Madagascar	1	1	0	2	1	2	1	5	1	7	2	1	4	1
Malawi	0	0	0	0	0	0	0	8	11	2	11	7	3	1
Malaysia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mali	0	1	0	0	0	1	3	7	9	8	1	5	2	6
Mauritania	0	0	0	0	1	1	1	3	2	5	7	5	3	3
Mauritius	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	0	0	0	0	0	1	5	0	3	0	6	0	1	0
Micronesia, Fed. Sts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moldova	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mongolia	0	1	4	0	0	1	1	1	0	7	1	1	0	2
Montenegro	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Morocco	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mozambique	2	2	2	5	2	2	9	0	7	6	6	5	8	1
Myanmar	0	2	7	8	6	4	0	16	3	2	4	5	8	2
Namibia	1	2	10	2	8	8	7	3	7	1	2	9	6	7
Nepal	8	1	0	2	2	1	15	7	4	16	14	8	4	2
Niger	7	4	2	3	2	5	5	3	5	12	7	6	4	0
Nigeria	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Macedonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	13	1	4	1	20	19	13	15	7	45	5	0	9	16
Papua New Guinea	4	7	1	6	9	6	3	2	7	4	6	3	1	6
Peru	0	0	1	1	0	1	0	5	2	1	1	1	0	2
Philippines	1	1	2	7	0	15	0	0	0	12	0	0	3	0
Romania	0	0	0	1	1	2	6	0	0	0	0	0	0	0
Russian Federation	0	0	1	4	1	0	1	0	5	0	0	1	0	0
Rwanda	2	0	1	0	1	15	7	15	5	1	5	2	6	5
Samoa	0	0	0	0	15	5	11	1	3	1	7	1	2	1
Senegal	0	0	0	0	0	1	0	0	1	1	1	2	0	0
Serbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seychelles	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sierra Leone	1	2	8	1	1	17	0	3	7	7	13	4	8	17
Singapore	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Somalia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Sudan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sri Lanka	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Lucia	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Sudan	2	1	22	3	11	11	0	14	27	6	3	0	8	3
Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Syrian Arab Republic	0	0	0	0	0	0	26	0	0	0	0	0	0	0
Tajikistan	0	0	3	4	0	21	1	1	5	8	2	2	1	8
Tanzania	11	14	8	2	6	9	0	99	8	71	10	13	19	6
Thailand	0	0	0	0	0	0	17	0	0	0	0	0	0	0
Timor-Leste	0	0	1	0	1	5	2	4	2	7	3	6	3	5
Togo	2	0	2	9	4	5	4	9	22	2	2	1	2	1
Tonga	1	1	2	0	0	3	0	8	2	2	8	3	5	8
Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tunisia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkmenistan	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Uganda	6	8	11	3	1	9	9	3	13	6	9	2	6	12
Ukraine	0	1	0	0	0	1	1	0	6	2	1	2	1	1
Uruguay	0	0	0	0	0	1	0	0	2	1	2	0	0	0
Uzbekistan	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Vanuatu	1	0	1	6	0	2	0	3	3	1	0	11	8	9
Venezuela, RB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vietnam	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Bank and Gaza	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Yemen, Rep.	0	0	0	0	0	0	1	12	2	1	1	0	3	2
Zambia	17	3	9	1	14	9	12	0	10	20	6	10	1	37
Zimbabwe	3	5	5	2	6	12	9	4	10	14	18	32	7	14



