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Project Aid and Firm Performance

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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, spanning 121 countries between 2001 and 2016. We find that, contrary to the World Bank, Chinese ODA projects increase, on average, firm sales and, compared to sector-specific, Chinese region-specific aid positively affect firm performance. Finally, we show that the positive effect of Chinese aid is stronger for firms lacking transport infrastructure (and with better electricity provision), suggesting that aid may improve firm performance by releasing their infrastructure constraints.

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

JEL Classification: F35, O19, E24, E25

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1 Introduction

There has been a renewed interest in the aid-growth relationship that aims to refine the treatment of endogeneity between aid and economic performance, 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 (and loan) effectiveness at the subnational level (e.g., Bluhm et al. 2020; Chauvet and Ehrhart 2018; Cruzatti et al. 2020; Gehring et al. 2019; Dreher and Lohman 2015; Dreher et al. 2021b, Bomprezzi and Marchesi 2021). Despite such promising developments in research, however, we think that there is still much to be understood on the identification of aid-effectiveness channels. In particular, an area that is relatively less researched is how various aid instruments (e.g., projects related to different sectors of activities) from heterogeneous donors, or through different lending categories, may perform.[1]

In this paper, we compare the effectiveness of the World Bank and Chinese aid projects across 110,864 firms, spanning 121 countries, over the period 2001-2016. We combine the recent literature that uses aid allocated at the subnational level with measures of aid effectiveness at the firm level (Chauvet and Ehrhart 2018; Ponticelli and Presbitero 2017). Following Chauvet and Ehrhart (2018), we view two ways through which aid influences firm performance, the demand channel (i.e., increased demand financed by aid is met by firms' production), and the supply channel (i.e., aid affects the productive capacity of firms). The literature on firm performance, in turn, indicates 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).[2]

We collect data on firm sales and various indicators of local business environment from multiple rounds of the World Bank Enterprise Survey (WBES), fielded between 2003 and 2016 across a large sample of 121 developing countries. Measures of aid are the number and the amount of aid projects from the World Bank (AidData 2017) and the Chinese Official Development Assistance (ODA) (Bluhm et al. 2020), available at the level of 484 first-order administrative regions (ADM1) spread

[1] 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 better suit recipient countries' specific needs (e.g., Asmus et al. 2016, Basurto et al. 2020; Marchesi and Masi 2021).

[2] 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).

across 121 countries between 2001 and 2014.[3] In particular, we compare the effectiveness of the World Bank and the Chinese ODA projects across 110,864 firms, mapped into six broad industrial sectors (food, mineral, manufacturing, wholesale and retail, transport, and other services).[4] We then utilize several firm characteristics and indicators of the local business environment to gain insights on the causal channels of aid-effectiveness.

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 of using nightlights as a proxy for economic activity (e.g., see Henderson et al. 2012 and Chen and Nordhaus 2011). In addition, our approach allows us to perform a more accurate assessment of the effect of aid at the regional level by exploiting both project and firm heterogeneity. 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.

The identification strategy primarily relies on a set of control variables (at both firm and region level) to account for the observable heterogeneity, and fixed-effect estimators to control for firm-level time-invariant heterogeneity. To address the reverse causality and the existence of time-varying unobservable heterogeneity, we instrument World Bank aid by an interaction term composed of the donor's aid budget and the recipient-specific probability of receiving aid from the World Bank (Lang 2016; Dreher et al. 2021a). Following Dreher et al. (2021a), 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 regions' likelihood to receive aid from China.

We refine the identification strategy by applying a detailed firm-sector-region mapping that distinguishes between sector-specific and region (ADM1)-specific development assistance projects provided by both the World Bank and China. We postulate that region-specific aid affects firms from all sectors in a specific region, whereas sector-specific aid affects firms in a particular industrial sector within a region. We find that, contrary to the World Bank, Chinese ODA projects increase, on average, firm sales. Compared to sector-specific, region-specific aid positively affect firm performance. When looking at the channel of transmission of Chinese aid, the positive effect of Chinese aid is especially strong for firms lacking transport infrastructure (and with better electricity provision) suggesting that aid may improve firm performance through a release of their infrastructure constraints. This result is consistent with Bluhm et al (2020), who find that

[3] In this study, we focus on ODA projects, which are 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.

[4] Appendix A and Appendix B describe in detail the mapping of the aid data between sectors and regions.

Chinese-financed transportation projects reduce spatial concentration within regions.[5]

Our findings appear overall in line, with the conclusions reached by Chauvet and Ehrhart (2018), who, using a panel of 4355 firms in 29 countries from (an older version of) the WBES dataset, find a positive effect of both bilateral and multilateral (OECD-DAC) ODA flow on firm sales growth. Our results are also in line with recent papers by Dreher and Lohmann (2015), Dreher et al. (2021a), (2021b). Dreher and Lohmann (2015), using geo-coded data for World Bank projects at both (ADM1) and (ADM2) levels, find no significant causal effect, on average, of regional World Bank projects on regional growth (measured as night-time light growth). In the case of Chinese projects, Dreher et al. (2021a), (2021b), 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 both at the country and regional level, respectively.[6] Finally, our results stand in contrast with those of Isaksson and Kotsadum (2018), who, considering a sample of 29 African countries, find that World Bank projects stimulate local economic activities, while the Chinese projects do not (but they increase corruption).

There are two 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 Isaksson and Kotsadum (2018). Second is the indicator of development outcome. While our measure of firm performance matches that of Chauvet and Ehrhart (2018), the study by Isaksson and Kotsadum (2018) use satellite data on night time light as a proxy for local economic development. Hence, 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 paper relates to at least two broad streams of the literature. First and foremost, 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

[5] Bluhm et al (2020), focusing on Chinese-financed transportation projects, analyze their effects on the spatial distribution of economic activity within and between regions in a large number of developing countries. They find that transport projects reduce spatial concentration within but not between regions. Moreover, transport projects decentralize activity particularly strongly in regions that are more urbanized, located closer to the coast, and less developed.

[6] In particular, the positive effects on counties' economic growth found by Dreher et al (2021a) imply that the sales' increase of firms operating in regions beneftting from Chinese projects does not come at the expenses of firms operating in regions with no Chinese intervention. Otherwise they would have observed an overall insignificant effect at the country level. Finally, Dreher et al. (2021b) showed positive effect of Chinese aid, considering only African countries and using night-time illumination as a measure of aggregate outcome at the ADM1 level.

development focus.[7] What is more, donors have also been criticized for a lack of "ownership" and underutilizing local knowledge in recipient countries (Dreher et al 2017).[8] Within the aid literature, our paper more closely relates to studies that focus on project aid (for World Bank projects, see Denizer et al. 2013; Dreher et al. 2013, 2015; Feeny and Vuong 2017; Kilby 2009, 2010, 2013, 2015; Marchesi and Masi 2021; Öhler and Nunnenkamp 2014; and Shin et al. 2017; for the Chinese projects, see Bluhm et al. 020; Cuzatti et al. 2020; Dreher and Fuchs 2015; Dreher et al. 2019, Dreher et al. 2021a, 2021b; Isaksson and Kotsadam 2018).[9]

This study also relates to the literature on 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 Foster et al. (2001). Firm productivity in developing countries is characterized by widespread differences in capabilities of individual firms across and within countries (Hsieh and Klenow 2009; IADB 2001; IGC 2019).[10] The performance of firms is largely affected by two sets of factors: internal, i.e., within the control of a firm or business, and external aspects of operating environment (Syverson 2011). Based on the classification of aid projects used in this paper, a sector-specific project (e.g., mineral) could potentially affect the internal factors, whereas a region-specific project (e.g., infrastructure) has the potential to improve the external factors. Thus, aid projects in our study may influence firm productivity (and sales' growth) through reallocation of resources across firms (and sectors) and within firm efficiency gains (Dollar et al. 2005; Busso, et al. 2013; Macmillan et al. 2014).

In summary, this paper contributes to the current literature on aid and economic performance in several ways. First, we extend the use of the geo-coded aid data by distinguishing between sector- and region-specific aid. This allows for a closer match of the location of aid and its potential beneficiaries. Second, distinguishing sector- and region-specific aid projects, provides a closer look at various channels that impinge on the levels of aid-effectiveness and contributes to the literature

[7] 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. 2018a, 2018b; Kilby 2015). Finally, Dreher et al. (2020) investigate whether Chinese aid is effective as a soft power instrument.

[8] 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. (2018c).

[9] Considering 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. More recently, these findings are confirmed by Watkins (2021).

[10] 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 the manufacturing sector, in some Latin American countries, is around 10-1 (IADB 2017).

on the aid-effectiveness contingent on the types of aid (e.g., Clemens et al. 2012; Asmus et al. 2016). Third, we contribute to studies that examine firm performance in aid-recipient countries. Chauvet and Ehrhart (2018) examined firm performance in 29 developing countries using variation of foreign aid 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. Fourth, we contribute 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 Chinese ODA remains effective whereas the World Bank development projects play no role 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 empirical model and the identification strategy. Section 4 then presents the results in the case of World Bank projects, while section 5 presents the results in the case of Chinese ODA projects. Section 6 shows the robustness analysis and the final section 7 concludes.

2 Background and Data Description

2.1 Aid Data

We use the AidData (2017) originally comprising of 5881 World Bank projects in the International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA) lending lines, approved between 1995 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 projects, worth $273.6 billion, financed with Chinese ODA or Other Official Flows (OOF), between 2000 and 2014, in 126 countries around the world (see Bluhm et al. 2020).[11] As previously mentioned, we focus on ODA projects since they are more comparable to World Bank projects. 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.

[11] 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).

We work with a sample of 121 countries over the period between 2003 and 2016.[12] Consistently with Chauvet and Ehrhart (2018), we drop countries defined as being in conflict during survey years, since these countries tend to experience abnormally high growth rates in the reconstruction years following violence, and survey participation and integrity is also compromised in years of conflict.[13] Only a small set of countries, however, are affected by this filtering, namely countries like Afghanistan, Bangladesh, Burundi, Colombia, Nigeria, Philippines, Sri Lanka and Uganda. We lose about 9000 observations related to these countries, while only Afghanistan and Philippines are effectively dropped from the analysis.

2.2 Firm level data

We measure firm performance using the World Bank Enterprise Survey data. Through face-to-face interviews with firm managers and owners of firms, the World Bank collected data on various indicators of the business environment, performance, and firm productivity. 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.

Including the latest available rounds, the WBES dataset has information on 146,666 firms spread across 139 countries between 2003 and 2018 (Paul and Isaka 2019). We had to drop 35802 firms either because of the missing observations or due to multiple locations.[14] Hence, we work with a final sample of 110,864 firms. Roughly 10 percent of the firms were successfully re-contacted, which produces an unbalanced panel dataset at the firm level.[15] The survey is constructed to generate a representative sample of a countries manufacturing and service sectors, with the final aim of providing indicators for the investment climate in a country and the responses are harmonized across countries for comparability. The sampling methodology for each country follows a stratified random sampling according to 3 criteria (firm size, sector, geographic location). This allows a

[12] The list of countries in the sample is presented in Table A5, in the online Appendix A.

[13] We consider a very stringent definition of conflict, based on the World Bank Global Spread Of Conflict By Country And Population (2018). Conflict is defined as having both 20 percent or more of a countries geographic area under conflict as well as at least 10 percent of the population affected.

[14] 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.

[15] One of the advantages of this updated version of the WBES is the availability of multiple questionnaire waves, which implies the possibility to construct a pseudo-panel for firms which participate in more than one wave. Within the survey, there are close to 15,000 firms which were recontacted at least once over the different iterations.

random sampling which is more representative of the economic composition of the country, since the likelihood of being selected for an interview is dependent on the individual firms' place, in the distribution of firms within a country, as well as its location with respect to geographic areas of economic activity and economically relevant sectors.

Table A1, in the online Appendix A, shows the classification of industries (coded 1 to 6) from the WBES data. Over 19 percent of the firms are in the wholesale and retail, hotels, and restaurant sector, about 11 percent in the mineral sector, 9 percent in the food sector and 5 percent in the transport, communication, information (IT), and construction sector. The rest of the firms are classified as manufacturing (about 37 percent) and "other services" (20 percent). The World Bank aid projects (e.g., public administration or education) that are not sector-specific but could affect the performance of a firm from any sector within a region are classified as region-specific aid and coded "0". We regroup 51 industrial sectors from the WBES data into the above mentioned six broad categories sectors (Table A2, in the online Appendix A). Table A3 shows the mapping between World Bank projects and the seven WBES sectors. The AidData provides information on 80 categories of aid, which we reclassify to match the seven WBES sectors (Table A4, in the online Appendix A).

The Chinese ODA are mapped into 24 sectors (see Tables B1 and B2, in the online Appendix B). We regroup them to match with the regional-sectoral classification for the World Bank. The regional Chinese ODA projects are related to social infrastructure and services, whereas the sectoral Chinese ODA projects are directed to physical infrastructure, agriculture, fishing, forestry, mining, industry, trade, and tourism. Despite our attempt to make the classification of regional and sectoral aid data comparable across different donors, there remain differences as they follow different disbursement channels.

As a next step, we restrict the period of analysis to make data available from both datasets. While the WBES data is available from 2003 to 2018, the information on the World Bank and Chinese projects are available for the periods 1994-2014 and 2000-2014, respectively. Following the standard practice in the aid literature (among others see Dreher et al. 2021a, 2021b), we use a two-year lag for a firm to 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.

Finally, while the AidData provides geocodes for each World Bank and Chinese project location, the same information is not available from the WBES data. To overcome this problem, we identified the latitude and longitude of the ADM1 level using the names of the regions reported in the WBES dataset. 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.). Finally, we geolocated each query using the Python client Geopy. 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. We then map each firm into an ADMI region following the condition that aid projects are implemented in the same ADM1 two years before the WBES interview took place. Unfortunately, this procedure, while guaranteeing the precision of the mapping between the location of the project with that of the firm, comes at the costs of losing quite a large number of observations of aid projects, which, in order to be considered, need to have been committed exactly two years before each survey date. Since a region might be under an aid project for longer periods than the ones we are able to measure, our results should then provide a lower bound for the effects of aid on firms' performance.

2.3 Descriptive Evidence

Figure 1 displays the locations of the World Bank aid projects and firms (surveyed in the WBES data). Green and red dots refer to locations of WBES firms and World Bank projects, respectively. Figure 2 shows the locations of Chinese ODA projects, where blue and green dots indicate the locations of ADM1 that received the Chinese project and have WBES firms, respectively. 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 concentrate in Africa. Over the past two decades, the 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 in building road, rail, port and pipeline projects across more than 60 countries (Perlez and Huang 2017). While China's influence on international aid policy has been bolstered by the creation of Asian Infrastructure Investment Bank (AIIB), the World Bank projects outnumber the Chinese projects by an overwhelming margin.

[Figures 1 & 2 about here]

Almost 76 percent of the World Bank projects are IDA and the rest are IBRD. Though a much smaller share of the World Bank projects goes to Europe and Latin America, compared to Africa and Asia, the proportion of IBRD projects are much higher in Europe (47 percent) and Latin America (73 percent) relative to that in Africa (3 percent) and Asia (30 percent). Latin America

is the only region receiving more IBRD than IDA projects (see Figures C1 and C3, in the online Appendix C). Turning to the Chinese aid, almost 72 percent of the Chinese projects are through the ODA lending channel, and the rest follows the OOF channel. The Chinese OOF mainly goes to Europe and Latin America, whereas Africa and Asia remain the Chinese ODA hub, with Africa receiving 60 percent of total Chinese ODA projects (see Figures C2 and C4, in the online Appendix C).[16]

In the paper we use as variables of interest both the number of projects and the committed aid amount. Figure 3 and 4 then show the distribution of aid across sectors and by comparing the distribution of the number of projects as opposed to their committed amounts. As Figure 3A shows, about 56 percent of World Bank projects are regional. Among sectors, food, mineral and transport represent the largest number and aid amount of sectoral projects. Moreover, when comparing the number of projects with the committed amount, we can see that the distribution across sectors is rather similar (Figure 3B). A different picture emerges when looking at Chinese ODA projects. Chinese ODA regional projects, as shown in Figure 4A, have a similar proportion to that of World Bank projects (63 percent). On the other hand, when considering the aid amount (Figure 4B), we can see that there is large difference in the distribution of aid projects as opposed to their committed amount. In particular, the aid amount for sectoral projects is overall much higher compared to that of regional projects, and, among sectors, the greatest share of commitments is allocated to projects in the transport and (to a less extent) mineral sectors.[17]

[Figures 3 & 4 about here]

Turning to the firms, the distribution of firm sales do not significantly vary across sectors and follow a bell-shaped pattern (Figure C9, in the online Appendix C). In the aggregate, the concentration of firms in the mineral sector appears to be at a higher value of sales compared to the other sectors, whereas firms with higher sales in the wholesale and retail sector are more diffuse in Europe (Figure C10).

3 Empirical strategy

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

[16] Figures C5-C8, in the online Appendix C, present further details on the distribution of World Bank and Chinese projects by region and sector.

[17] Similar distributions are presented in the descriptive analysis of the paper by Bluhm et al. (2020).

$$g_{i,k,h,j,(t,t-2)} = \alpha + \beta P_{k,h,j,t-2} + \gamma X_{i,k,h,j,t} + \delta Z_{h,j,t} + \tau_{k,t} + \mu_{h/i} + \varepsilon_{i,k,h,j,t} \ , \tag{1}$$

where g is the annual growth rate of sales, computed over three years, between year t and $t-2$, of firm i, in industry k, region h and country j. P represents either World Bank or Chinese projects both at the regional and sectoral level (in terms of number of projects and committed amount) tied to region h.[18] In sections 4.2 and 5.1, we consider regional and sectoral projects separately. X is a set of time varying firm-level characteristics, while Z is a set of regional-level variables (logged regional population and GDP).[19] We then include industry-year dummies $\tau_{k,t}$, in order to control for industry time-varying heterogeneity, and either region or firm fixed effects. Finally, to avoid extremely fast-growing firms driving the results, we excluded 823 firms whose sales fall into the 99th percentile.[20]

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. To address this issue, the standard errors are clustered at the regional level.

We control for the lagged value of *Sales*, in logarithm, which is measures at t-2, and for 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 Tables C1, in the online Appendix C, while Table C2 presents summary statistics for our sample of firms and Table C3 shows the distribution on World Bank projects, between investment projects and development policy lending.

[18] As reported by Bluhm et al. (2020), in the case of China, financial values are available for 65 percent of the projects limiting to some extent the power of our estimates.

[19] Regional GDP is measured considering the log of night-time lights (NOAA, National Geophysical Data Center, 1992-2013. Population is taken from the Socioeconomic Data and Applications Center (SEDAC), 1975, 1990, 2000, and 2014/2015.

[20] Also 28,525 firms are discarded due to missing values for sales, 263 are discarded due to missing values for industry and 14,319 observations are dropped due to due to missing control variables. Finally, we lose 9240 observations due to conflicts.

3.1 Identification strategy for the World Bank aid projects

Equation (1) is estimated using both region and firm fixed effects, which allows us to control for firm-level time-invariant heterogeneity. We also add *industry* x *year* dummies in order to also control for industry time-varying heterogeneity. Thus, 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) exploit temporal variation in US wheat production, which they interact with the aid recipient's probability to receive US food aid.