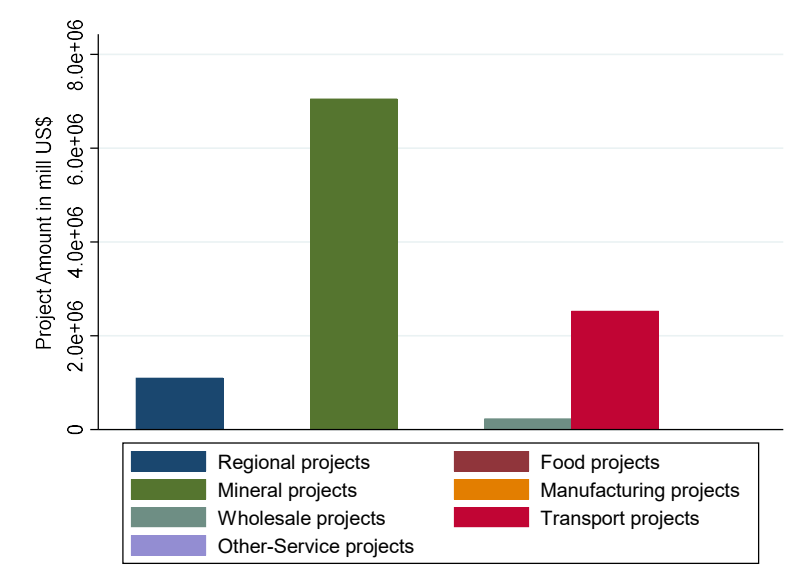
## APPENDIX C. Additional Figures

**Figure C1: World Bank project amounts (in million UD\$) by industrial sector**



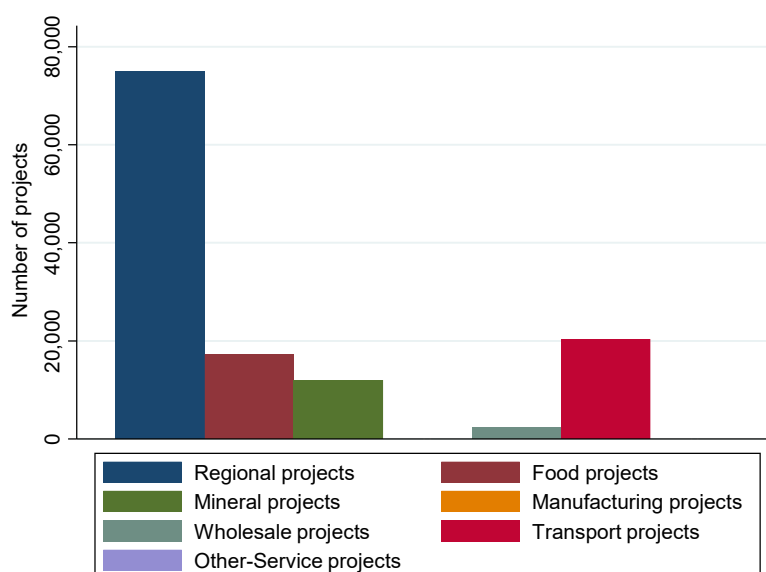
*Notes:* This classification considers the original raw data on World Bank projects

**Figure C2: Chinese project amounts (in million UD\$) by industrial sector**



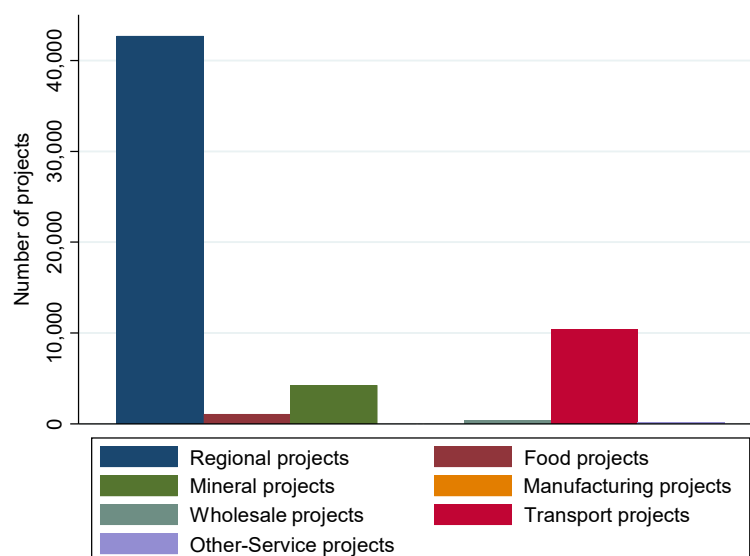
*Notes:* This classification considers the original raw data on Chinese projects

**Figure C3: World Bank number of project by industrial sector**



*Notes:* This classification considers the original raw data on World Bank projects

**Figure C4: Chinese number of project by industrial sector**



*Notes:* This classification considers the original raw data on Chinese projects

Figure C5. Distribution of sales by sectors and regions

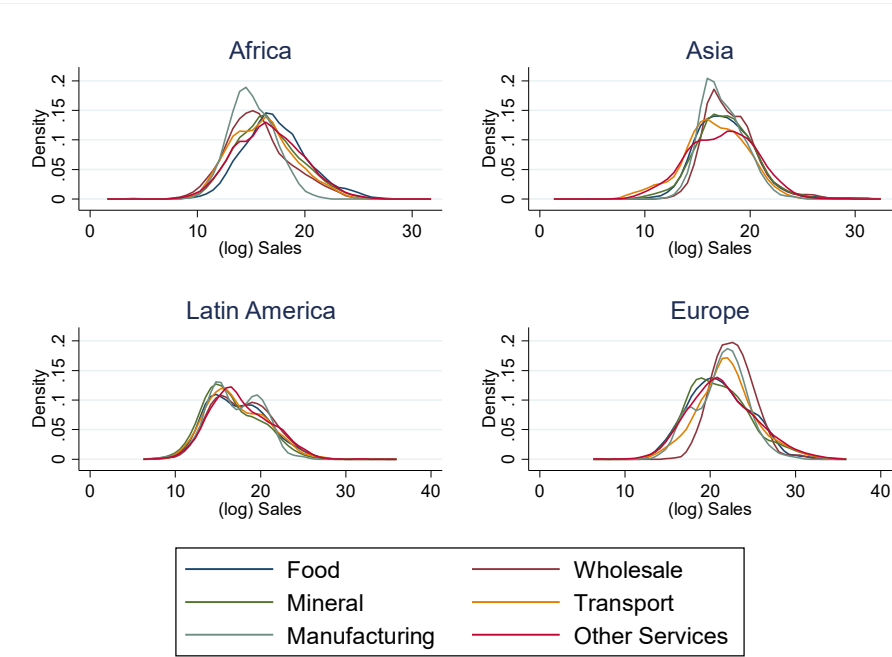
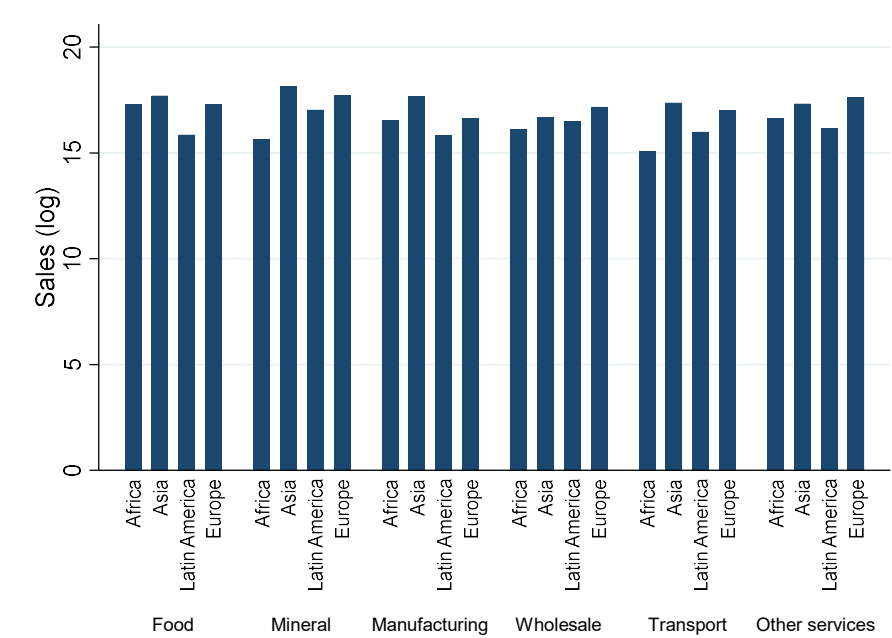