Following Lang (2016) and Dreher (2020a) our identification strategy is based on an instrumental variable (IV), which consists in the interaction of the donor's aid budget with the recipient-specific probability of receiving aid from the respective donor. 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 World Bank liquidity. 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".[21] The source of exogenous variation in the World Bank resources is then weighted by historical proximity between the World Bank and recipient regions. The IV equation in then the following:

$$IV_{h,t-2}^{IBRD/IDA} = IBRD/IDA\ resources_{t-2}\ \text{x}\ Probability_{h,t-2}^{IBRD/IDA}, \tag{2}$$

where $Probability_{h,t-2}^{IBRD/IDA}$ is the (time-varying) share of years between 1994 and 2014 that region h received either an IBRD or an IDA projects, and $IBRD/IDA\ resources_{t-2}$ is the temporal variation in the IBRD's equity-to-loans ratio/IDA's "funding position". The IBRD's equity-to-loans ratio: measure of the IBRD's "ability to issue loans without calling its callable capital"

[21] Variation across time is given by the temporal variation in the IBRD equity-to-loans ratio/IDA funding position; while variation across regions is given by the share of years under an IBRD/IDA project, from 1994 to 2014.

(Bulow 2002).[22] The IDA's funding position: 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.

Controlling for year fixed effects (which captures World Bank liquidity) as well as for the time-varying and region-specific probability component of the interaction term, the identifying assumption underlying this approach thus follows a difference-in-differences logic. Like a difference-in-differences approach, we investigate the differential effect of World Bank liquidity on World Bank projects to regions with high compared to low probability of receiving 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. For identification, we exploit the fact that the World Bank will be able to give more projects in years in which its liquidity is higher, so that regions with an initially higher participation probability are more likely to receive a project in these years (as displayed in Figure D3, in the online Appendix D). The regression equation would then become the following:

$$g_{i,k,h,j,(t,t-2)} = \alpha + \beta P_{k,h,j,t-2} + \gamma X_{i,k,h,j,t} + \delta Probability_{h,t-2}^{IBRD/IDA} + \lambda Z_{h,j,t} + \tau_{k,t} + \mu_{h/i} + \varepsilon_{i,k,h,j,t} \ , \quad (1a)$$

where, respect to Equation (1), we have added the time-varying share of years that region h received either IBRD or IDA aid. This component of the interaction IV would not be absorbed by the region (or firm) and industry-time fixed effects.

Given the structure of the identification strategy, the exclusion restrictions would be violated, if there was some unobservable, time-varying trend affecting sales differently across countries based on their past exposure to World Bank projects. There are several reasons why we think this is unlikely.

First, one of the key features of this methodology is the fact that the World Bank's liquidity varies primarily because of institutional rules that seem quite independent from the pattern of the global economy. For example, the equity injections have only taken place at significant intervals, even as the global economy expanded massively, which eventually lead to a significant erosion of the

[22] 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).

capital injected into the World Bank in real terms. These injections are low both in absolute terms and also relative to other multilateral development banks. Given the limited equity injections over time, the lending disbursed by the IBRD, for instance, has from the very beginning depended on being able to access financial markets and leverage its relatively thinly capitalized balance sheet.

The timing of this variation then seems exogenous to both global economic cycles and country-specific trends in firm sales. Again, even if there were evidence of correlation between the two, it would only bias the results if the correlation was contingent on a country's past participation in World Bank projects. We plot the World Bank liquidity ratio over our period of estimation alongside the trend in firm sales in countries, distinguishing between different degrees of past World Bank participation. These trends are parallel and not obviously correlated to World Bank liquidity (Figure D1, in the online Appendix D).

One might also be concerned that the interacted instrumental variable violates the exclusion restriction because World Bank liquidity is correlated with some omitted variables, which differentially affect firm performance in regions with low and high probabilities of receiving World Bank aid. To address this threat, we tested for the most obvious country-level confounders. As shown in Table D1, in the online Appendix D, the results are robust to these additional controls.[23]

3.2 Identification strategy for the Chinese ODA projects

In the case of Chinese aid, our instrumental variable is an interaction that exploits exogenous time variation in China's steel production and cross-sectional variation in the recipient regions' likelihood to receive Chinese aid. Variation across regions is given by the share of years between 2000 and 2014 that region h received Chinese aid. Our exogenous source of time variation in Chinese funding is the (logged) annual amount of Chinese steel production (in thousand tons).[24]

As described by Dreher et al. (2021a), China is the world's leading producer and exporter of steel, and the Chinese government considers steel as a commodity of strategic importance. China tends to generate an oversupply of steel, then looking for foreign markets in which it can dispose of its over-production. 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.[25]

[23] More details are available in section 6 below.

[24] Data are taken from the World Steel Association (2010, 2014).

[25] Dreher et al 2021(a) show that the results are robust to using China's (logged) production of other input material used in aid projects, such as aluminium, cement, glass, iron and timber.

For identification, we exploit the fact that China tends to expand its regular clientele in years in which steel production is higher, so that countries with an initially lower participation probability are more likely to receive a program in these years (as displayed in Figure D4, in the online Appendix D). Controlling for year fixed effects (which captures steel production) and for the time-varying, region-specific probability component of the interaction term, the identifying assumption underlying this approach thus follows a difference-in-differences logic. We investigate the differential effect of Chinese steel on the present participation in a Chinese ODA project, in regions with a high compared to a low probability of receiving Chinese ODA 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 effects.

As discussed above, the source of exogenous variation in the Chinese resources is weighted by historical proximity between China and recipient regions, as follows:

$$IV^{CHN}_{h,t-2} = Steel_{t-3} \text{ x } Probability^{CHN}_{h,t-2}, \tag{3}$$

where $Probability^{CHN}_{h,t-2}$ is the (time-varying) share of years between 2000 and 2014 that region h received Chinese aid, 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. Figure 5 illustrates the timing of events for both World Bank and Chinese aid.

[Figure 5 about here]

Similarly to Equation (1a) above, the regression equation would now become:

$$g_{i,k,h,j,(t,t-2)} = \alpha + \beta P_{k,h,j,t-2} + \gamma X_{i,k,h,j,t} + \delta Probability^{CHN}_{h,t-2} + \lambda Z_{h,j,t} + \tau_{k,t} + \mu_{h/i} + \varepsilon_{i,k,h,j,t} \ . \tag{1b}$$

As explained by Dreher et al. (2021b), 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 probability of receiving Chinese aid. To address this threat, we also test for the most obvious country-level confounders and the results are robust to these additional controls (see Table D2, in the online Appendix D).

Finally, we also 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. Following Dreher et al. (2021a), 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 Tables D3 and D4, in the online Appendix D.

Section 6 provides more information on the validity of our instruments, whereas the next section presents the regression results in the case of World Bank projects, and Section 5 shows the results in the case of Chinese ODA aid.

4 World Bank projects

Table 1 presents the baseline outcome for the World Bank aid projects. We consider growth in sales (the difference of the amounts of firm sales, in log) as the dependent variable. Columns 1 to 4 of Table 1 shows our results for a simple pooled OLS, a two-stage least squares (2SLS), a fixed-effects model, and a 2SLS with fixed-effects, respectively. In columns 1-2 of Table 1, Equation (1a) is estimated including region (ADM1) dummies, while columns 3-4 show the results for a panel sample with firm fixed effects and without region dummies. Columns 5-8 follow the same structure of columns 1-4.. All specifications include industry-year dummies. The panel sample is restricted to a group of 6,893 firms, which corresponds to about 10 percent of the observations in the OLS sample.[26] The variable of interest is given by the number of projects, in columns 1-4, while we take the log of committed amount, in columns 5-8. The first-stage results show the coefficients for our instruments, which are always positive and significant, and with the expected sign.[27] Kleibergen Paap tests provide further evidence in support of identification.

As our control variables are concerned, the coefficient of *Sales* at (t-2) is always negative and significant, at the one percent level, suggests a catching-up effect, i.e., firms with lower sales in t-2, on average, show faster growth of sales than firms with higher sales in t-2. The coefficient of *State* is negative and significant, at the ten percent level, only in the panel specification (while is otherwise not significant) suggesting that state-owned firms perform worse on average. *Foreign-*

[26] About 9,081 firms were re-contacted; among them, 2,188 firms did not match to either our classification of sectors or ADM1.

[27] The coefficient of IBRD x Probability, in column 6, is positive but not significant at conventional levels.

owned firms perform better, on average, but the coefficient is positive and significant, at the one percent level, only in the OLS specifications. *Export*-oriented firms are associated to a higher rate of growth in sales, on average.[28] *Size* has a positive and significant coefficient, at the one percent level, suggesting that larger firms also tend to have a positive growth of sales.[29] Finally, the coefficients of the regional controls are not significant at conventional levels.[30]

[Table 1 about here]

Turning to our interest variables, the coefficient of the number of World Bank aid projects is negative and statistically significant either at the five (column 1 and 4) or ten percent level (column 2).[31] Yet, this result is not robust to running a randomization of the sample of firms per country (as explained in section 6.3), since the negative coefficient of World Bank projects is not statistically significant in most cases.

Finally, the relationship between committed amount and growth of firm sales remains negative but statistically insignificant. In order to better interpret this result, in the next section, we examine the effectiveness of IDA and IBRD projects separately.

4.1 IDA and IBRD projects

Table 2 reports the regression outcomes by distinguishing between IDA and IBRD projects. As shown in Figure C1, in the online Appendix C, most World Bank projects in our sample (about 76 percent) fall into the IDA category. In Table 2, we follow the same order of model specifications as in Table 1, 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 2 restricts the sample to ADM1 regions that received IDA projects, and the number of firms drops to 48,817. In a similar way, panel B of Table 2 restricts the sample to 42,180 firms spread across regions that received IBRD projects. The first-stage results show that the coefficients for our instruments are always positive, significant, and with the expected sign.

As can be seen, the coefficients of IDA projects are always negative, across the eight specifications but never significant, on average, at conventional levels. This result is then in line with Dreher

[28] The coefficient of *Export* is generally positive and significant, except for the specifications reported in column 4 and 8, in which it is not significant at conventional levels.

[29] There is a strong correlation between *Size* and *Exports*, as most of the larger firms in the sample are those firms which also tend to export (see, among others, Melitz 2003, Helpman et al. 2004).

[30] The variable regional growth is always dropped in the panel specifications due to insufficient observations.

[31] In the OLS fixed effect specification of column 3, the coefficient is negative but not significant at conventional levels.

and Lohmann (2015), who find no evidence of a significant causal effect on World Bank projects on night-time light. On the other hand, the coefficients of IBRD projects are always negative and statistically significant. In particular, the coefficients of the instrumented aid are negative and significant at the one percent level. This result then shows that the overall negative impact of World Bank projects, presented in Table 1, was due to IBRD projects.

IBRD projects are mostly concentrated in Latin America (73 percent), relative to Europe (47 percent), Asia (30 percent) and Africa (3 percent) (Figure C1, in the online Appendix C). Thus, as a next step, we focus on Latin America to understand which country could be responsible for this overall negative result. In particular, we find that Argentina has the highest number of IBRD projects and, at the same time, is the more represented Latin American country in the sample. What is more, we find that while the average increase in growth sales, after an IBRD intervention in Latin America, is about 2 percent, in Argentina we observe a drop of about 4 percent.[32] Therefore, after removing Argentina from our sample, we find that the estimated coefficients, in both panels A and B, conform to the baseline IDA results (Table E2, in the online Appendix E).

[Table 2 about here]

4.2 Sector-specific aid versus regional aid

As discussed in greater detail in section 2, we classify a World Bank project as regional when all types of firms in an ADM1 region are likely to benefit from it. The proportion of regional aid is comparable (between 53 to 61 percent) across the four geographic regions (Figure C3, in the online Appendix C), with the highest proportion in Europe (61 percent) and the lowest in Africa (53 percent). 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).

Panel A, of Table 3, reports the outcomes for sectoral aid on our full sample (i.e., now including Argentina). The sample size drops to 41,348 firms and to only 3,229 firms for the panel regression. The coefficient are all statistically insignificant. The causal effect from the IV estimates (columns 2, 4, 6 and 8) is always negative but never statistically significant at conventional levels. Panel B of Table 6 shows 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 percent for the panel estimation. The coefficients are generally not statistically significant, similarly to

[32] This arguably depend on the fact that the survey years cover the period after 2001, when Argentina entered a prolonged financial and economic crisis after the sovereign debt default at the end of 2001.

what we have shown in Panel A, except for the negative and significant coefficient displayed in the pooled OLS specifications of column 1 and 5.

[Table 3 about here]

In sum, the results of this section show that World Bank projects have, on average, a negative and significant effect on firm sales (though not robust to sample selection). In particular, when distinguishing between IBRD and IDA projects, we can see that this negative effect is driven by IBRD projects and in particular by one country, namely Argentina, which is well represented in this survey, has been a recipient of several IBRD projects and, most importantly, has been exposed to a severe economic and financial crisis during our sample years. After excluding this country from our sample, we find no causal effect of World Bank participation on firm performance (Table F2, panel A, in the online Appendix F). This result holds when focusing on IBRD projects (Table F2, panel B). Similarly, it holds when we differentiate between regional and sectoral projects, in the full sample.

5 Chinese ODA projects

Table 4 presents the baseline model results with Chinese (ODA) aid projects.[33] Table 4 replicates the regression model specifications reported in Table 1. Unlike the World Bank projects, both the OLS and IV regression outcomes, in all columns, report positive coefficients. In columns 2 and 4, the coefficients of the instrumented aid are positive and significant, at the one percent level. When we replace the number of the Chinese ODA projects with the log of Chinese ODA commitments, the effect of aid on firm sales' growth remain positive and statistically significant at the five (column 6) and ten (column 8) level of significance. The first-stage results show that the coefficient for our instrument is always negative, significant, and with the expected sign. The reported Kleibergen Paap tests provide further evidence in support of identification.

In quantitative terms, in the panel specification of column 4, we find that one more Chinese project increases growth of firm's sales by 1.2 percent, while one percent increase in Chinese ODA commitments increases firm sales growth by 3 percent. These results are comparable (but stronger) than those of Chauvet and Ehrahrt (2018), who find that 1 percent increase of ODA bilateral and multilateral aid increases sales by about one percent. Moreover, these results are

[33] However, as shown in Table F3, in the online Appendix F, the results are similar using data on all Chinese projects.

consistent with Dreher et al. (2021a), who also find a positive causal effect of Chinese projects on country's growth (and no significant effect of World Bank aid).[34]

Turning to the control variables, we observe a 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.

[Table 4 about here]

5.1 Sector-specific aid versus regional aid

Table 5 presents the outcomes for Chinese regional and sectoral ODA projects. Panel A and panel B show the outcomes of sectoral aid and regional aid, respectively. The number of observations for these regressions is comparable to the analysis done with the World Bank. The causal effect of sectoral Chinese ODA aid on firm growth, in the instrumented regressions (columns 2 and 4), is always positive but not statistically significant. What is more, the aid coefficient is identified only in the specification of column 6 (when the variable of interest is the committed aid amount). This could be explained by the fact that sectoral Chinese ODA projetcs exceeds regional ones only when considering their committed amounts (as shown in Figure 4 above), whereas the number of sectoral projects is rather small. In the next sub-section we provide some evidence consistent with this, on average, insignificant effect.

Contrarily to sectoral aid, the coefficients of regional Chinese ODA projects, panel B of Table 5, are always positive and significant, at the five percent level, in the instrumented regressions displayed in column 2 and 4. Since regional projects prevail over sectoral only when considering their number (but not their amount), symmetrically to panel A, the results are now stronger when the interest variable is the number of projects, as reported in columns 1-4, in Table 5. On the other hand, when considering the size of the committed amount, we can see that the coefficient is positive and significant only in column 6. Quantitatively, we find that, controlling for firm fixed effects, one more regional project increases firm' sales by 1.27 percent, which is comparable to the baseline result. The next sub-section provides more detailed evidence on the effects of Chinese aid when distinguishing by firm's sector.

[34] Quantitatively, they find that that one more Chinese project increases a country's growth, on average, between 0.41 and 1.49 (depending on specification). Our result is consistent with theirs, even if the magnitude is not easy to be compared.

[Table 5 about here]

5.2 Aid by industrial sector

We examine the effect of both World Bank and Chinese aid on firm performance, by disaggregating firms according to their industrial sector.[35] Table 6 shows the regression outcomes by sector. In the first four columns of Table 6, 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 (23,620) and the smallest is for the Transport sector (1,796).[36] As previously described, in the case of the World Bank, the most financed projects are those in the Transport sector, followed by Mineral and Food (Figure 3b above). As for Chinese ODA projects, the Transport and Mineral sectors are the two receiving most resources, followed by the Wholesale and retail sector (Figure 4B).[37]

Considering the IV results, in five out of six sectors, World Bank projects do not have any significant effect on firm sales growth.[38] In the case of Chinese ODA projects, we find some interesting contrasts. The IV estimates show positive and statistically significant effects (at the five percent level effect) for firms in the Food, Manufacturing and Wholesale and retail sector, while, for the Mineral industry, the effect of the amount of Chinese ODA aid is negative and statistically significant (at the five percent level).[39] What is more, this negative effect is sizeable in quantitative terms, as one percent change in aid, on average, reduces sales in firms operating in the mineral sector by about 3 percent. Since positive and negative effects would compensate on average, over industrial sectors, this evidence is then consistent with the average non-significant effect of Chinese sectoral aid, which was previously described.

In summary, we find evidence that Chinese ODA intervention crowds out local firms operating in the mineral sector. The fact that Chinese aid, at least to some extent, crowds out firms which operates in one of the two most financed aid sectors, raises some questions about the actual

[35] Due to lack of sufficient observations, we are not able to examine the effectiveness of aid by specific aid sector. In other words, we can only consider subsamples of firms, according to their industrial sector, but we are unable to disaggregate Chinese projects, by sector.

[36] Table A1 and A2, in the online Appendix A, show the distribution of firms across sectors and the WBES sectoral classification.

[37] The distribution actually changes when we consider the number of projects instead of the committed amounts (see Figure 4A).

[38] The only exception relates to firm operating in the manufacturing sector, but this effect disappears once we exclude Argentina from the analysis.

[39] IV regressions for the sample of Transport firms (Chinese ODA, columns 6 and 8) could not be performed due to insufficient observations. In fact, the number of firms belonging to the transport sector is the smallest in the sample (about 4.5 percent).

impact of these projects on the local economic activity. One possible explanation could be that extractive activity is eventually carried out by more competitive multinational firms (not included in the survey) which would make life tougher for existing local firms. The fact that we cannot run IV regression for the sample of firms operating in the Transport sector makes, unfortunately, impossible for us to see what happen to the firms operating in the sector which receives the greatest share (about 60 percent) of the Chinese ODA budget.[40] In the next section, we can leverage the extensive heterogeneity of our data to explore some of the channels through which Chinese ODA aid may affect firm sales.