Figure C6. Sales by sectors and regions



## APPENDIX D. Summary statistics and variable definition

**Table D1: Definition and Sources**

Variable	Description	Source	Unit
<b>FIRM</b>			
Log Sales (base year)	Establishment Sales 3 Years Ago	World Bank Enterprise Survey	log
Sales growth	Average annual growth rate of sales	Own elaboration from WBES	%
Foreign	Dummy=1 if owned by private foreign individuals, companies or organizations	World Bank Enterprise Survey	Binary
Export	Dummy=1 if sales from indirect exports>0	World Bank Enterprise Survey	Binary
Size	Small, Medium, And Large Firm Categories Based On No. Of Employees	World Bank Enterprise Survey	1 Small(<20) 2 Medium(20-99) 3 Large(100 & over)
Firm has an overdraft facility	Dummy=1 if firms have an overdraft facility	World Bank Enterprise Survey	Binary
No obstacle with access to finance	No obstacle with access to finance, categorical variable (1-5)	World Bank Enterprise Survey	
Firm has internationally-recognized quality certification	Dummy=1 if firm has internationally-recognized quality certification	World Bank Enterprise Survey	Binary
Firm has a checking/saving account	Dummy=1 if firm has a checking/saving account	World Bank Enterprise Survey	Binary
Financial statements certified by external auditor	Dummy=1 if firm has financial statements certified by external auditor	World Bank Enterprise Survey	Binary
No obstacle with electricity	No obstacle with electricity, categorical variable (1-5)	World Bank Enterprise Survey	
No obstacle with transport	No obstacle with transport, categorical variable (1-5)	World Bank Enterprise Survey	
No obstacle with political instability	No obstacle with political instability, categorical variable (1-5)	World Bank Enterprise Survey	
No obstacle with crime, theft and disorder	No obstacle with crime, theft and disorder, categorical variable (1-5)	World Bank Enterprise Survey	
No obstacle with corruption	No obstacle with corruption, categorical variable (1-5)	World Bank Enterprise Survey	
<b>REGIONAL</b>			
Log regional population	Gridded population of the World (ADM1), log values	Hosted by CIESIN, at Columbia University (2000, 2005, 2010, 2015, 2020)	Log
Log regional GDP	Night-time lights	NOAA, National Geophysical Data Centre (1992-2013)	Log
Total # WB project	Number of total WB projects	Own elaboration from AidData	
Tot Amount WB project	Amount of total WB projects	Own elaboration from AidData	Log
p(IBRD/IDA)_*	Number of IBRD/IDA projects in the ADM1, two years before	Own elaboration from AidData	
pa(IBRD/IDA)_*	Amount of the IBRD/IDA projects in the ADM1, two years before, million of US\$	Own elaboration from AidData	Log

p(regional/sectoral)_*	Number of WB regional/sectoral projects in the ADM1, two years before	Own elaboration from AidData	
pa(regional/sectoral)_*	Amount of WB regional/sectoral projects in the ADM1, two years before, million of US\$	Own elaboration from AidData	Log
Total Chinese project	Number of total Chinese projects	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	
Tot Amount Chinese project	Amount of total Chinese projects	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	Log
pc(ODA)_*	Number of Chinese ODA projects in the ADM1, two years before	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	
pac(ODA)_*	Amount of Chinese ODA projects in the ADM1, two years before, millions of US\$	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	Log
pc(regional/sectoral)_*	Number of Chinese regional/sectoral projects in the ADM1, two years before	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	
pac(regional/sectoral)_*	Amount of the Chinese regional/sectoral projects in the ADM1, two years before, millions of US\$	Own elaboration from AidData (see Bluhm <i>et al.</i> (2018)	Log
<b>IV</b>			
Log steel production	China's (log) production of crude steel in thousand tons.	World Steel Association (2000, 2010, 2016).	
Probability to receive Chinese project	Measures the share of years in the sample in which an ADM1 region received at least one Chinese project.	Own calculation	
Probability to receive Chinese ODA project	Measures the share of years in the sample in which an ADM1 region received at least one Chinese ODA development finance project.	Own calculation	
IBRD equity-to-loan ratio	"Equity" is defined as the sum of usable paid-in capital, general reserves, special reserves, and cumulative translation adjustments. It does not include the "callable capital" that the IBRD's shareholders are legally obligated to provide if and when it is needed. "Loans" are defined as the sum of loans outstanding and the present value of guarantees.	IBRD's annual financial statements, various years	
IDA	Following Dreher <i>et al.</i> (2020) is a measure of the IDA's capacity to commit to new financing of credits, grants and guarantees at any point in time. It is the sum of the "Net Investment Portfolio" and "Non-negotiable, non-interest-bearing demand obligations (on account of members' subscriptions and contributions)" then divided by the sum of the Bank's undisbursed commitments of development credits and grants. N.B. Since 2008 this indicator is publicly disclosed by the World Bank in its annual financial statement. For the years 2000-2007 it was reconstructed following the WB description on how it creates it. And by generating the WB's "Net investment portfolio" measure summing up "Investments—Notes B and F" and "currencies due from banks" less "net payable from investment securities transactions"	World Bank Annual Reports, World Bank's IDA Financial Statements, various years.	
Probability to receive WB aid, IBRD	Measures the share of years in the sample in which an ADM1 region received at least one IBRD project.	Own calculation	
Probability to receive WB aid, IDA	Measures the share of years in the sample in which an ADM1 region received at least one IDA project.	Own calculation	
Probability to receive WB aid, IBRD sectoral/regional	Measures the share of years in the sample in which an ADM1 region received at least one IBRD sectoral/regional project.	Own calculation	
Probability to receive WB aid, IDA regional/regional	Measures the share of years in the sample in which an ADM1 region received at least one IDA sectoral/regional project.	Own calculation	

**Table D2a. Summary statistics**

Variable	N	Mean	SD	Min	Max
<b>FIRM CHARACTERISTICS</b>					
Sales growth	67204	0.11	0.45	-8.53	2.57
Log Sales (base year)	67204	16.83	3.27	5.50	37.24
State	67204	0.01	0.12	0	1
Foreign	67204	0.12	0.33	0	1
Export	67204	0.22	0.41	0	1
Size	67204	1.72	0.76	1	3
Overdraft	49253	0.40	0.49	0	1
Access to finance	49253	3.44	1.33	1	5
Quality certification	49253	0.21	0.40	0	1
Checking/saving account	49253	0.87	0.34	0	1
Financial statements certified by external auditor	49253	0.51	0.50	0	1
Electricity	49253	3.21	1.50	1	5
Transport	49253	3.70	1.28	1	5
Political stability	49253	3.27	1.47	1	5
(lack of) crime, theft and disorder	49253	3.27	1.47	1	5
(lack of) corruption	49253	3.19	1.50	1	5
<b>REGIONAL VARIABLES</b>					
Log regional population	67204	14.68	1.45	7.81	18.35
Log regional GDP	67204	9.39	1.65	-0.76	13.19
<b>WB projects</b>					
Number Total	67204	0.94	1.30	0	8
Amount of WB projects (log)	67204	2.33	2.54	0	8.17
Total # IBRD projects	67204	0.31	0.76	0	8
Amount IBRD projects (log)	67204	1.06	2.15	0	8.17
Total # IDA projects	67204	0.64	1.21	0	7
Amount IDA projects (log)	67204	1.37	2.15	0	7.81
Total # of sectoral WB projects	67204	0.37	0.65	0	4
Total # of regional WB projects	67204	0.56	1.01	0	6
Amount of sectoral WB projects (log)	67204	1.30	2.10	0	7.17
Amount of regional WB projects (log)	67204	1.56	2.28	0	8.12
<b>China ODA Projects</b>					
Total # CHN ODA projects	67204	0.40	1.20	0	11
Amount of CHN ODA projects (log)	67204	2.25	5.66	0	21.95
Total # of sectoral CHN ODA projects	67204	0.11	0.61	0	8
Total # of regional CHN ODA projects	67204	0.29	0.82	0	10
Amount of sectoral CHN ODA projects (log)	67204	0.57	3.18	0	21.95
Amount of regional CHN ODA projects (log)	67204	1.90	5.14	0	19.08

*Notes:* These summary statistics refer to the OLS specification with region Fixed Effects (columns 1 of Tables 3-4 and 6-7).