[Table 6 about here]

5.3 The channel of aid transmission

On a theoretical ground, we identify several channels of interest through which aid could influence firm sales growth. In general, the literature points out that financial flows can have both demand and supply side effects on firms (e.g., Chauvet and Ehrhart 2018; Bomprezzi and Marchesi 2021). In this section, we try to unravel this black box with the help of some firm level characteristics and indicators of firm operating environment.

Besides demand factors (which would be quite difficult to measure in this setting) aid is assumed to influence growth of firm sales through both internal (within the control of a firm or business) and external factors including various aspects of the environment that a firm operates in (e.g., Dollar et al. 2005; Busso et al. 2013; Macmillan et al. 2014; Syverson 2011). Such internal and external channels could be related to the supply side factors, as argued in the aid literature (Rajan and Subramanian 2007, 2011; Chauvet and Ehrhart 2018).[41] 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).[42]

[40] When we consider all Chinese projects, the most financed sector is actually the Mineral one (i.e., about 63 percent, as reported in Figure C8, in the online Appendix A).

[41] 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. They find that aid adversely impacts industries that rely relatively more on institutions and are more outward looking. Finally, in a credit constrained environment, aid may provide the government with financing, hence making more credit available for private firms (Rajan and Subramanian 2011).

[42] By Dutch disease we refer here to the apparent causal relationship between the increase of foreign aid and the decline of a country' 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.

We measure these channels using data on firm characteristics available from the WBES, in particular the questions on sources of finance, quality of infrastructure and institutional capacity. We re-estimate the baseline estimations with an interacting term capturing the joint effect of Chinese number of ODA projects and each channel.[43] This strategy was first implemented by Rajan and Zingales (1998), who investigate whether financial development facilitates economic growth by exploring whether it may reduce the costs of external finance to firms.[44] The rest of the analysis uses the firm fixed-effect estimation.[45] Hence, we estimate the following equation:

$$g_{i,k,h,j,(t,t-2)} = \alpha_1 + \beta_1 P_{h,k,j,t-2} + \gamma_1 X_{i,k,h,j,t} + \delta_1 Probability^{CHN}_{h,t-2} + \lambda_1 Z_{h,j,t} + \\ + \mu CH_{i,k,h,j,t} + \rho CH_{i,k,h,j,t} \text{ x } P_{h,k,j,t-2} + \tau_{k,t} + \mu_i + \varepsilon_{i,k,h,j,t} \ , \quad (4)$$

which is similar to Equation (1b) above, except for the interaction term of aid with a set of relevant firm-level characteristics ($CH_{i,k,h,j,t}$ x $P_{h,k,j,t-2}$). We include industry-year dummies $\tau_{k,t}$, and (only) firm fixed effects.

We utilize a set of 11 variables from WBES to measure the channels.[46] 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 (i) if a firm has internationally-recognized *Quality certification*, (ii) whether a firm has a *Checking/saving account*, and (iii) 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.[47]

The Dutch disease effect, measured by the variable *Exports*, examines if the firm has any adverse effect of aid on its export potential. On the other hand, related to this, one might expect that an export oriented firm is more likely to benefit from aid through an improved access to trade credit.

[43] We consider only the number of projects because financial values are available only for about two-third of all Chinese ODA projects.

[44] In particular, they interact measures of financial development with industrial sectors that are relatively more in need of external finance. They find that such sectors develop disproportionately faster in countries with more developed financial markets.

[45] As we show in Table E2, in the online Appendix E, the results are robust to using the Woolridge control function approach (Woolridge 2015), which allows us to correct for the potential endogeneity bias. Unfortunately, this method does not allow to calculate the marginal effects of the interacted terms.

[46] Table C4, in the online Appendix C, lists all the firm specific information we use in this section.

[47] Very recently, Choudhary and Limodio (2021), based from evidence from Pakistan, show that banks in low-income countries face severe liquidity risk (due to volatile deposits) and dysfunctional liquidity markets. Overall, such liquidity problems deter the transformation of short-term deposits into long-term loans discouraging long-term investments.

In fact, the deterioration in the credit quality of exporting firms after an economic crisis could make trade credit less available and more expensive.

The infrastructure channel uses two variables, whether a firm has any obstacle with respect to *Electricity* provision and *Transport*. Finally the institution channel is constructed using three indicators, which measure whether a firm has any obstacle due to (perceived) *Political instability*, *Crime*, theft and disorder, and *Corruption*, respectively. Unlike the previous studies, these channels vary across firms.

Table 7 reports the outcomes on the interaction between the Chinese ODA projects and these channels. The sample size of the panel is close to 5,000 firms. In each of the 11 columns, when looking at the interaction terms, we find that the coefficients are generally positive (except in columns 8 and 9) but rarely significant. Specifically, only the coefficients of the interactions with Financial statement certified by an *External Auditor* and *Electricity* are positive and significant at the five percent level. The results, however, are different when looking at the marginal effects of some of the interactions.

Figure 6 plots the marginal effects of the Chinese ODA projects on firms' sales in conjunction with the categorical indicators: *A*ccess to *Finance* (Panel A); *A*ccess to *Electricity* and *Access to Transport* (Panel B); (lack of) *Political instability*, (lack of) *Crime* and (lack of) *Corruption* (Panel C).

As can be seen, the effect on average firm sales growth is (slightly) increasing with greater *Access to Finance* (where higher values indicate smaller obstacles) and is always positive. Hence, Chinese ODA aid is more effective when firms are less in need of financial resources.

A similar results is detected when looking at the marginal effects of the interaction of Chinese ODA aid with the indicator *Access to Electricity* (where higher values indicate less of an obstacle) as displayed in Panel B. The marginal effect is always positive and increasing, suggesting that the effect on average firm sales increases with better *Electricity* provision. On the other hand, the effect is (slightly) decreasing as firms are less in need of *Transport* infrastructure. This result then corroborates the idea that aid can be effective through the relief of the infrastructure constraint of the firms. Since *Transport* is the sector that absorbs the greatest share of Chinese ODA aid, this evidence suggests that this may be an important channel of transmission of Chinese ODA projects.

The last Panel C of Figure 6 shows the marginal effects of the interactions with the three variables related to the quality of the institutions (as perceived at the firm level), where higher values indicate better institutions. In all cases, at the average value, the effect is positive. For lack of

Political instability, however, the effect is (slightly) decreasing. This result is consistent with the fact that Chinese aid (contrary to World Bank projects) comes with few strings attached and hence is more vulnerable to political capture (Dreher et al. 2020, 2021b).[48] On the other hand, firm sales are increasing with both lack of *Crime* and lack of *Corruption*. More specifically, the positive effect of Chinese ODA on firms' sales growth steadily increases in a safer environment. However, we find no significant effect for firms at the lower bound of the indicator for *Crime* (i.e., operating in a more violent environment). Finally, the marginal effect of Chinese ODA projects on firms' sales is always positive and increasing for firms operating in a less corrupted region.

[Figure 6 about here]

To sum up, we find that Chinese ODA projects are more effective in regions with worse *Transport* infrastructure, suggesting that this may be an important channel of aid transmission. At the same time, Chinese ODA projects contribute to firm performance more effectively in a business environment that provides easy access to credit, is safer and less corrupt. Finally, the next section contains some robustness analysis.

6 Robustness

This section contains a robustness analysis for our main results, and the related Tables and Figures are presented in the online Appendices D-F. We begin with issues regarding the identification strategy, in particular to address the exclusion restrictions, to then turning to a series of alternative specifications for our main models. Finally we discuss issues related to our survey data, specifically the topic of sample dependence.

6.1 Identification

The biggest threat to identification regards the presence of underlying, time-varying heterogeneous trends, which are correlated to either World Bank or Chinese steel and may affect firm sales differentially, conditional on the share of years spent under an aid project (Christian and Barrett 2017). Following previous studies (e.g., Christian and Barrett, 2017; Chauvet and Ehrhart, 2018;

[48] On the other hand the World Bank provides financing which is subject to restrictive and specific procurement rules. In particular, 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. In turn, this plan defines the project procurement arrangements, including the organization, procedures, and review thresholds at all levels (government, local government and communities).

Dreher et al., 2021a, 2021b), we then check the validity of our instruments by plotting trends across regions below and above the median of the probability of receiving projects from the two donors. More precisely, in Figure D3, we plot the IBRD's equity-to-loans ratio and the IDA's funding position in tandem with the IBRD/IDA project amount and sales growth. On the other hand, in Figure D2, in the online Appendix D, we plot the variation in Chinese steel production in concert with the variation in Chinese projects' amount and sales growth for the two groups of regions. Since we do not have a proper panel, we construct three-year averages of project amounts and sales growth.

The results give little reason to believe that the parallel trends assumption is violated in both Chinese and World Bank projects. Indeed, the probability-specific trends in the annual growth rate of sales seem rather parallel across regions with a probability of receiving aid that is above the median, and those with a probability of receiving aid that is below the median. We do not see any non-linear trend, either in the Chinese steel production nor in the World Bank aid budget, which are similar to the trends in project amount and sales growth for the two different groups of regions.

A similar issue is the one of alternative trends driving the first stage, which could represent a possible threat to the exclusion restriction. We explore some of these potential confounders, as we consider the presence of global GDP and Chinese aid (in the case of World Bank projects) and Chinese FDI and Trade and World Bank aid (in the case of Chinese ODA projects). Table D1 and D2, in the online Appendix D, confirm that the results are robust to controlling for the differential effect of these alternative trends by interacting them with either region-specific World Bank, or Chinese aid probability. Finally, Table D3 and D4, in the online Appendix D, show that, in the case of Chinese ODA projects, the results are generally robust to using international reserve as well as Chinese steel production as an instrument.

6.2 Alternative specifications

As discussed above, in this section of the Appendix we present the results of alternative specifications. Most importantly, we look at whether World Bank and Chinese ODA projects affect growth of permanent employees at the firm level.[49] By constructing an indicator of firm employment growth in the same way that firm sales growth is constructed, we should be able to measure the effect of project aid on firm employment growth. As shown in Table E1, in the online Appendix E, while World Bank projects either do not have any effect on job creation or they

[49] Our measure of employment incorporates only full-time, permanent workers.

decrease in the panel specification, Chinese ODA projects increase employment (but only in the pooled sample). This effect, however, seems rather small as one more Chinese project increases the number of permanent workers by only 0.10 percent.

Finally, in Table E1, we show the results obtained applying the control function approach developed by Woolridge (2015) to the interaction between Chinese ODA project and firm characteristics, in order to investigate the channels of transmission of Chinese ODA aid. We find that the results are in line with those presented in Table 7 above.

6.3 Sample dependence

A quite evident limitation to survey data is the problem of recontacting firms. The biggest limitation which would affect our results on firm sales growth is firms dropping out because they go bust, what we call the survivor bias. If this were the case however, we would expect that the distribution of firms with repeated interviews versus the distribution of single-presence (no repeated interviews) firms would be significantly different. Figure F1, in the online Appendix F, shows that the two distributions are rather similar.

An equally important issue to address in our model is the role of sample dependence, such as the sensitivity of the results to the inclusion of certain countries in the sample. There are a series of subsample analyses we can run as a sensitivity analysis. Table F1, in the online Appendix F, shows that the results are similar when considering the full sample of countries (that is including those under a conflict). As previously discussed in Section 4, Table F2 shows that, when omitting Argentina from our sample, consistently with previous literature, the coefficient of World Bank aid turns insignificant. Then, Table F3 shows that the results obtained using Chinese ODA projects also hold when considering the total amount of Chinese aid (as in Dreher et al. 2021a, 2021b).

Finally, we run a randomization of the sample of firms per region, as a formal test to the sensitivity of our results to sample dependence. Indeed, as shown in Table A5, in the online Appendix A, the number of firms varies sizably across regions. For example, the number of observations ranges from 1 (Fier, in Albania) to 1475 (Lima, Province in Peru), with an average number of about 250 firms per region.[50] This implies that regions in which more firms are surveyed may be overrepresented in the sample. We consider a strategy of randomization in which each region is given the same weight, by randomly drawing the same number of enterprises from each region. Hence, we randomly draw 250 observations for each region in the full sample, and 50 observations for each region when using

[50] For the firms that are observed twice, the number of observations ranges from 1 to 544, with an average number of about 50 firms per region.

firm fixed effects. Each random draw is replicated 500 times, and we then compute the mean value of the coefficient for aid, its standard deviation, and the percentage of estimations in which this coefficient is not significantly different from zero. This test is run using IV. The results are presented in Table F4, in the online Appendix F. Columns 1-4, of Table F4, show the results in the case of World Bank aid, while columns 5-6 show the results for Chinese aid.

We find that the average coefficient for World Bank projects is close to the one reported in Table 1, but, differently from Table 1, the negative coefficient of World Bank projects are not statistically significant in most cases.[51] On the other hand, the coefficients reported in Columns 5-8 are in line with those presented in Table 3.[52] In conclusion, all results are consistent across all the methods, and we find an average effect very similar to our baseline results.

7 Conclusions

Over the past two decades, the concept and very nature of aid have 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. 2021), many see the Chinese Belt and Road initiative (BRI) as a way to secure commercial benefits for Chinese domestic firms (Kaplinsky and Morris 2009); let alone the prevalence of widespread corruption around Chinese projects sites (Isaksson and Kotsadum 2018).[53] 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.

We examine the effectiveness of the World Bank (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. Information on firm sales and local business environment is collected from multiple rounds of the World Bank Enterprise Survey conducted between 2003 and 2016.

Following Lang (2016) and Dreher et al (2021a, 2021b), our identification strategy exploits the

[51] In particular, the coefficients are never significant when we exclude Argentina from the sample, as shown in Table F5.

[52] When we consider the amount of Chinese projects, in the panel specification, in column 8, we fail to estimate a significant coefficient in 88% of the cases. This depends on the fact that the number of observations shrinks considerably when taking project amount together with firm fixed effects.

[53] 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).

differential effect of changes in World Bank liquidity and Chinese steel production on project allocation. While World Bank projects fail to improve firm sales, we find significant evidence for Chinese ODA projects contributing to a positive growth in firm sales. The outcomes vary across sectors of activities, as aid-effectiveness is stronger with region-specific aid compared to sector-specific projects. What is more, we also find evidence of some crowding out of local activity, in the case of Chinese ODA projects, for firms operating in the mineral sector.

Some interesting results are detected when looking at the channels of aid transmission. We find that Chinese ODA projects are more effective for firms with worse transport infrastructure, while they benefit more firms, which are less financially constrained, with better electricity provision or placed in a safer and less corrupt environment. Investment in infrastructure is indeed very important (Financial Times 2021), especially in African countries. By connecting remote regions and providing jobs, building infrastructure can spread opportunity across nations unequal in economic strength. What is more, better infrastructure will strengthen the continent's defences, as, in many parts of Africa, the government's grip on remote territories can be limited, allowing militant groups to step in.

Evaluation of aid effectiveness at the firm level highlights the nuanced channels through which aid affects firm performance. This study 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. Moreover, the mechanisms we have considered are not exhaustive and they are mostly 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 that is not feasible to investigate in this paper due to data constraints. We show a few of several possible directions in which firm-level analysis of aid can be extended, and the rest we leave for future research.

Due to its severity, the COVID-19 crisis has made developing countries in desperate need of assistance to overcome its consequences. It is the worst economic crisis since the Great Depression, which has led to the first global rise in poverty this century and International Organizations have responded pledging financial support in the hundreds of billions of dollars (e.g., Bolton et al. 2020; The United Nations 2020). In the wake of the pandemic, the importance of foreign aid and hence the debate on its effectiveness is due to be put under the spotlight.

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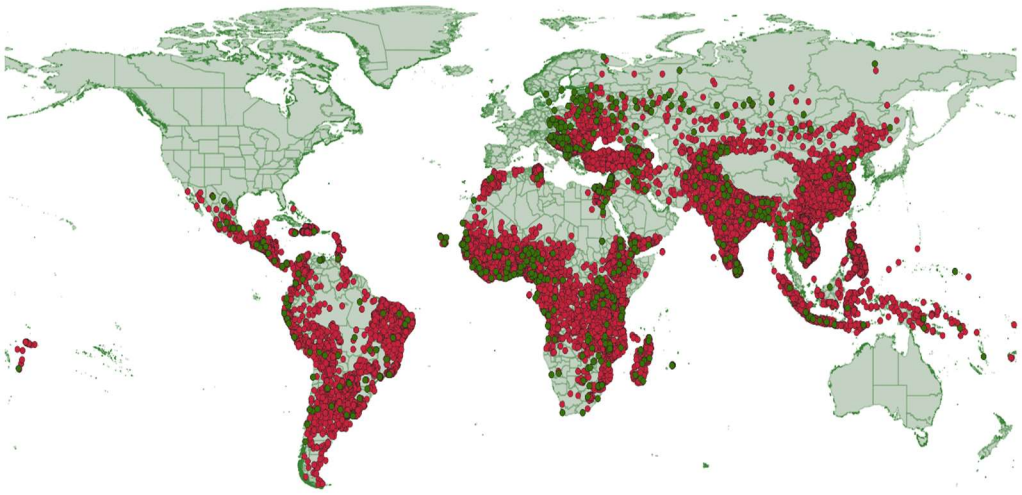
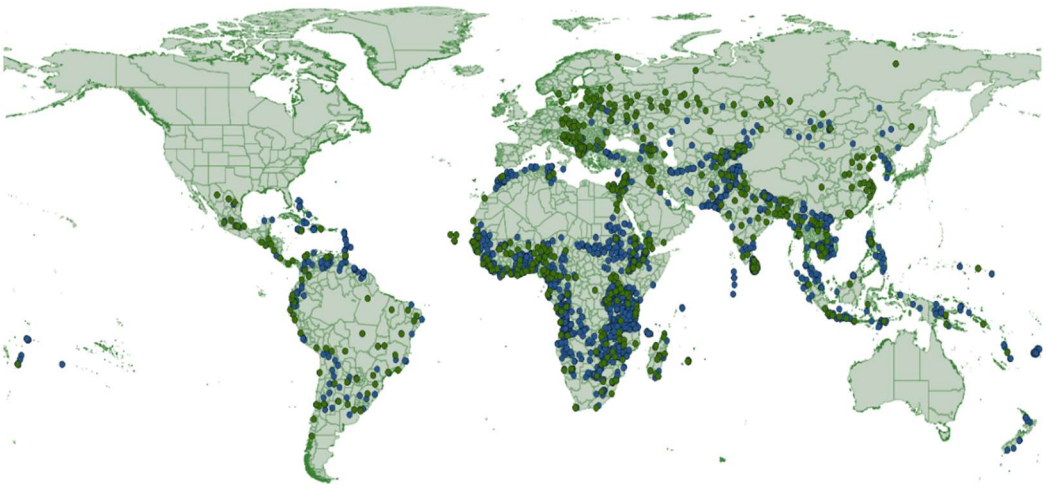
Figures

Figure 1: World Bank project and firm distribution across countries



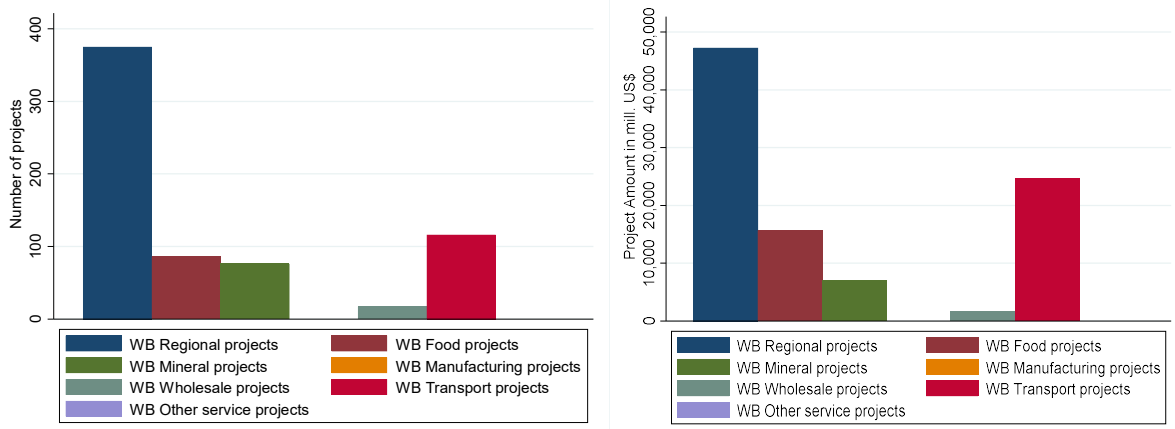
Note: Green dots refer to WBES firms, while red dots are the World Bank projects.

Figure 2: Chinese Project and firm distribution across countries



Note: Green dots refer to WBES firms, while blue dots are the Chinese projectS

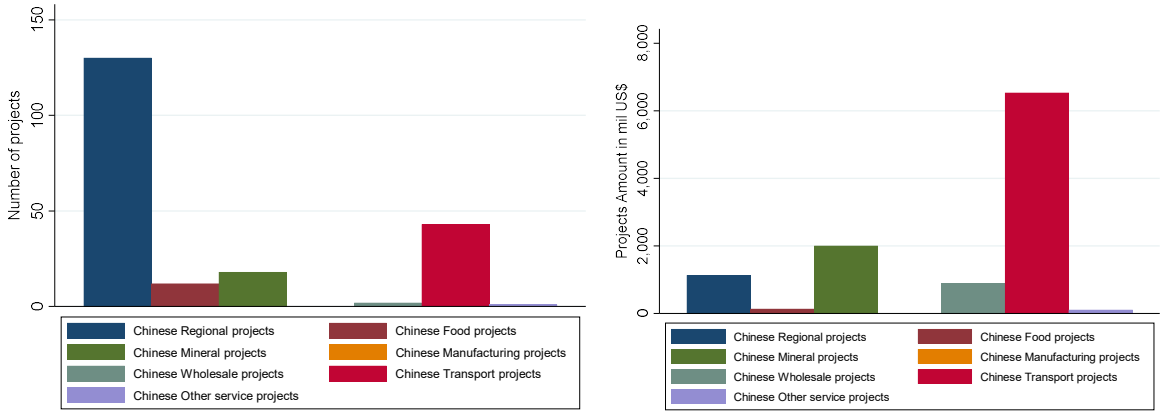
Figure 3: World Bank number and amount of projects by sector



Panel A Panel B

Notes: Distribution of regional and sectoral World Bank aid projects by number of projects (Panel A) and project amount (Panel B)

Figure 4: Chinese ODA number and amount of projects by sector



Panel A Panel B

Notes: Distribution of regional and sectoral Chinese ODA projects by number of projects (Panel A) and project amount (Panel B)

Figure 5: Timeline of the events

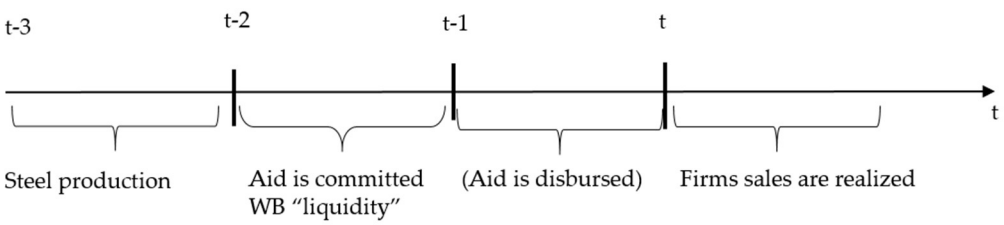
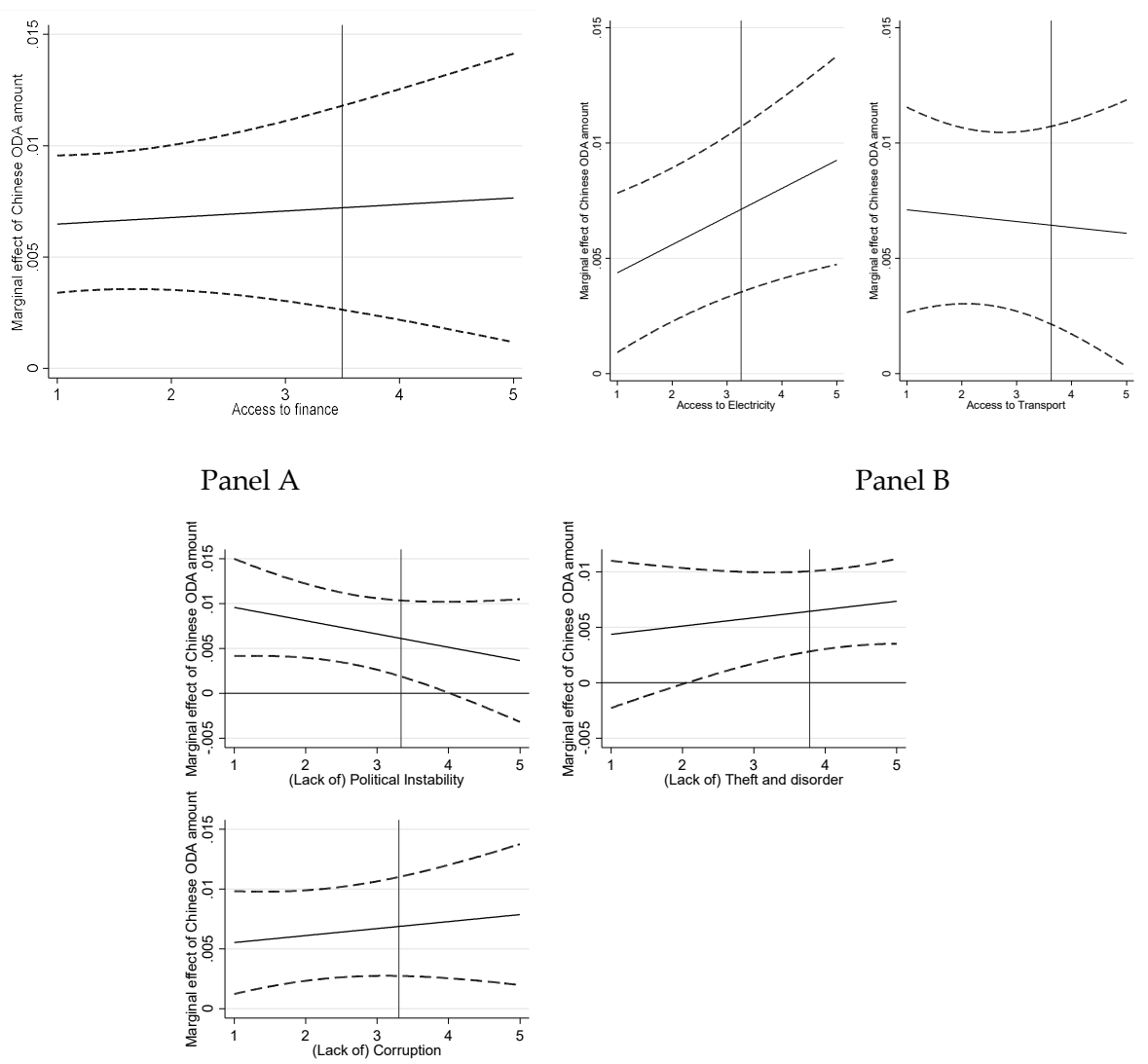


Figure 6: Chinese aid, and measures of access to finance and reputation as channels



Notes: Marginal effects of an additional Chinese ODA projects on average firm sales growth by different values of firm characteristics. Panel A shows effects for levels of firm *Access to Finance*, with Panel B representing firms with *Electricity* Provision and Access to *Transport* infrastructure. Panel C shows effects for lack of (perceived) institutional quality, such as *Political Instability, Crime and Corruption*. Dotted lines show 95% confidence interval.

Tables

Table 1: Firm sales growth and World Bank total projects

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Total # WB projects	-0.031**	-0.046*	-0.016	-0.073**				
	(-2.488)	(-1.646)	(-1.440)	(-2.184)				
Log amount of WB projects					-0.003	-0.030	0.006	-0.062
					(-0.510)	(-1.430)	(0.834)	(-1.453)
Log Sales (base year)	-0.091***	-0.092***	-0.128***	-0.131***	-0.091***	-0.091***	-0.127***	-0.130***
	(-17.953)	(-18.788)	(-8.825)	(-9.350)	(-16.900)	(-17.830)	(-8.625)	(-8.972)
State ownership (Yes/No)	0.006	0.006	-0.152*	-0.152*	0.007	0.008	-0.151*	-0.152*
	(0.345)	(0.353)	(-1.737)	(-1.717)	(0.371)	(0.459)	(-1.715)	(-1.733)
Foreign ownership (Yes/No)	0.065***	0.065***	0.026	0.026	0.064***	0.065***	0.027	0.017
	(8.638)	(9.048)	(0.869)	(0.874)	(8.129)	(8.723)	(0.902)	(0.511)
Exports goods (Yes/No)	0.042***	0.043***	0.037*	0.030	0.042***	0.042***	0.039*	0.023
	(6.938)	(6.979)	(1.677)	(1.327)	(6.890)	(6.663)	(1.752)	(0.931)
Firm Size	0.166***	0.166***	0.108***	0.112***	0.166***	0.166***	0.109***	0.106***
	(19.449)	(20.427)	(4.723)	(5.185)	(18.335)	(19.376)	(4.769)	(4.495)
Log regional population	-0.097	-0.084	0.053	-0.064	-0.065	-0.084	0.112	-0.116
	(-0.332)	(-0.264)	(0.100)	(-0.107)	(-0.212)	(-0.238)	(0.211)	(-0.167)
Log regional GDP	0.071	0.066			0.069	0.044		
	(0.384)	(0.326)			(0.360)	(0.199)		
Probability of an IBRD project		0.328**		0.551**		0.547*		1.020*
		(2.111)		(2.008)		(1.953)		(1.717)
Probability of an IDA project		-0.003		0.121		0.016		0.247
		(-0.011)		(0.328)		(0.059)		(0.570)
Constant	2.039		1.473		1.709		0.563	
	(0.646)		(0.191)		(0.517)		(0.072)	
First stage								
IBRD x Probability		28.44*		59.55***		31.525		52.654*
p-value		(0.064)		(0.002)		(0.120)		(0.048)
IDA x Probability		25.41***		20.13***		34.521***		33.092***
p-value		(0.000)		(0.008)		(0.00)		(0.001)
Observations	60,480	60,480	6,893	6,893	60,480	60,480	6,893	6,893
R-squared	0.220	0.126	0.243	0.159	0.219	0.123	0.242	0.124
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)		0.012		0.004		0.003		0.007
Panel observations			3,365	3,365			3,365	3,365

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 2: Firm sales growth, IDA and IBRD projects

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: IDA								
Total # of IDA projects	-0.032	-0.014	-0.030	-0.100				
	(-1.264)	(-0.491)	(-0.963)	(-0.911)				
Log amount of IDA projects					-0.006	-0.012	0.011	-0.100
					(-0.342)	(-0.492)	(0.451)	(-0.792)
Probability of an IDA project		0.376***		0.581***		0.978**		1.373***
		(2.777)		(3.782)		(1.985)		(2.669)
First stage								
IDA x Probability		25.838***		19.125**		29.974***		19.005**
p-value		(0.00)		(0.023)		(0.00)		(0.035)
Observations	48,817	48,817	5,022	5,022	48,817	48,817	5,022	5,022
R-squared	0.238	0.127	0.260	0.169	0.237	0.127	0.259	0.124
Kleibergen-Paap LM stat (p-value)		0.022		0.056		0.007		0.082
Panel observations			2,473	2,473			2,473	2,473
Panel B: IBRD								
Total # of IBRD projects	-0.020***	-0.062***	-0.012	-0.048***				
	(-3.124)	(-3.569)	(-1.421)	(-3.778)				
Log total amount of IBRD projects					-0.005	-0.065	0.003	-0.062
					(-1.335)	(-1.569)	(0.892)	(-1.606)
Probability of an IBRD project		-0.167		0.137		-0.150		0.416
		(-0.686)		(0.279)		(-0.557)		(0.577)
First stage								
IBRD x Probability		43.380***		77.443***		41.758*		59.235*
p-values		(0.005)		(0.000)		(0.076)		(0.070)
Observations	42,280	42,280	3,830	3,830	42,280	42,280	3,830	3,830
R-squared	0.240	0.130	0.284	0.173	0.240	0.121	0.283	0.115
Kleibergen-Paap LM stat (p-value)		0.020		0.031		0.102		0.062
Panel observations			1,850	1,850			1,850	1,850

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 3: Firm sales growth, sectoral and regional World Bank projects

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: Sectoral Aid								
Total # of sectoral WB projects	0.039	-0.059	-0.002	-0.070				
	(0.993)	(-0.602)	(-0.041)	(-0.583)				
Log total amount of sectoral WB projects					0.018	-0.007	0.006	-0.010
					(1.282)	(-0.183)	(0.359)	(-0.173)
Probability of an IBRD sectoral project		1.402		0.454		1.205		0.135
		(1.547)		(0.240)		(1.236)		(0.062)
Probability of an IDA sectoral project		0.331		0.390		0.252		0.262
		(0.646)		(0.458)		(0.389)		(0.189)
First stage								
IBRD x Sec. Probability		1.363		-4.206		-9.687		-20.542*
p-value		(0.798)		(0.289)		(0.522)		(0-096)
IDA x Sec. Probability		19.787***		25.734***		52.883***		48.257***
p-value		(0.000)		(0.003)		(0.003)		(0.002)
Observations	41,348	41,348	3,229	3,229	41,348	41,348	3,229	3,229
R-squared	0.259	0.132	0.331	0.231	0.259	0.133	0.331	0.232
Kleibergen-Paap LM stat (p-value)		0.107		0.005		0.161		0.039
Panel observations			1,579	1,579			1,579	1,579
Panel B: Regional Aid								
Total # of regional WB projects	-0.03***	0.043	-0.013	0.053				
	(-2.718)	(0.521)	(-0.848)	(0.546)				
Log total amount of regional WB projects					-0.012**	0.025	-0.005	0.031
					(-2.165)	(0.724)	(-0.526)	(0.726)
Probability of an IBRD regional project		-0.191		0.010		-0.423		-0.306
		(-0.540)		(0.013)		(-0.729)		(-0.308)
Probability of an IDA regional project		0.025		0.197		-0.038		0.053
		(0.037)		(0.452)		(-0.057)		(0.101)
First stage								
IBRD x Regional Probability		-29.499**		-15.138		-106.613**		-47.303*
p-value		(0.047)		(0.370)		(0.030)		(0.079)
IDA x Regional Probability		39.321***		46.460***		80.193**		103.034***
p-value		(0.006)		(0.008)		(0.014)		(0.002)
Observations	42,723	42,723	3,434	3,434	42,723	42,723	3,434	3,434
R-squared	0.244	0.127	0.255	0.118	0.244	0.127	0.255	0.120
Kleibergen-Paap LM stat (p-value)		0.005		0.025		0.006		0.005
Panel observations			1,689	1,689			1,689	1,689

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 4: 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	0.031**	0.057***	0.001	0.120***				
	(2.194)	(3.056)	(0.056)	(2.941)				
Log total amount of Chinese ODA					0.004	0.021**	0.002	0.033*
					(1.021)	(2.190)	(0.704)	(1.817)
Log Sales (base year)	-0.094***	-0.094***	-0.127***	-0.132***	-0.092***	-0.094***	-0.128***	-0.133***
	(-25.256)	(-26.389)	(-8.626)	(-9.618)	(-21.143)	(-23.004)	(-8.787)	(-10.060)
State ownership (Yes/No)	0.006	0.007	-0.151*	-0.184**	0.007	0.007	-0.150*	-0.166*
	(0.354)	(0.364)	(-1.733)	(-1.993)	(0.368)	(0.412)	(-1.703)	(-1.716)
Foreign ownership (Yes/No)	0.067***	0.067***	0.026	0.043	0.065***	0.067***	0.027	0.044
	(9.715)	(9.975)	(0.869)	(1.411)	(9.088)	(9.856)	(0.903)	(1.389)
Exports goods (Yes/No)	0.044***	0.045***	0.038*	0.043*	0.043***	0.044***	0.038*	0.035
	(7.658)	(7.814)	(1.713)	(1.880)	(7.257)	(7.509)	(1.674)	(1.376)
Firm Size	0.170***	0.171***	0.108***	0.119***	0.167***	0.170***	0.108***	0.118***
	(27.547)	(28.881)	(4.708)	(5.477)	(22.872)	(25.364)	(4.719)	(5.716)
Log regional population	-0.071	0.045	0.088	0.487	-0.037	0.304	0.101	1.067
	(-0.228)	(0.146)	(0.167)	(0.890)	(-0.114)	(0.645)	(0.189)	(1.239)
Log regional GDP	0.091	0.027			0.062	-0.139		
	(0.474)	(0.129)			(0.300)	(-0.401)		
Constant	1.829		0.926		1.430		0.731	
	(0.546)		(0.119)		(0.404)		(0.093)	
Probability of a Chinese ODA project		-0.481		-1.506**		-0.990**		-2.166**
		(-1.470)		(-2.430)		(-1.977)		(-2.298)
First stage								
Steel amount x Probability		-19.201***		-10.407***		-51.863***		-37.788***
p-value		(0.000)		(0.000)		(0.000)		(0.065)
Observations	60,480	60,480	6,893	6,893	60,480	60,480	6,893	6,893
R-squared	0.222	0.127	0.242	0.149	0.220	0.117	0.242	0.126
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)		0.009		0.003		0.012		0.103
Panel observations			3,365	3,365			3,365	3,365

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 5: Firm sales growth, sectoral and regional Chinese aid

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: Sectoral Aid								
Total number of Chinese sectoral ODA	-0.014	0.143	-0.029**	0.043				
	(-1.184)	(0.745)	(-2.204)	(0.407)				
Log total amount of Chinese sectoral ODA					0.000	0.008	-0.003	0.010
					(0.088)	(0.839)	(-0.951)	(0.449)
Probability of a Chinese ODA sectoral project		-3.083		-0.976		-1.232*		-0.860
		(-0.955)		(-0.551)		(-1.649)		(-0.622)
First stage								
Steel x Sec Probability		-7.063		-14.003		-124.123*		-63.250
p-value		(0.169)		(0.002)		(0.001)		(0.173)
Observations	52,866	52,866	4,474	4,474	52,866	52,866	4,474	4,474
R-squared	0.227	0.127	0.264	0.184	0.227	0.132	0.263	0.187
Kleibergen-Paap LM stat (p-value)		0.209		0.128		0.091		0.174
Panel observations			2,185	2,185			2,185	2,185
Panel B: Regional Aid								
Total number of Chinese regional ODA	0.048**	0.053**	0.019	0.088**				
	(2.510)	(2.017)	(0.765)	(2.029)				
Log total amount of Chinese regional ODA					0.008*	0.012*	0.006**	0.020
					(1.855)	(1.683)	(2.371)	(1.442)
Probability of a Chinese ODA regional project		-0.508**		-0.805**		-0.651***		-1.050**
		(-2.320)		(-2.243)		(-2.722)		(-2.324)
First stage								
Steel x Regional Probability		-14.755***		-9.343***		-68.177**		-39.953
p-value		(0.000)		(0.000)		(0.025)		(0.219)
Observations	59,305	59,305	6,666	6,666	59,305	59,305	6,666	6,666
R-squared	0.226	0.129	0.242	0.169	0.225	0.129	0.246	0.169
Kleibergen-Paap LM stat (p-value)		0.004		0.003		0.023		0.217
Panel observations			3,252	3,252			3,252	3,252

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 6: 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**	-0.023	-0.002	-0.007	0.035***	0.036*	0.007**	0.012
	(-2.513)	(-1.311)	(-0.415)	(-0.218)	(8.277)	(1.656)	(2.217)	(1.497)
Observations	5,609	5,609	5,609	5,609	5,609	5,609	5,609	5,609
Kleibergen-Paap LM stat (p-value)		0.280		0.270		0.032		0.008
R-squared	0.267	0.105	0.265	0.103	0.271	0.108	0.268	0.103
Panel A: Mineral								
Aid	-0.013	-0.069	0.009	-0.019	-0.040**	-0.173	-0.014	-0.029**
	(-0.914)	(-0.784)	(1.349)	(-0.811)	(-2.042)	(-1.020)	(-1.603)	(-1.975)
Observations	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045
Kleibergen-Paap LM stat (p-value)		0.363		0.164		0.145		0.041
R-squared	0.262	0.126	0.262	0.127	0.263	0.117	0.265	0.132
Panel A: Manufacturing								
Aid	-0.036**	-0.059	-0.004	-0.042*	0.038**	0.112***	0.006	0.032***
	(-2.148)	(-1.581)	(-0.570)	(-1.660)	(2.167)	(5.779)	(1.170)	(2.960)
Observations	23,620	23,620	23,620	23,620	23,620	23,620	23,620	23,620
Kleibergen-Paap LM stat (p-value)		0.044		0.007		0.081		0.007
R-squared	0.231	0.144	0.229	0.139	0.234	0.136	0.231	0.126
Panel A: Wholesale & retail								
Aid	-0.019	-0.071*	-0.002	-0.029	0.030	0.118**	0.002	0.031***
	(-1.398)	(-1.750)	(-0.302)	(-1.089)	(1.602)	(2.318)	(0.478)	(3.169)
Observations	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735
Kleibergen-Paap LM stat (p-value)		0.002		0.001		0.066		0.016
R-squared	0.271	0.127	0.270	0.127	0.272	0.119	0.270	0.103
Panel A: Transport								
Aid	-0.019	0.339	-0.062	1.089	-0.548***		-0.054***	
	(-0.331)	(1.004)	(-0.331)	(1.004)	(-22.712)		(-22.712)	
Observations	1,796	1,796	1,796	1,796	1,796		1,796	
Kleibergen-Paap LM stat (p-value)		0.420		0.420				
R-squared	0.303	0.187	0.303	0.187	0.303		0.303	
Panel A: Other services								
Aid	-0.025*	-0.038	0.002	-0.032	0.009	0.037	0.001	0.011
	(-1.670)	(-1.285)	(0.223)	(-1.372)	(0.632)	(1.295)	(0.265)	(1.037)
Observations	13,675	13,675	13,675	13,675	13,675	13,675	13,675	13,675
Kleibergen-Paap LM stat (p-value)		0.001		0.000		0.021		0.081
R-squared	0.246	0.116	0.245	0.113	0.245	0.115	0.245	0.114

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Columns 3-4 uses the same estimators as columns 1-2 but the variable of interest is log of committed amount. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is Chinese ODA projects instead of World Bank projects. IV regressions for the sample of Transport firms (Chinese ODA, columns 6 and 8) could not be performed due to insufficient observations. In fact, the number of firms belonging to the transport sector is the smallest in this sample (about 4.5 percent). All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table 7: The Channels, firm sales growth, the Chinese aid amount

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 Amount of Chinese	0.005*	0.006***	0.006**	0.004	0.004**	0.002	0.003	0.007**	0.011**	0.004	0.005
ODA	(1.705)	(2.836)	(2.339)	(0.915)	(2.082)	(0.586)	(1.365)	(2.205)	(2.528)	(0.734)	(1.549)
Total amount of Chinese ODA	0.004	0.000	0.003	0.003	0.004**	0.001	0.001**	-0.000	-0.001	0.001	0.001
× CHANNEL	(1.306)	(0.318)	(0.859)	(0.709)	(1.986)	(0.200)	(2.048)	(-0.250)	(-1.044)	(0.704)	(0.585)
CHANNEL	0.006	0.004	-0.041	0.015	0.013	0.036	0.000	-0.008	0.002	-0.007	0.000
	(0.296)	(0.494)	(-1.258)	(0.403)	(0.631)	(1.641)	(0.069)	(-1.028)	(0.229)	(-1.012)	(0.016)
Constant	-0.561	-0.095	-0.160	-0.046	-0.012	0.655	0.105	-0.290	1.117	0.018	-0.195
	(-0.112)	(-0.018)	(-0.032)	(-0.009)	(-0.002)	(0.084)	(0.020)	(-0.056)	(0.204)	(0.004)	(-0.037)
Observations	7,107	6,955	7,107	7,107	7,107	9,192	7,081	7,050	6,839	7,107	6,807
R-squared	0.277	0.284	0.276	0.276	0.277	0.242	0.277	0.275	0.285	0.276	0.288
Panel observations	4,759	4,669	4,759	4,759	4,759	5,664	4,749	4,732	4,698	4,759	4,673

Notes. Differential effects of Chinese ODA projects on average firm sales growth. Regressions are run using an OLS fixed-effect estimator. Columns are sorted according to channel considered, through interactions with firm-specific characteristics. All specifications include industry-year dummies and firm and regional level controls. Standard errors are clustered at the country level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

ONLINE APPENDICES

ONLINE 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 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

World Bank Projects					WBES
Code	Sectors	Description	Definition	Coded activities	categories
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 *Legal and regulatory reform*: establishing, assessing and strengthening legal and regulatory frameworks; supporting consultative processes and regulatory impact assessment.	0
10	BH	Sub-national government administration	The term *subnational government* 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	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	0

			special-purpose subnational government entities.	PEFA, and procurement, at the subnational level; Increasing transparency in subnational financial management through increased standardization and harmonization of accounting and reporting system, etc.	
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, institutional capacity building, sector assessments/research, human resources management, school consolidations, and public-private partnerships.	Development of education policies, strategies, legislation, and / or regulations; Institutional capacity building in education ministries and public agencies; Education sector research studies, surveys and assessments. Education management information systems (EMIS); Financial management; Decentralization; Human resources management, etc.	0
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 to acquire, refresh or update their knowledge, skills and competencies in a particular field.	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
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-	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

			oriented curriculum that introduces theoretical concepts across a broad range of subjects.		
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 NBFI (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	0

				and policies, including governance and accountability.	
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 substation 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	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
60	TC	Urban Transport			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 capacity building support to sanitation-related service providers.	0
71	WT	Wastewater Collection and Transportation			0
72	WV	Wastewater Treatment and Disposal			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	4

				negotiations and World Trade Organization accession; Modernizing border management. Enhancing connectivity between firms, markets, and consumers. Promoting pro-competition sector policies.	
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

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
Afghanistan	.	.	.	.	.	647	.	526	.	.	.	.	.	.
Albania	.	.	.	.	304	.	175	.	.	.	360	.	.	.
Angola	.	.	.	425	.	.	.	360	.	.	.	.	.	.
Antigua and Barbuda	.	.	.	.	.	.	.	151	.	.	.	.	.	.
Argentina	.	.	.	1,063	.	.	.	1,054	.	.	.	.	.	985.
Armenia	.	.	.	.	.	.	374	.	.	.	360	.	.	.
Azerbaijan	.	.	.	.	.	.	380	.	.	.	390	.	.	.
Bahamas	.	.	.	.	.	.	.	150	.	.	.	.	.	.
Bangladesh	.	.	.	.	1,504	.	.	.	250	.	1,442	.	.	.
Barbados	.	.	.	.	.	.	.	150	.	.	.	.	.	.
Belarus	.	.	.	.	.	273	.	.	.	.	360	.	.	.
Belize	.	.	.	.	.	.	.	150	.	.	.	.	.	.
Benin	.	197	.	.	.	.	150	.	.	.	.	.	.	150
Bhutan	.	.	.	.	.	.	250	.	.	.	.	.	253	.
Bolivia	.	.	.	613	.	.	.	362	.	.	.	.	.	.
Bosnia and Herzegovina	.	.	.	.	.	.	361	.	.	.	360	.	.	.
Botswana	.	.	.	342	.	.	.	268	.	.	.	.	.	.
Brazil	1,642	.	.	.	.	.	1,802	.	.	.	.	.	.	.
Bulgaria	.	.	.	.	1,015	.	288	.	.	.	293	.	.	.
Burkina Faso	.	.	.	139	.	.	394	.	.	.	.	.	.	.
Burundi	.	.	.	270	.	.	.	.	.	.	.	157	.	.
Cambodia	.	.	.	.	.	.	.	.	.	.	472	.	.	373
Cameroon	.	.	.	207	.	.	363	.	.	.	.	.	.	361
Cape Verde	.	.	.	98	.	.	156	.	.	.	.	.	.	.
Central African Republic	.	.	.	.	.	.	.	.	150	.	.	.	.	.
Chad	.	.	.	.	.	.	150	.	.	.	.	.	.	.
Chile	.	.	.	1,017	.	.	.	1,033	.	.	.	.	.	.
People's Republic China	.	.	.	.	.	.	.	.	.	2,700	.	.	.	.
Colombia	.	.	.	1,000	.	.	.	942	.	.	.	.	.	.
Congo	.	.	.	.	.	.	151	.	.	.	.	.	.	.
Costa Rica	.	.	.	.	.	.	.	538	.	.	.	.	.	.
Croatia	.	.	.	.	633	.	159	.	.	.	360	.	.	.
Czech Republic	.	.	.	.	.	.	250	.	.	.	254	.	.	.
Côte d'Ivoire	.	.	.	.	.	.	526	.	.	.	.	.	.	361
DRC	.	.	.	340	.	.	.	359	.	.	529	.	.	.
Djibouti	.	.	.	.	.	.	.	.	.	.	266	.	.	.
Dominica	.	.	.	.	.	.	.	150	.	.	.	.	.	.
Dominican Republic	.	.	.	.	.	.	.	360	.	.	.	.	.	359
Ecuador	453	.	.	658	.	.	.	366	.	.	.	.	.	.
Egypt	.	.	.	.	.	.	.	.	.	.	2,897	.	.	1,814
El Salvador	.	.	.	693	.	.	.	360	.	.	.	.	.	719
Eritrea	.	.	.	.	.	.	179	.	.	.	.	.	.	.
Estonia	.	.	.	.	.	.	273	.	.	.	273	.	.	.
Eswatini	.	.	.	307	.	.	.	.	.	.	.	.	.	150
Ethiopia	.	.	.	.	.	.	.	.	644	.	.	.	848	.
Fiji	.	.	.	.	.	.	164	.	.	.	.	.	.	.
FYR Macedonia	.	.	.	.	.	.	366	.	.	.	360	.	.	.
Gabon	.	.	.	.	.	.	179	.	.	.	.	.	.	.
Gambia	.	.	.	174	.	.	.	.	.	.	.	.	.	.
Georgia	.	.	.	.	.	373	.	.	.	.	360	.	.	.
Ghana	.	.	.	.	494	.	.	.	.	.	720	.	.	.
Grenada	.	.	.	.	.	.	.	153	.	.	.	.	.	.
Guatemala	.	.	.	522	.	.	.	590	.	.	.	.	.	.
Guinea	.	.	.	223	.	.	.	.	.	.	.	.	.	150
Guinea Bissau	.	.	.	159	.	.	.	.	.	.	.	.	.	.
Guyana	.	.	.	.	.	.	.	165	.	.	.	.	.	.
Honduras	450	.	.	436	.	.	.	360	.	.	.	.	.	332

Hungary	.	.	.	.	.	.	291	.	.	.	310	.	.	.
India	.	.	.	.	.	.	.	.	.	.	.	9,281	.	.
Indonesia	.	.	.	.	.	.	1,444	.	.	.	.	.	1,320	.
Iraq	.	.	.	.	.	.	.	.	756	.	.	.	.	.
Israel	.	.	.	.	.	.	.	.	.	.	483	.	.	.
Jamaica	.	.	.	.	.	.	.	376	.	.	.	.	.	.
Jordan	.	.	.	.	.	.	.	.	.	.	573	.	.	.
Kazakhstan	.	.	.	.	.	.	544	.	.	.	600	.	.	.
Kenya	.	.	.	.	657	.	.	.	.	.	781	.	.	.
Kosovo	.	.	.	.	.	.	270	.	.	.	202	.	.	.
Kyrgyz Republic	.	.	.	.	.	.	235	.	.	.	270	.	.	.
Lao PDR	.	.	.	.	.	.	360	.	.	379	.	.	.	368
Latvia	.	.	.	.	.	.	271	.	.	.	336	.	.	.
Lebanon	.	.	.	.	.	.	.	.	.	.	561	.	.	.
Lesotho	.	.	.	.	.	.	151	.	.	.	.	.	.	150
Liberia	.	.	.	.	.	.	150	.	.	.	.	.	.	.
Lithuania	.	.	.	.	.	.	276	.	.	.	270	.	.	.
Madagascar	.	.	.	.	.	.	445	.	.	.	532	.	.	.
Malawi	.	.	.	.	.	.	150	.	.	.	.	523	.	.
Malaysia	.	.	.	.	.	.	.	.	.	.	.	.	1,000	.
Mali	155	.	.	.	490	.	.	360	.	.	.	.	.	185
Mauritania	.	.	.	237	.	.	.	.	.	.	.	150	.	.
Mauritius	.	.	.	.	.	.	398	.	.	.	.	.	.	.
Mexico	.	.	.	1,480	.	.	.	1,480	.	.	.	.	.	.
Micronesia	.	.	.	.	.	.	68	.	.	.	.	.	.	.
Moldova	.	.	.	.	.	.	363	.	.	.	360	.	.	.
Mongolia	.	.	.	.	.	.	362	.	.	.	360	.	.	.
Montenegro	.	.	.	.	.	.	116	.	.	.	150	.	.	.
Morocco	.	.	.	.	.	.	.	.	.	.	407	.	.	.
Mozambique	.	.	.	.	479	.	.	.	.	.	.	.	.	.
Myanmar	.	.	.	.	.	.	.	.	.	.	.	632	.	607
Namibia	.	.	.	329	.	.	.	.	.	.	.	580	.	.
Nepal	.	.	.	.	.	.	368	.	.	.	482	.	.	.
Nicaragua	452	.	.	478	.	.	.	336	.	.	.	.	.	333
Niger	.	.	125	.	.	.	150	.	.	.	.	.	.	.
Nigeria	.	.	.	.	1,891	.	3,157	.	.	.	.	2,676	.	.
Pakistan	.	.	.	.	935	.	.	.	.	.	1,247	.	.	.
Panama	.	.	.	604	.	.	.	365	.	.	.	.	.	.
Papua New Guinea	.	.	.	.	.	.	.	.	.	.	.	.	65	.
Paraguay	.	.	.	613	.	.	.	361	.	.	.	.	.	.
Peru	.	.	.	632	.	.	.	1,000	.	.	.	.	.	.
Philippines	.	.	.	.	.	.	1,326	.	.	.	.	.	1,335	.
Poland	.	.	.	.	.	.	455	.	.	.	542	.	.	.
Romania	.	.	.	.	.	.	541	.	.	.	540	.	.	.
Russian Federation	.	.	.	.	.	.	1,004	.	.	4,220	.	.	.	.
Rwanda	.	.	.	212	.	.	.	.	241	.	.	.	.	.
Samoa	.	.	.	.	.	.	109	.	.	.	.	.	.	.
Senegal	.	.	.	.	506	.	.	.	.	.	.	601	.	.
Serbia	.	.	.	.	.	.	388	.	.	.	360	.	.	.
Sierra Leone	.	.	.	.	.	.	150	.	.	.	.	.	.	.
Slovak Republic	.	.	.	.	.	.	275	.	.	.	268	.	.	.
Slovenia	.	.	.	.	.	.	276	.	.	.	270	.	.	.
Solomon Islands	.	.	.	.	.	.	.	.	.	.	.	.	151	.
South Africa	603	.	.	.	937	.	.	.	.	.	.	.	.	.
South Sudan	.	.	.	.	.	.	.	.	.	.	.	738	.	.
Sri Lanka	.	.	.	.	.	.	.	.	610	.	.	.	.	.
St. Kitts and Nevis	.	.	.	.	.	.	.	150	.	.	.	.	.	.
St. Lucia	.	.	.	.	.	.	.	150	.	.	.	.	.	.
St. Vincent and the Grenadines	.	.	.	.	.	.	.	154	.	.	.	.	.	.
Sudan	.	.	.	.	.	.	.	.	.	.	.	662	.	.
Suriname	.	.	.	.	.	.	.	152	.	.	.	.	.	.
Sweden	.	.	.	.	.	.	.	.	.	.	.	600	.	.

Tajikistan	.	.	.	.	.	360	.	.	.	.	359	.	.	.
Tanzania	.	.	.	419	.	.	.	.	.	.	813	.	.	.
Thailand	.	.	.	.	.	.	.	.	.	.	.	.	.	1,000
Timor-Leste	.	.	.	.	.	.	150	.	.	.	.	.	126	.
Togo	.	.	.	.	.	.	155	.	.	.	.	.	.	150
Tonga	.	.	.	.	.	.	150	.	.	.	.	.	.	.
Trinidad and Tobago	.	.	.	.	.	.	.	370	.	.	.	.	.	.
Tunisia	.	.	.	.	.	.	.	.	.	.	592	.	.	.
Turkey	.	.	.	.	.	1,152	.	.	.	.	1,344	.	.	.
Uganda	.	.	.	563	.	.	.	.	.	.	762	.	.	.
Ukraine	.	.	.	.	.	851	.	.	.	.	1,002	.	.	.
Uruguay	.	.	.	621	.	.	.	607	.	.	.	.	.	.
Uzbekistan	.	.	.	.	.	366	.	.	.	.	390	.	.	.
Vanuatu	.	.	.	.	.	.	128	.	.	.	.	.	.	.
Venezuela	.	.	.	120	.	.	.	320	.	.	.	.	.	.
Viet Nam	.	.	1,150	.	.	.	1,053	.	.	.	.	.	996	.
West Bank and Gaza	.	.	.	.	.	.	.	.	.	.	434	.	.	.
Yemen	.	.	.	.	.	.	.	477	.	.	353	.	.	.
Zambia	.	.	.	.	484	.	.	.	.	.	720	.	.	.
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	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		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														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

ONLINE 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

Chinese projects	WBES Categorise
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 B2: 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
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: Summary statistics and variable definition

Table C1: Definition and Sources

Variable	Description	Source	Unit
FIRM			
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	
REGIONAL			
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 *et al.* (2020)	
Tot Amount Chinese project	Amount of total Chinese projects	Own elaboration from AidData (see Bluhm *et al.* (2020)	Log
pc(ODA)_*	Number of Chinese ODA projects in the ADM1, two years before	Own elaboration from AidData (see Bluhm *et al.* (2020)	
pac(ODA)_*	Amount of Chinese ODA projects in the ADM1, two years before, millions of US$	Own elaboration from AidData (see Bluhm *et al.* (2020)	Log

pc(regional/sectoral)_*	Number of Chinese regional/sectoral projects in the ADM1, two years before	Own elaboration from AidData (see Bluhm *et al.* (2020)	
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 *et al.* (2020)	Log
IV			
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 *et al.* (2021a) 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 anADM1 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 anADM1 region received at least one IDA sectoral/regional project.	Own calculation	

Table C2: Summary statistics

Variable	N	Mean	SD	Min	Max
FIRM CHARACTERISTICS					
Sales growth	60480	0.11	0.45	-8.53	2.57
Log Sales (base year)	60480	16.83	3.27	5.50	37.24
State	60480	0.01	0.12	0	1
Foreign	60480	0.12	0.33	0	1
Export	60480	0.22	0.41	0	1
Size	60480	1.72	0.76	1	3
Overdraft	45912	0.40	0.49	0	1
Access to finance	44355	3.44	1.33	1	5
Quality certification	45912	0.21	0.40	0	1
Checking/saving account	45912	0.87	0.34	0	1
Financial statements certified by external auditor	45912	0.51	0.50	0	1
Electricity	45906	3.21	1.50	1	5
Transport	45855	3.70	1.28	1	5
Political stability	45696	3.27	1.47	1	5
(lack of) crime, theft and disorder	45612	3.27	1.47	1	5
(lack of) corruption	45883	3.19	1.50	1	5
REGIONAL VARIABLES					
Log regional population	60480	14.68	1.45	7.81	18.35
Log regional GDP	60480	9.39	1.65	-0.76	13.19
WB projects					
Number Total	60480	0.94	1.30	0	8
Amount of WB projects (log)	60480	2.33	2.54	0	8.17
Total # IBRD projects	60480	0.31	0.76	0	8
Amount IBRD projects (log)	60480	1.06	2.15	0	8.17
Total # IDA projects	60480	0.64	1.21	0	7
Amount IDA projects (log)	60480	1.37	2.15	0	7.81
Total # of sectoral WB projects	60480	0.37	0.65	0	4
Total # of regional WB projects	60480	0.56	1.01	0	6
Amount of sectoral WB projects (log)	60480	1.30	2.10	0	7.17
Amount of regional WB projects (log)	60480	1.56	2.28	0	8.12
China ODA Projects					
Total # CHN ODA projects	60480	0.40	1.20	0	11
Amount of CHN ODA projects (log)	60480	2.25	5.66	0	21.95
Total # of sectoral CHN ODA projects	60480	0.11	0.61	0	8
Total # of regional CHN ODA projects	60480	0.29	0.82	0	10
Amount of sectoral CHN ODA projects (log)	60480	0.57	3.18	0	21.95
Amount of regional CHN ODA projects (log)	60480	1.90	5.14	0	19.08

Notes: These summary statistics refer to the OLS specification with region fixed effects

Table C3: Frequency of World Bank investment and development policy lending projects (percent)

	Development Policy Lending	Investment projects	Total
Regional projects	3.5	96.5	100
Sectoral projects	0.6	99.4	100
	2	98	100

Table C4: Description of the Channels

CREDIT (Reputations and actual constraint)
Firm has an overdraft facility (Yes / No)
Access to finance
Has internationally-recognized quality certification (Yes /No)
Firm has a checking and\or saving account (Yes /No)
Financial statements checked & certified by External auditor (Yes /No)
DUTCH DISEASE
Exports goods (Yes/No)
INFRASTRUCTURE
Electricity
Transport
CORRUPTION
(Lack of) Political instability
(Lack of) Crime, theft and disorder
(Lack of) Corruption

Figure C1: World Bank IBRD and IDA projects by region

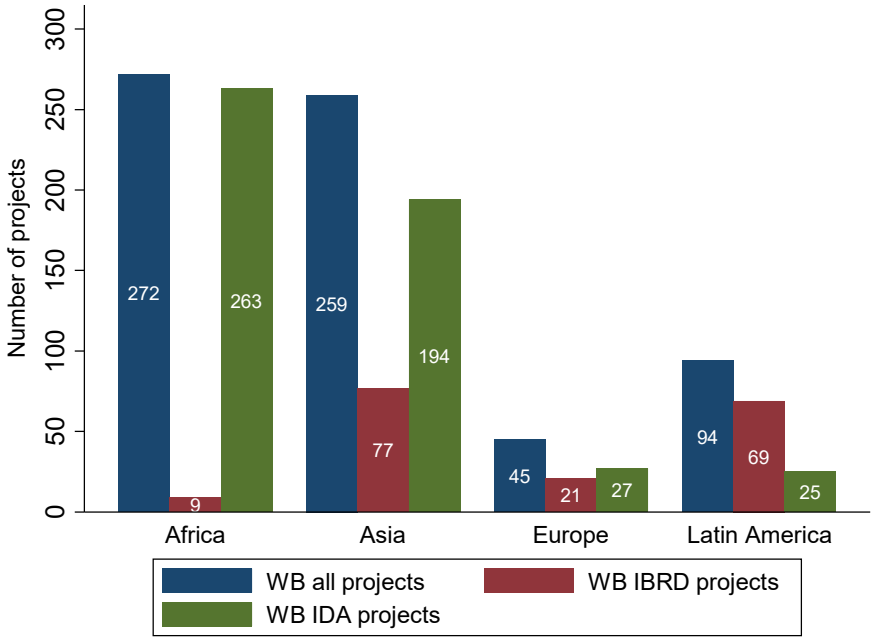


Figure C2: Chinese ODA and OOF projects by region

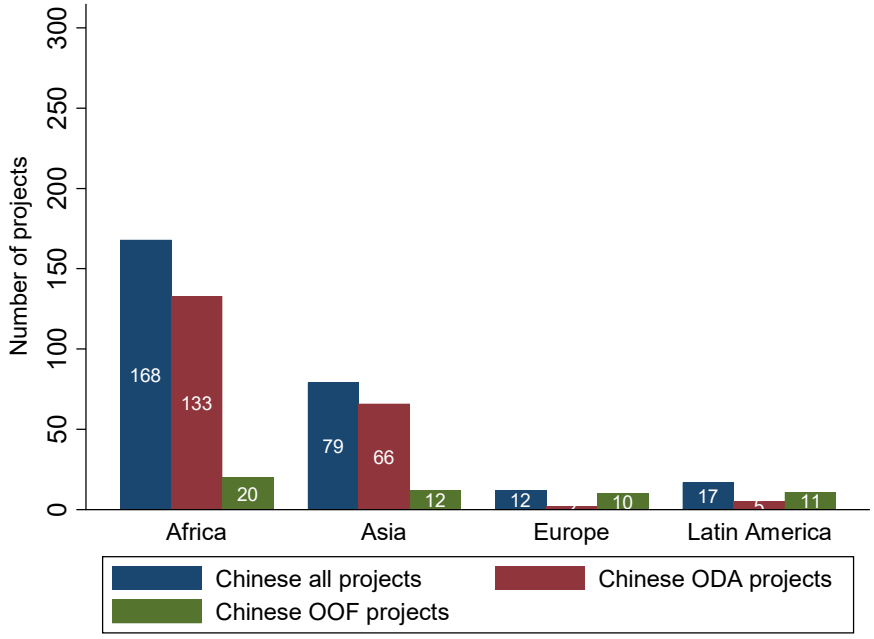


Figure C3: World Bank projects by region and sector

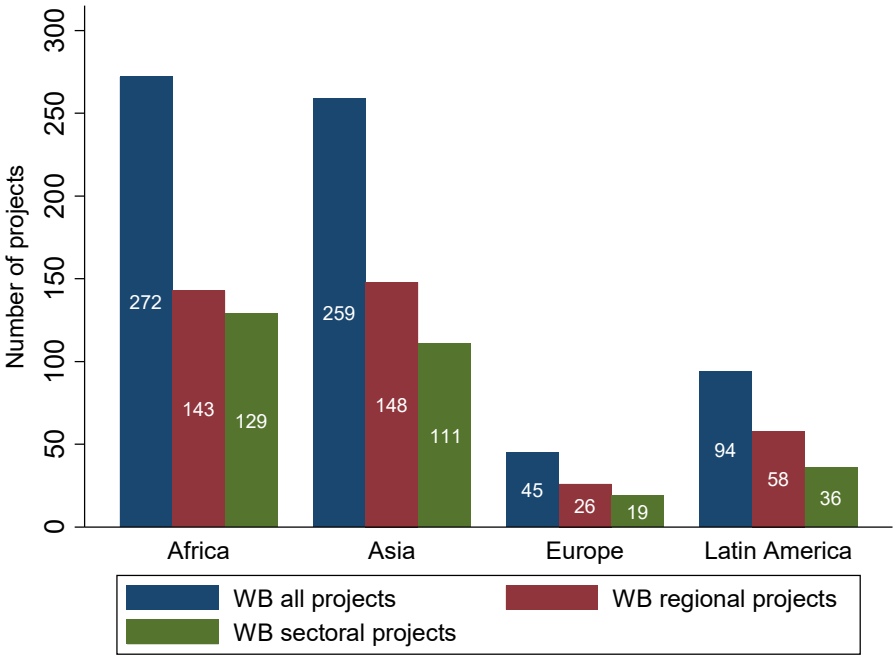


Figure C4: Chinese ODA projects by region and sector

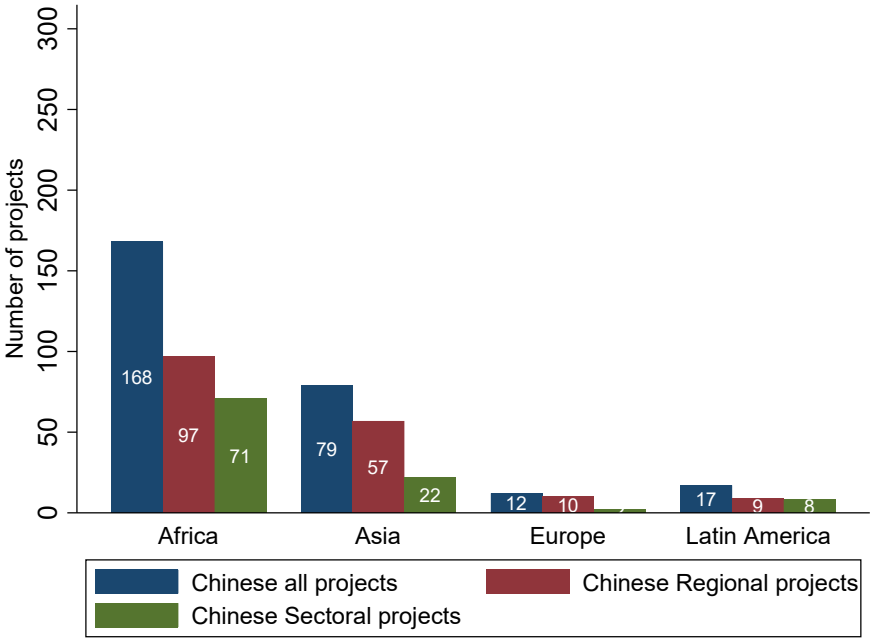


Figure C5: World Bank and Chinese number of project by region

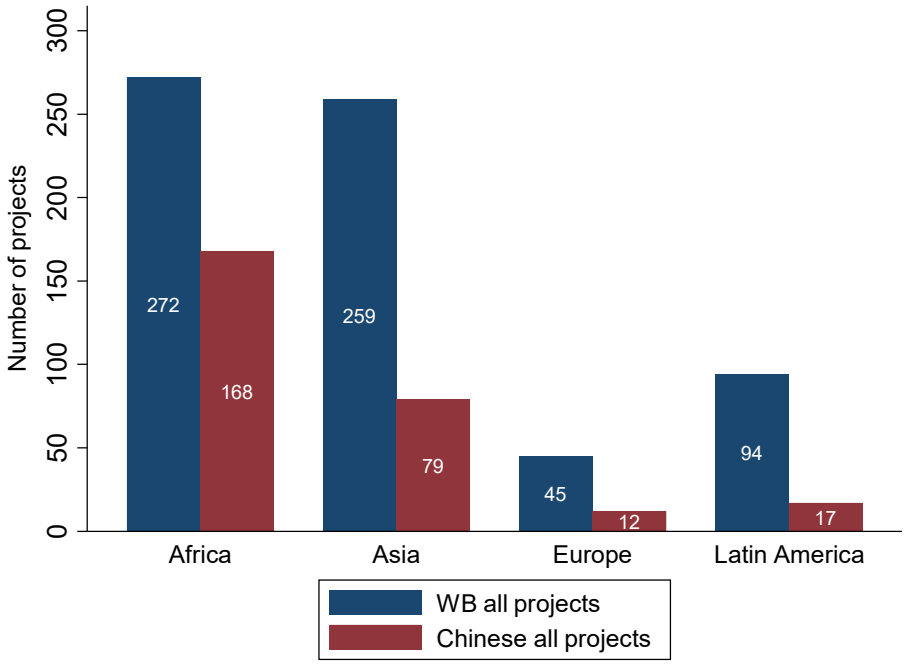


Figure C6: World Bank and Chinese project amounts (in million UD$) by region

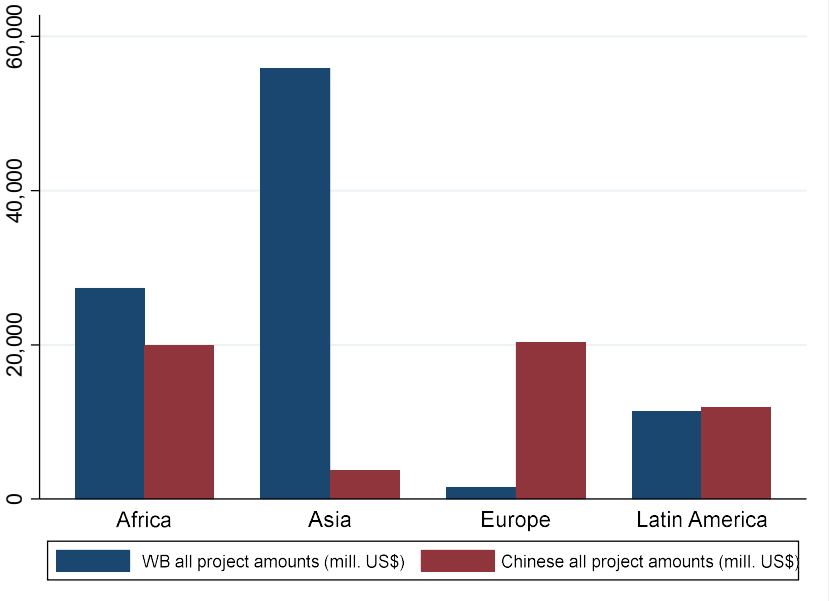


Figure C7: Chinese total number of project by industrial sector

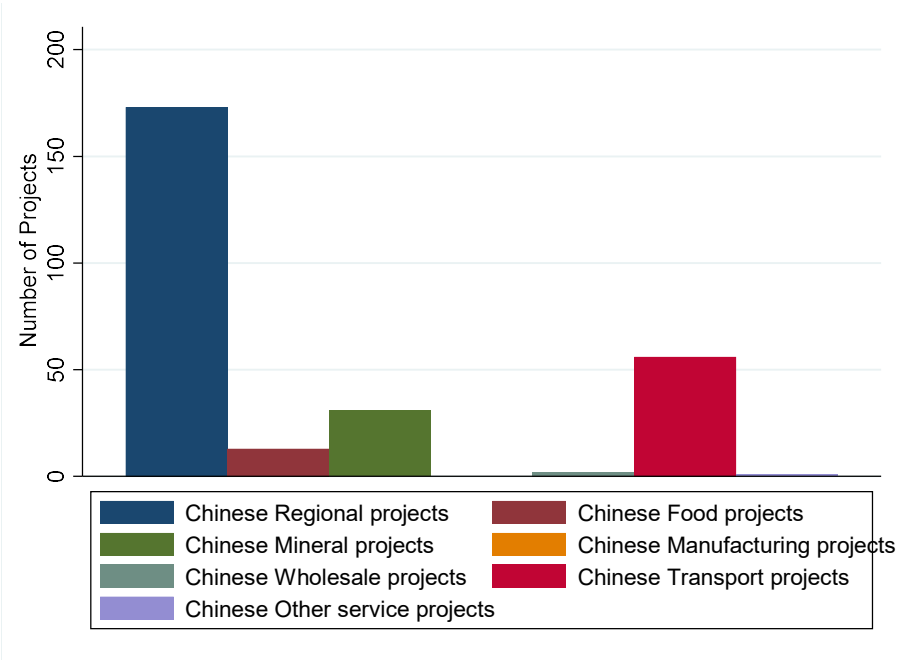


Figure C8: Chinese total project amounts (in million UD$) by industrial sector

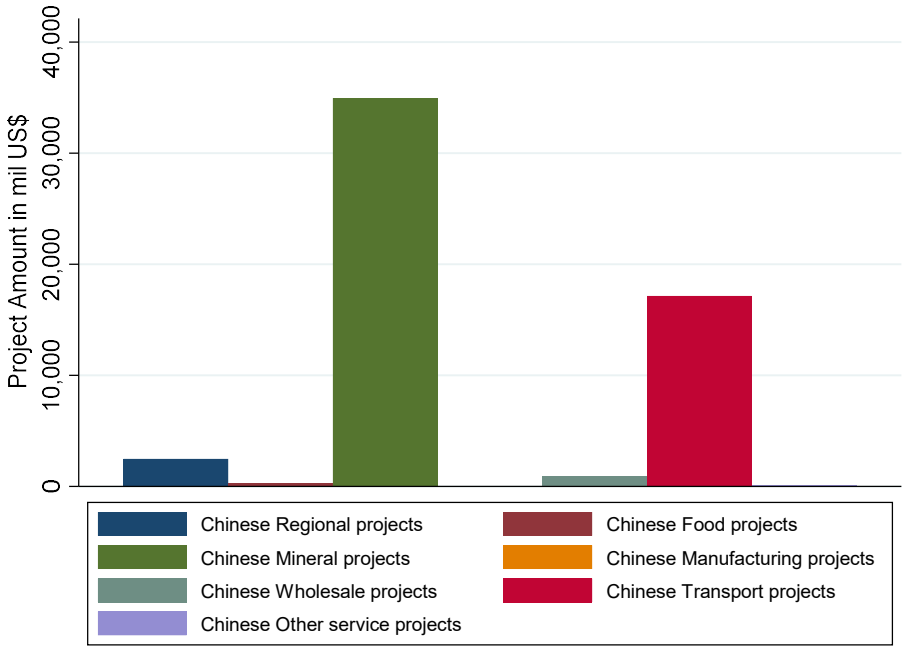


Figure C9: Distribution of sales by sectors

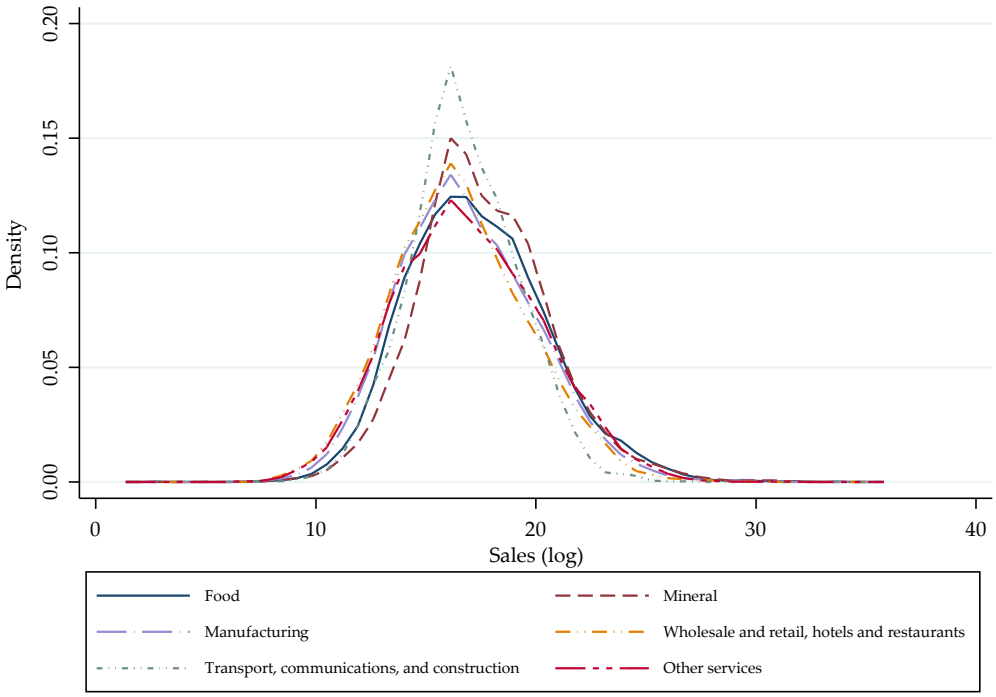
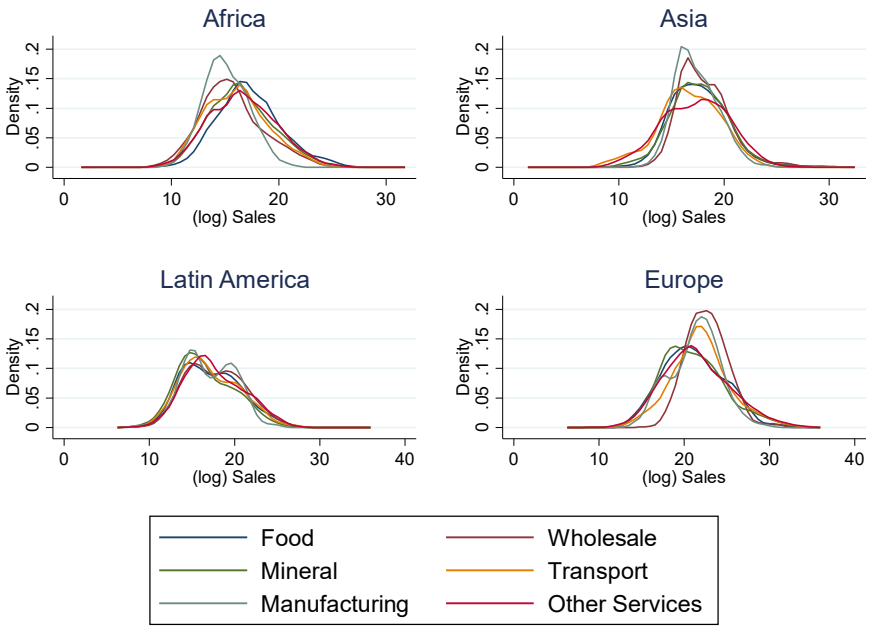


Figure C10: Distribution of sales by sectors and regions



ONLINE APPENDIX D: Identification

Table D1: Underlying trends (World Bank projects): Global GDP growth and Chinese aid

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS FE	2SLS	2SLS FE	2SLS	2SLS FE
Total # WB projects	-0.058	-0.122*	-0.044	-0.073**	-0.062	-0.123*
	(-1.192)	(-1.831)	(-1.593)	(-2.163)	(-1.250)	(-1.891)
Probability of an IBRD project	0.216	0.397	0.271*	0.551**	0.142	0.395
	(1.104)	(1.056)	(1.787)	(2.019)	(0.722)	(1.061)
Probability of an IDA project	-0.180	-0.284	-0.056	0.116	-0.264	-0.280
	(-0.785)	(-0.621)	(-0.240)	(0.327)	(-1.023)	(-0.608)
Global GDP x World Bank Probability	0.065	0.187			0.081	0.189
	(0.637)	(1.143)			(0.772)	(1.180)
Chinese ODA projects			0.026**	0.001	0.024*	-0.001
			(2.040)	(0.048)	(1.847)	(-0.065)
Observations	60,480	6,893	60,480	6,893	60,480	6,893
R-squared	0.125	0.125	0.128	0.159	0.127	0.124
Region FE	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES
Industry x year FE	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)	0.049	0.012	0.012	0.003	0.052	0.013
Panel observations		3,365		3,365		3,365

Notes: Standard errors are clustered at the regional level. t-statistics are reported in parentheses; *, ** and *** denote significance levels at 10%, 5% and 1%, respectively. Columns (1)-(2) control for the global GDP growth, interacted with the share of years, between 2000 and 2014, that region *h* received World Bank (i.e. IBRD or IDA) aid). Column (3)-(4) control for Chinese ODA projects, while columns (5)-(6) control for both.

Table D2: Underlying trends (Chinese ODA projects): Chinese FDI, Trade and World Bank aid

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS FE	2SLS	2SLS FE	2SLS	2SLS FE
Total number of Chinese ODA	0.031***	0.048***	0.055***	0.119***	0.030***	0.044**
	(2.597)	(2.670)	(3.003)	(2.874)	(2.616)	(2.277)
Probability of a Chinese ODA project	0.459*	0.213	-0.499	-1.540**	0.459*	0.199
	(1.808)	(0.696)	(-1.575)	(-2.550)	(1.859)	(0.621)
Trade x Probability	-0.0001	-0.0001**			-0.0001	-0.0001
	(-0.032)	(-2.239)			(-0.507)	(-1.437)
Foreign Direct Investment x	0.002*	0.002			0.002**	0.003*
Probability	(1.935)	(1.398)			(2.080)	(1.846)
World Bank projects			-0.025***	-0.024*	-0.015	0.042*
			(-2.713)	(-1.848)	(-1.480)	(1.888)
Observations	34,765	2,334	60,480	6,893	34,765	2,334
R-squared	0.131	0.166	0.128	0.152	0.131	0.169
Region FE	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES
Industry x year FE	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)	0.022	0.045	0.009	0.003	0.023	0.041
Panel observations		1,167		3,365		1,167

Notes: Standard errors are clustered at the regional level. t-statistics are reported in parentheses; *, ** and *** denote significance levels at 10%, 5% and 1%, respectively. Columns (1)-(2) 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. Column (3)-(4) control for World Bank projects, while columns (5)-(6) control for both.

Table D3: Additional IV: Chinese steel and reserves

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total number of Chinese ODA	0.031**	0.058***	0.001	0.119***				
	(2.194)	(3.154)	(0.056)	(2.932)				
Log total amount of Chinese ODA				0.004	0.022**	0.002	0.032**	0.004
				(1.021)	(2.225)	(0.704)	(1.969)	(1.021)
Probability of a Chinese ODA project	-0.498		-1.493**		-1.021**		-2.099**	-0.498
	(-1.529)		(-2.406)		(-2.025)		(-2.485)	(-1.529)
Constant	4.901		0.824		1.430		0.630	
	(0.678)		(0.106)		(0.404)		(0.080)	
Observations	60,480	60,480	6,893	6,893	60,480	60,480	6,893	6,893
R-squared	0.222	0.127	0.242	0.149	0.220	0.117	0.242	0.131
Region FE	YES	NO	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES	NO	YES
Industry x year FE	YES	YES	YES	YES	YES	YES	YES	YES
Kleibergen-Paap LM stat (p-value)		0.0293		0.0129		0.0397		0.1952
Panel observations			3,365	3,365			3,365	3,365

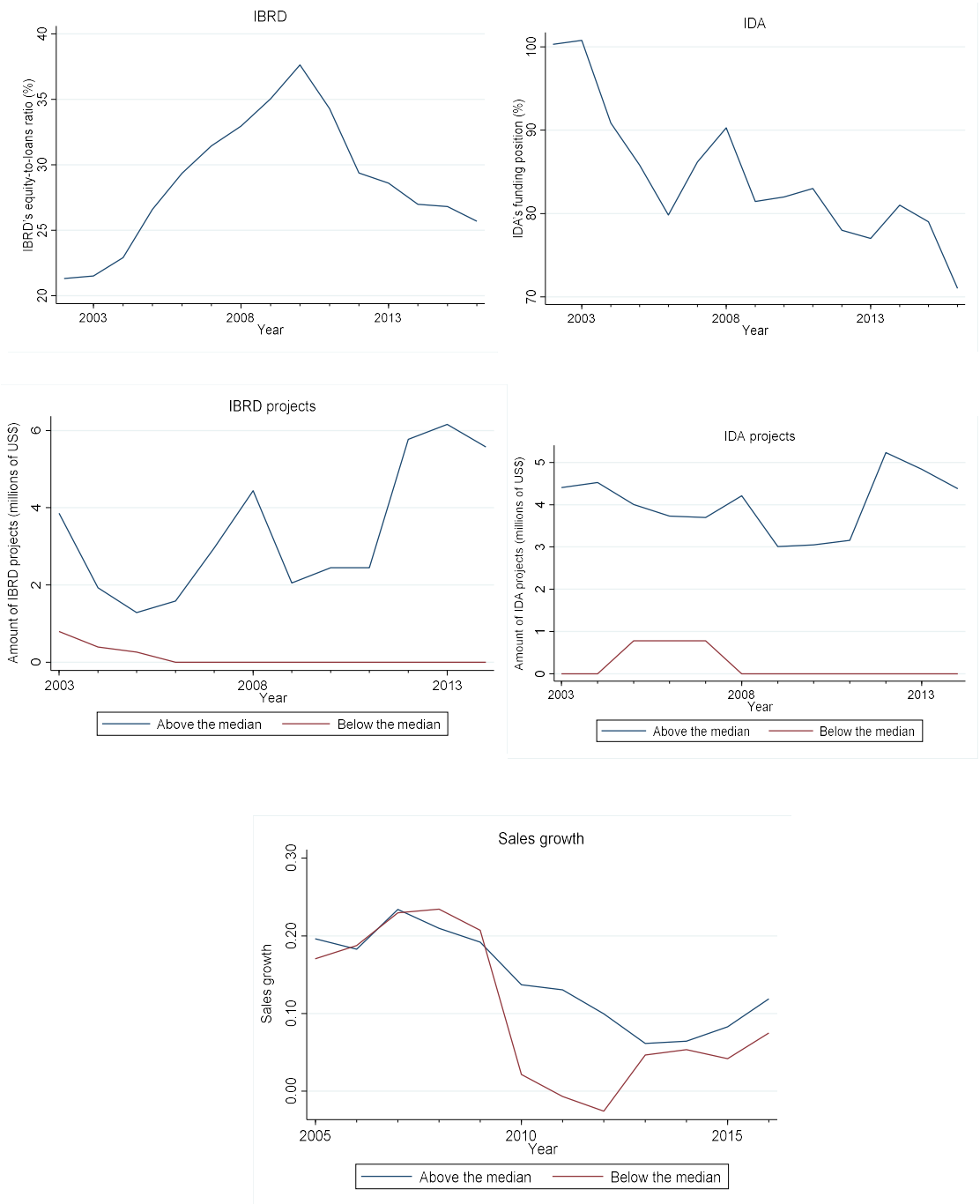
Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. In all specification throughout columns (1)-(8) we use the net change in China's holdings of international reserves as an additional instrument. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table D4: Additional IV: Chinese Reserves and Chinese ODA, by industrial sector

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV
	Aid = total # of Chinese projects		Aid = Log amount of Chinese Aid	
Panel A: Food				
Aid	0.035***	0.016	0.007**	0.005
	(8.277)	(1.273)	(2.217)	(0.990)
Observations	5,609	5,609	5,609	5,609
R-squared	0.271	0.108	0.268	0.106
Kleibergen-Paap LM stat (p-value)		0.0762		0.0362
Panel B: Mineral				
Aid	-0.040**	-0.052*	-0.014	-0.032***
	(-2.042)	(-1.681)	(-1.603)	(-3.361)
Observations	5,045	5,045	5,045	5,045
R-squared	0.263	0.129	0.265	0.132
Kleibergen-Paap LM stat (p-value)		0.0770		0.1118
Panel C: Manufacturing				
Aid	0.038**	0.058**	0.006	0.023*
	(2.167)	(2.440)	(1.170)	(1.807)
Observations	23,620	23,620	23,620	23,620
R-squared	0.234	0.147	0.231	0.137
Kleibergen-Paap LM stat (p-value)		0.0432		0.0506
Panel D: Wholesale				
Aid	0.030	0.047	0.002	0.036
	(1.602)	(1.461)	(0.478)	(1.520)
Observations	10,735	10,735	10,735	10,735
R-squared	0.272	0.131	0.270	0.094
Kleibergen-Paap LM stat (p-value)		0.0506		0.2189
Panel E: Transport				
Aid	-0.548***		-0.054***	
	(-22.712)		(-22.712)	
Observations	1,796		1,796	
R-squared	0.303		0.303	
Kleibergen-Paap LM stat (p-value)				
Panel F: Other services				
Aid	0.009	0.074***	0.001	0.032**
	(0.632)	(3.030)	(0.265)	(2.291)
Observations	13,675	13,675	13,675	13,675
R-squared	0.245	0.110	0.245	0.095
Kleibergen-Paap LM stat (p-value)		0.0290		0.0519

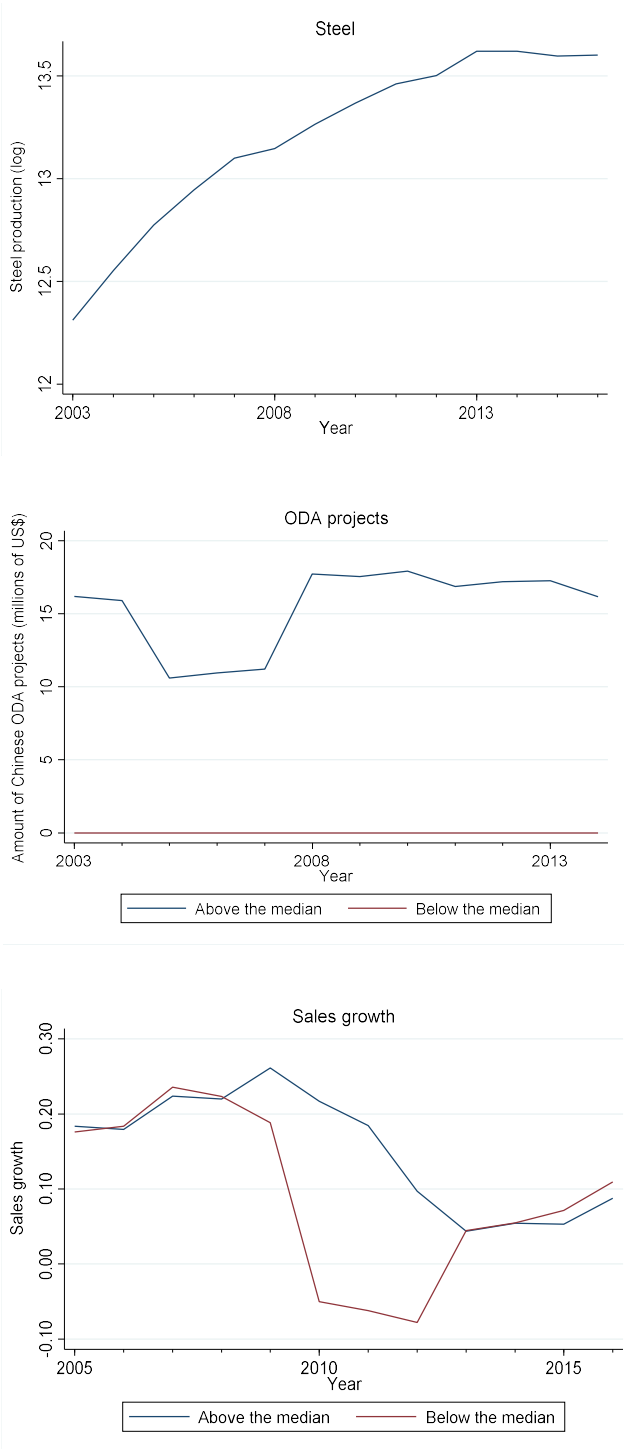
Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Columns 3-4 use the same estimators as in columns 1-2, but the variable of interest is log of aid committed amount. IV regressions for the panel sample of Transport firms (Chinese ODA, columns 6 and 8) could not be performed due to insufficient observations. In fact, the number of firms belonging to the transport sector is the smallest in this sample (about 4.8 percent, as shown in Table A1). All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Figure D1: Parallel trends, IBRD and IDA funding positions and World Bank projects



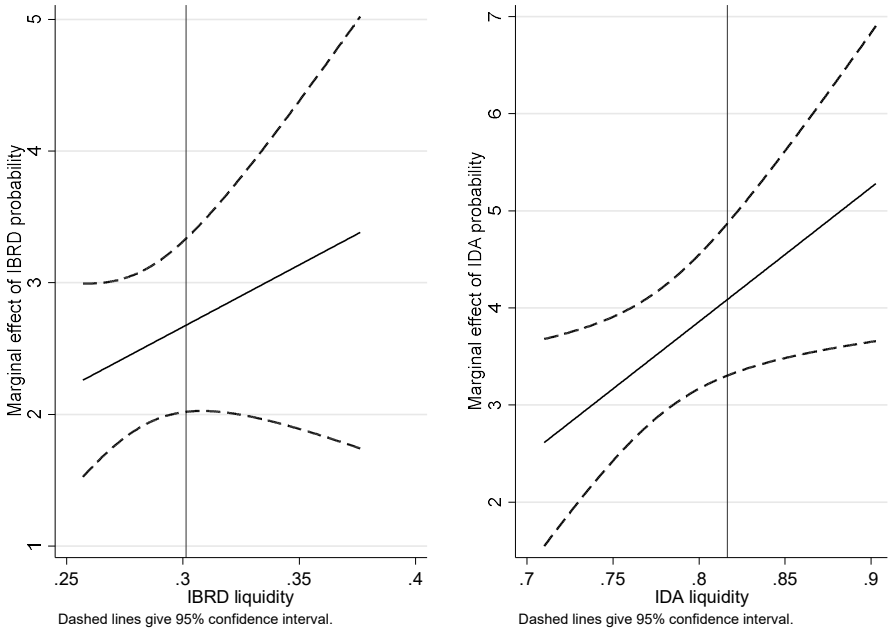
Notes: Panel A shows IBRD's equity to loans ration in percent over time. Panel B shows IDA's funding position in percent over time. Panel C shows the three-year average amount of IBRD projects within the group of regions (ADM1) that is above the median of the probability of receiving IBRD projects, and the group that is below the median over time. The averages are calculated using observations from the sample of Column 2, panel A, in Table 2. Panel D shows the three-year average amount of IDA projects within the group of regions which is above the median of the probability of receiving IDA projects, and the group that is below the median over time. Averages are built using observations from the sample of Column 2, panel B, in Table 2. Panel E shows the three-year average sales growth rate within the group of regions that is above the median of the probability of receiving either an IBRD or an IDA project, and the group that is below the median over time. Averages are calculated using observations from the sample of Column 2 in Table 1.

Figure D2: Parallel trends, Chinese steel and Chinese ODA



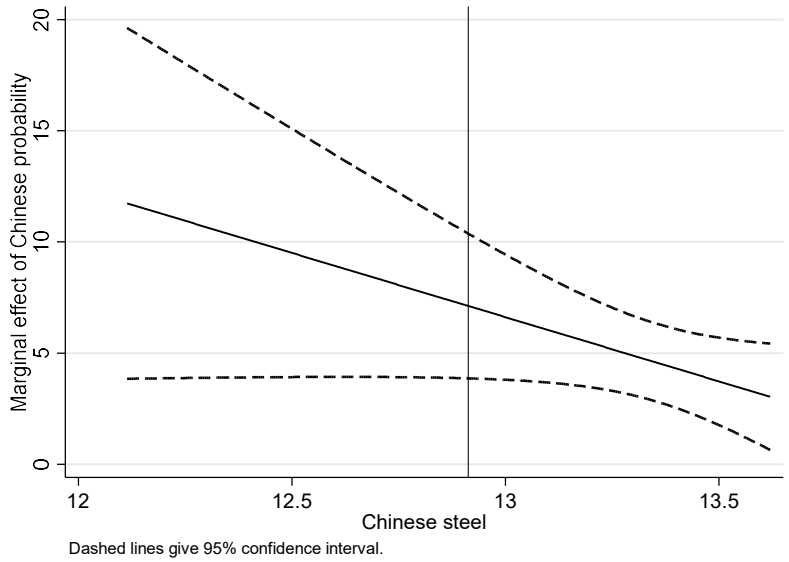
Notes: Panel A shows China's logged production of steel over time. Panel B shows the three-year average amount of ODA projects within the group of regions (ADM1) which is above the median of the probability of receiving projects, and the group that is below the median over time. Panel C shows the three-year average sales growth rate within these two groups over time. The averages are calculated using observations from the sample of Column 2, in Table 3.

Figure D3: First stage marginal effects, World Bank IBRD and IDA funding position



Notes: Marginal effects of share of past years under IBRD and IDA projects on current participation in IBRD and IDA projects, for differing levels of IBRD and IDA liquidity in a given year. Corresponds to regression of Column 1, in Table 1. Dotted lines show 95% confidence interval.

Figure D4: First stage marginal effects, Chinese steel



Notes: Marginal effects of share of past years under Chinese ODA projects on current participation in Chinese ODA projects, for differing levels of steel production in a given year. Corresponds to regression of Column 1, in Table 4. Dotted lines show 95% confidence interval.

ONLINE APPENDIX E: Alternative specifications

Table E1: Jobs, World Bank and Chinese ODA aid

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: World Bank								
Total # of WB projects	-0.004	-0.018	0.002	-0.029**				
	(-1.048)	(-1.610)	(0.507)	(-2.034)				
Log amount of WB projects					0.001	-0.013	0.003	-0.017*
					(0.386)	(-1.511)	(1.112)	(-1.665)
Probability of an IBRD project		0.089		0.200*		0.191		0.280*
		(1.049)		(1.776)		(1.507)		(1.903)
Probability of an IDA project		0.141*		0.240***		0.157*		0.251***
		(1.848)		(3.263)		(1.720)		(2.898)
First stage								
IBRD x Probability		26.953*		56.078**		32.257		55.371**
p-value		(0.078)		(0.004)		(0.106)		(0.036)
IDA x Probability		25.390***		21.603***		34.636**		35.227***
p-value		(0.000)		(0.006)		(0.036)		(0.000)
Observations	59,995	59,995	6,807	6,807	59,995	59,995	6,807	6,807
R-squared	0.086	0.016	0.112	0.020	0.086	0.015	0.112	0.021
Kleibergen-Paap LM stat (p-value)		0.0106		0.0036		0.0022		0.0040
Panel observations			3,324	3,324			3,324	3,324
Total # of Chinese ODA	0.010***	0.008**	0.004	0.004				
	(4.193)	(2.008)	(1.136)	(0.384)				
Log total amount of Chinese ODA					0.002**	0.003	0.000	0.001
					(2.152)	(1.600)	(0.252)	(0.379)
Probability of an Chinese ODA		0.039		-0.030		-0.044		-0.050
		(0.682)		(-0.212)		(-0.389)		(-0.257)
First stage								
Steel amount x Probability		-19.244		-10.491		-50.667		-39.114
p-value		(0.000)		(0.000)		(0.000)		(0.051)
Observations	59,995	59,995	6,807	6,807	59,995	59,995	6,807	6,807
R-squared	0.087	0.018	0.112	0.035	0.087	0.017	0.112	0.035
Kleibergen-Paap LM stat (p-value)		0.0093		0.0029		0.0150		0.0897
Panel observations			3,324	3,324			3,324	3,324

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table E2: The Channels, firm sales growth, the Chinese ODA aid (control function approach)

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 Amount of Chinese ODA	0.003	0.006	0.004	0.002	0.003	-0.005	0.009*	0.004	-0.001	0.001	0.005
	(0.786)	(1.020)	(1.067)	(0.495)	(0.724)	(-1.038)	(1.821)	(0.785)	(-0.192)	(0.182)	(0.930)
Total Amount of Chinese ODA × CHANNEL	0.004	-0.000	0.003	0.003	0.004**	0.000	-0.001**	0.000	0.002	0.001	-0.000
	(1.286)	(-0.312)	(0.844)	(0.646)	(1.999)	(0.173)	(-2.100)	(0.087)	(1.328)	(0.814)	(-0.142)
CHANNEL	0.006	0.004	-0.040	0.016	0.013	0.039*	0.000	-0.008	-0.003	-0.008	-0.004
	(0.292)	(0.486)	(-1.231)	(0.446)	(0.654)	(1.703)	(0.062)	(-1.078)	(-0.371)	(-1.080)	(-0.681)
1st Stage Residuals	0.002	0.003	0.003	0.003	0.003	0.013**	0.003	0.003	0.003	0.003	0.003
	(0.547)	(0.683)	(0.566)	(0.613)	(0.670)	(2.233)	(0.624)	(0.662)	(0.708)	(0.734)	(0.642)
Constant	-0.097	0.383	0.311	0.560	0.411	1.289	0.514	0.476	1.404	0.822	0.388
	(-0.019)	(0.071)	(0.060)	(0.110)	(0.079)	(0.175)	(0.098)	(0.090)	(0.263)	(0.156)	(0.074)
Observations	7,107	6,955	7,107	7,107	7,107	9,192	7,107	7,107	7,001	7,107	7,107
R-squared	0.277	0.284	0.277	0.276	0.277	0.249	0.277	0.276	0.275	0.276	0.276
Panel observations	4,759	4,669	4,759	4,759	4,759	5,664	4,759	4,759	4,749	4,759	4,759

Notes. Differential effects of Chinese ODA projects on average firm sales growth. Regressions are run using an OLS fixed-effect estimator, correcting for endogeneity bias with control function approach (Woolridge, 2015). Columns are sorted according to channel considered, through interactions with firm-specific characteristics. All specifications include industry-year dummies and firm and regional level controls. Standard errors are clustered at the country level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

ONLINE APPENDIX F: Sample dependence

Table F1: Firm sales growth, World Bank and Chinese ODA aid, full sample (including countries with conflict)

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: World Bank								
Total # of WB projects	-0.028**	-0.061	-0.014	-0.128				
	(-2.399)	(-1.407)	(-1.311)	(-1.482)				
Log amount of WB projects					-0.005	-0.040	-0.001	-0.072
					(-0.974)	(-1.621)	(-0.072)	(-1.567)
Probability of an IBRD project		0.258		0.667		0.633*		1.161*
		(1.620)		(1.529)		(1.844)		(1.716)
Probability of an IDA project		0.176		0.368		0.219		0.365
		(0.678)		(0.720)		(0.836)		(0.799)
First stage								
IBRD x Probability		16.938		28.321		26.894		39.446
p-value		(0.329)		(0.234)		(0.104)		(0.152)
IDA x Probability		20.056***		14.795		30.747		30.103
p-value		(0.004)		(0.046)		(0.000)		(0.001)
Observations	67,204	67,204	8,039	8,039	67,204	67,204	8,039	8,039
R-squared	0.222	0.125	0.252	0.116	0.221	0.122	0.251	0.201
Kleibergen-Paap LM stat (p-value)		0.0553		0.0784		0.0019		0.0084
Panel observations			3,938	3,938			3,938	3,938
Total # of Chinese ODA	0.030**	0.053***	0.008	0.092***				
	(2.108)	(3.028)	(0.434)	(3.341)				
Log total amount of Chinese ODA					0.004	0.015**	0.003	0.019***
					(1.021)	(2.148)	(1.057)	(2.768)
Probability of a Chinese ODA project		-0.536**		-1.114***		-0.740***		-1.283***
		(-2.231)		(-2.618)		(-2.578)		(-2.852)
First stage								
Steel amount x Probability		-18.787		-12.667		-67.972		-1.2827
p-values		(0.000)		(0.000)		(0.000)		(0.004)
Observations	67,204	67,204	8,039	8,039	67,204	67,204	8,039	8,039
R-squared	0.223	0.129	0.251	0.171	0.221	0.124	0.252	0.173
Kleibergen-Paap LM stat (p-value)		0.0048		0.0009		0.0009		0.0116
Panel observations			3,938	3,938			3,938	3,938

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table F2: Firm sales growth, World Bank and IBRD projects (excluding Argentina)

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Panel A: World Bank project								
Total # WB projects	-0.029**	-0.013	-0.010	-0.068				
	(-1.968)	(-0.479)	(-0.889)	(-0.954)				
Log amount of WB projects					-0.001	-0.012	0.005	-0.047
					(-0.139)	(-0.616)	(0.575)	(-0.904)
Probability of an IBRD project		0.368		0.514		0.472		0.608
		(1.520)		(0.593)		(1.438)		(0.610)
Probability of an IDA project		-0.142		0.136		-0.110		0.183
		(-0.606)		(0.308)		(-0.434)		(0.397)
Observations	58,156	58,156	6,336	6,336	58,156	58,156	6,336	6,336
R-squared	0.216	0.125	0.240	0.156	0.215	0.124	0.240	0.140
Kleibergen-Paap LM stat (p-value)		0.046		0.023		0.006		0.014
Panel observations			3109	3109			3109	3109
Panel B: IBRD projects								
Total # IBRD projects	-0.003	0.042	0.034	0.179				
	(-0.141)	(0.379)	(0.668)	(0.971)				
Log amount of IBRD projects					0.004	0.060	0.025	0.108
					(0.511)	(0.297)	(1.624)	(0.882)
Probability of an IBRD project		-0.090		-0.751		-1.233		-2.274
		(-0.109)		(-0.738)		(-0.244)		(-0.732)
Observations	24,265	24,265	1,210	1,210	24,265	24,265	1,210	1,210
R-squared	0.277	0.125	0.340	0.109	0.277	0.124	0.344	0.106
Kleibergen-Paap LM stat (p-value)		0.046		0.023		0.006		0.006
Panel observations			605	605			605	605

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls and exclude Argentina among the sample of countries. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table F3: Firm sales growth and all Chinese projects

Dependent variable: Annual growth rate of sales	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Total number of Chinese projects	0.021	0.045*	0.004	0.085**				
	(1.386)	(1.687)	(0.267)	(2.481)				
Log total amount of Chinese projects					0.001	0.012	0.003	0.017**
					(0.276)	(1.414)	(1.208)	(2.208)
Probability of a Chinese project		-0.406**		-0.791**		-0.554*		-0.852**
		(-2.019)		(-2.330)		(-1.841)		(-2.536)
First stage								
Steel x Chinese Aid Probability		-11.121***		-10.165***		-40,639***		-50,358***
p-value		(0,000)		(0,000)		(0,004)		(0,001)
Observations	67,204	67,204	8,039	8,039	67,204	67,204	8,039	8,039
R-squared	0.222	0.127	0.251	0.158	0.221	0.121	0.252	0.166
Kleibergen-Paap LM stat (p-value)		0,003		0,003		0,030		0,015
Panel observations			3938	3938			3938	3938

Notes: Column 1 uses an OLS estimator with region dummies. Column 2 uses an IV estimator with region dummies. Column 3 uses the within estimator with firm fixed effects. Column 4 uses an IV estimator with firm fixed effect. Columns 5-8 use the same estimators as in columns 1-4, but the variable of interest is log of committed aid. All models include industry-year dummies and firm and regional level controls. Kleibergen-Paap p-values are for the underidentification LM test. Standard errors are clustered at the regional level. t-statistics in parenthesis, ***p<0.01, **<p0.05, *p<0.1.

Table F4: Randomization of firms

	World Bank aid				Chinese aid			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total number		Amount		Total number		Amount	
Coefficient of aid, 500 replications:								
Mean	-0.054	-0.094	-0.027	-0.042	0.048	0.114	0.019	0.064
Standard deviation	0.004	0.025	0.003	0.017	0.004	0.024	0.002	0.016
Percent not significant	0.2	85.8	85.2	100	4.8	13	41.8	88.6
Number of firms randomly drawn	250	50	250	50	250	50	250	50
Region FE	YES	NO	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES	NO	YES
Industry x year FE	YES	YES	YES	YES	YES	YES	YES	YES

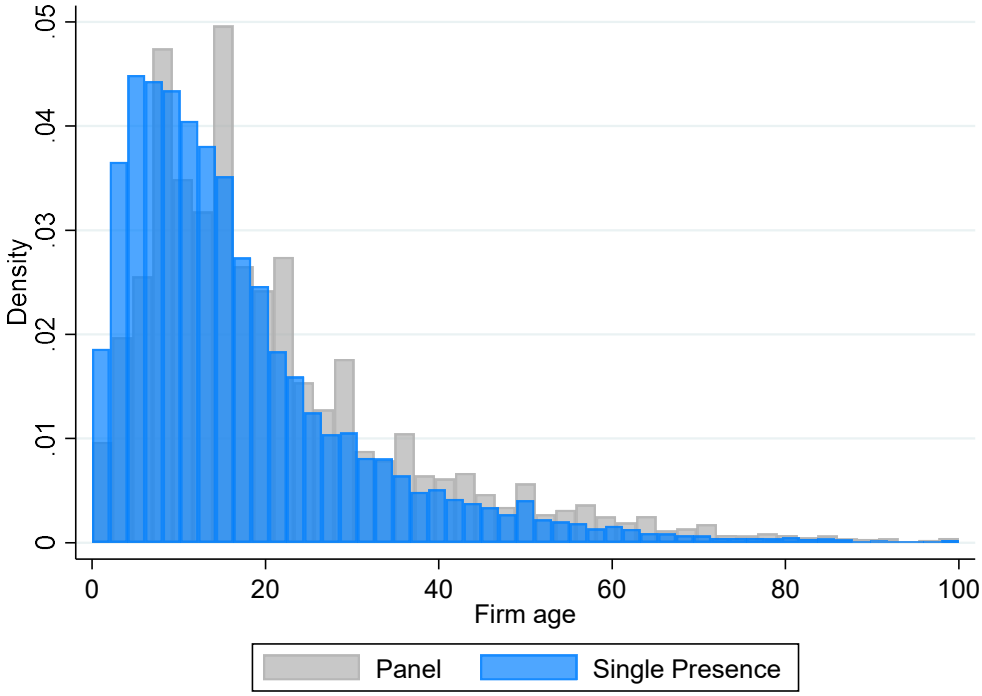
Notes: Randomization strategies for firm sample in regressions. Columns 1-4 present the results for World Bank aid, while columns 5-8 present the results for Chinese aid. In Columns (1), (2), (5) and (6) the variable of interest is the total number of aid projects. Columns 3, 4, 7 and 8 show the result for the total amount of aid projects. Estimations are all run using IV. Standard errors are clustered at the regional level. Different columns represent different randomization strategies. "Mean" represents the average second stage coefficient for World Bank and Chinese ODA projects on firm sales growth for 500 regressions with random sampling (without replacement). Columns (1), (3), (5) and (7) show the results for a 2SLS estimator in a sample of pooled firms, whereas columns (2), (4), (6) and (8) show the results for a 2SLS estimator with firm fixed effects. Percent significant states the share of estimated coefficients in the simulations that were statistically insignificant with a p-value < 0.1.

Table F5: Randomization of firms, World Bank projects, excluding Argentina

	World Bank aid			
	(1)	(2)	(3)	(4)
	Total number		Amount	
Coefficient of aid, 500 replications				
Mean	-0.011	-0.028	-0.008	-0.024
Standard deviation	0.006	0.032	0.004	0.016
Percent not significant	100	100	100	100
Number of firms randomly drawn				
Region FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES
Industry X year FE	YES	YES	YES	YES

Notes: Randomization strategies for firm sample in regressions. In columns 1-2, the variable of interest is the total number of World Bank projects, while columns 3-4 show the result for the total amount of committed aid. Estimations are all run using IV. Standard errors are clustered at the regional level. Different columns represent different randomization strategies. "Mean" represents the average second stage coefficient for World Bank projects on firm sales growth for 500 regressions with random sampling (without replacement). Columns 1-2 shows the results for a 2SLS estimator in a sample of pooled firms, whereas columns 3-4 show the results for a 2SLS estimator with firm fixed effects. Percent significant states the share of estimated coefficients in the simulations that were statistically insignificant with a p-value < 0.1.

Figure F1: Survival bias



Notes: Distributions of firm age in full sample (excluding conflict countries) for firms which only appear in one wave of the survey (single presence) versus firms that are recontacted at least once over different waves.