**Table D2b. Aid Committed Amounts (in mill. US\$)**

<b>WB projects</b>	
Amount of WB projects (mill. US\$)	112.33
Amount IBRD projects (mill. US\$)	61.75
Amount IDA projects (mill. US\$)	51.56
Amount of sectoral WB projects (mill. US\$)	44.97
Amount of regional WB projects (mill. US\$)	68.21
<b>China Projects</b>	
Amount of CHN Total projects (mill. US\$)	62.10
Amount of sectoral CHN total projects (mill. US\$)	50.10
Amount of regional CHN total projects (mill. US\$)	11.00
Amount of CHN ODA projects (mill. US\$)	15.10
Amount of sectoral CHN ODA projects (mill. US\$)	11.00
Amount of regional CHN ODA projects (mill. US\$)	4.10

**Table D3. Description of the Channels**

<b>CREDIT</b> (Reputations and actual constraint)		Estimated coeff. with Disales as dep. variable
How much less of an obstacle?	Firm has an overdraft facility (Yes / No)	0.051***
	Access to finance	0.006
	Has internationally-recognized quality certification (Yes /No)	0.062**
	Firm has a checking and/or saving account (Yes /No)	0.031
	Financial statements checked & certified by External auditor (Yes /No)	0.068***
	<b>DUTCH DISEASE</b>	
	Exports goods (Yes/No)	0.043***
	Customs & trade regulations	-0.016**
	<b>INFRASTRUCTURE</b>	
	Electricity	-0.001
	Transport	-0.017**
	<b>CORRUPTION</b>	
	Political instability	0.006
	Crime, theft and disorder	-0.009*
	Corruption	0.019**

**Table D4: Firm sales growth and the Chinese ODA, Robustness checks**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total number of Chinese ODA	0.021 (0.639)	0.038 (1.114)	0.018 (0.805)	-0.021 (-0.609)				
Log total amount of Chinese ODA					0.003 (0.562)	0.005 (1.031)	0.003 (0.556)	-0.004 (-0.672)
Log Sales (base year)		-0.137*** (-8.926)	-0.096*** (-20.530)	-0.133*** (-9.169)	-0.097*** (-15.904)	-0.135*** (-8.569)	-0.095*** (-19.086)	-0.133*** (-9.136)
State ownership (Yes/No)		-0.056 (-0.674)	-0.000 (-0.014)	-0.149* (-1.955)	0.020 (0.876)	-0.047 (-0.565)	-0.000 (-0.000)	-0.153** (-1.981)
Foreign ownership (Yes/No)		0.048 (1.335)	0.066*** (8.865)	0.030 (1.027)	0.071*** (6.914)	0.044 (1.255)	0.065*** (8.649)	0.031 (1.065)
Exports goods (Yes/No)		0.025 (1.013)	0.044*** (7.058)	0.020 (1.002)	0.041*** (4.902)	0.022 (0.908)	0.043*** (6.905)	0.021 (1.034)
Firm Size		0.130*** (5.345)	0.174*** (22.718)	0.125*** (5.947)	0.176*** (17.489)	0.128*** (5.228)	0.172*** (20.799)	0.126*** (5.949)
Log regional population		0.493 (1.405)	-0.122 (-0.438)	-0.060 (-0.120)	0.202 (0.644)	0.517 (1.382)	-0.107 (-0.365)	-0.100 (-0.205)
Log regional GDP			0.109 (0.642)		-0.243 (-0.761)		0.096 (0.533)	
Trade x Probability	-0.000 (-0.065)	0.000 (0.634)			-0.000 (-0.093)	0.000 (0.984)		
Foreign Direct Investment x Probability	0.001 (0.700)	-0.002 (-0.807)			0.001 (0.867)	-0.003 (-1.322)		
Observations	48,134	5,394	67,204	8,039	48,134	5,394	67,204	8,039
R-squared	0.131	0.191	0.128	0.171	0.127	0.186	0.126	0.168
OLS	NO	NO	NO	NO	NO	NO	NO	NO
IV	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	NO	NO	NO	YES	NO	NO	NO
Firm FE	NO	YES	YES	YES	NO	YES	YES	YES
Industry X year FE	YES	YES	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Panel observations		2,697		3,938		2,697		3,938

Notes: Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively. Columns (1)-(2) and (5)-(6) control for the Chinese foreign direct investment (FDI) and trade flows with China interacted with the share of years, between 2000 and 2014, that region  $h$  received Chinese aid. Columns (3)-(4) and (7)-(8) we use the net change in China's holdings of international reserves as an additional instrument.



**Table D4: Firm sales growth, World Bank and Chinese ODA aid by sector**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	Aid = total # of WB projects		Aid = Log amount of WB Aid		Aid = total # of WB projects		Aid = Log amount of WB Aid		Aid = total # of Chinese ODA		Aid = Log amount of Chinese ODA	
<b>Panel A: Food</b>	<b>WB Aid sector</b>				<b>WB Aid and Firm sector matched</b>				<b>CHN ODA Aid sector</b>			
Aid	0.001 (0.015)	-0.156 (-0.717)	0.008 (0.521)	-0.037 (-0.695)	-0.097 (-1.147)	0.087 (0.373)	-0.010 (-0.459)	0.024 (0.486)				
Observations	67,204	67,204	67,204	67,204	6,475	6,475	6,475	6,475				
KP		0.114		0.137		0.111		0.107				
R-squared	0.221	0.121	0.221	0.121	0.265	0.093	0.264	0.095				
<b>Panel B: Mineral</b>												
Aid	-0.025 (-0.353)	-0.079 (-0.565)	0.001 (0.080)	-0.029 (-0.580)	-0.055* (-1.863)	0.210 (0.458)	-0.019* (-1.761)	0.073 (0.473)	-0.037 (-1.313)	-0.027 (-0.035)	-0.016** (-2.120)	-0.003 (-0.035)
Observations	67,204	67,204	67,204	67,204	6,121	6,121	6,121	6,121	67,204	67,204	67,204	67,204
KP		0.012		0.027		0.138		0.138		0.070		0.074
R-squared	0.221	0.125	0.221	0.123	0.247	0.109	0.247	0.109	0.221	0.125	0.222	0.126
<b>Panel D: Transport</b>												
Aid	-0.003 (-0.100)	1.414 (1.596)	0.002 (0.239)	0.360* (1.659)	0.584** (2.376)	1.414 (1.596)	0.159** (2.538)	0.360* (1.659)	0.050 (1.052)	-0.003 (-0.034)	0.010 (0.937)	-0.001 (-0.034)
Observations	67,204	2,250	67,204	2,250	2,250	2,250	2,250	2,250	67,204	67,204	67,204	67,204
Kleibergen-Paap (p-value)		0.122		0.039		0.041		0.040		0.055		0.047
R-squared	0.221	0.178	0.221	0.178	0.353	0.178	0.353	0.178	0.222	0.125	0.222	0.125

Notes: In columns (1)-(4) and (9)-(12) we include World Bank and Chinese ODA projects classified by sector. We can include only Food, Mineral and Transport sectorial aid as there are insufficient observations for projects belonging to the other two sectors: “Wholesale” and “Other-Services”, while no project is classified as “Manufacturing”. In Columns (5)-(8) we present the results obtained matching the projects classified in one sector with the firms belonging to the same sector. This was possible only for World Bank projects, as the number of Chinese ODA projects does not allow to match them with the corresponding firms. Robust t-statistics in parentheses; \*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively