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ABSTRACT

Foreign Direct Investment (FDI) in extractive industries (mining and quarrying) is expected to increase dramatically in many developing countries, due to the rising global demand for commodities. One key question for policymakers is whether this form of FDI could help spur investments in other sectors, in order to help boost their countries' long term growth prospects. Countries with large extractive industries seek to promote economic diversification, so other types of FDI would also be critical in this regard. This paper analyzes whether mining FDI "crowds out" or "crowds in" FDI in other sectors via intersectoral linkages. It utilizes a novel data set covering sector-disaggregated FDI flows in 70 countries from 1985 to 2010. Results show differential effects of mining FDI on FDI in other sectors (manufacturing, services, financial services, non-financial services) and across country groups. Some of the interesting results are seen in the high income countries group, where mining FDI is observed to have crowding out effect on total services and more specifically, financial services FDI and in the lower middle income countries group, where mining FDI is observed to crowd in both manufacturing and financial services FDI.

JEL: F2, F21, O16, O19

Key Words: Foreign direct investment (FDI), spillovers, crowding out, mining

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Introduction

Foreign Direct Investment (FDI) has proved critical to the economic growth stories of numerous emerging market economies, notably those in East Asia. Some studies also suggest that FDI contributes to growth not just because of capital infusion, but also through other channels such as the productivity enhancing spillover effects from adapting new technologies and more effective production processes and systems. In principle, FDI could also fuel the development of a wider array of products and services, which should contribute to economic diversification.

Recent literature has begun to emphasize how some types of FDI—including FDI in manufacturing and services—could be associated with stronger investments in other sectors (e.g. Kolstad and Vilanger, 2008; Cazzavillan and Olszewski, 2012; Raff and von der Ruhr 2001). These studies highlight the important synergies across different types of FDI, suggesting that investments in certain sectors either crowd in or crowd out investments in other sectors.

Nevertheless, few if any studies have empirically analyzed the potential effects of increased FDI in the mining and extractives industries. An extensive literature on mining highlights the potential risk of Dutch disease in commodity export dependent economies. On the other hand, more developed extractive industries could help fuel the development of other sectors (e.g. heavy industries and other sectors in manufacturing), potentially strengthening the prospects for developing those sectors. Indeed the net effect of expanded FDI in extractive industries is an area for empirical analysis.

This study contributes to the empirical evidence in this area by examining whether and to what extent FDI in mining and extractive industries could help boost FDI in other sectors, using a comprehensive disaggregated dataset on FDI in 70 countries from 1985 to 2010. In that respect, we study the intersectoral FDI impacts that are due to product chain linkages rather than productivity spillovers. Overall, the results suggest a crowding in effect in lower middle income countries and crowding out effect in high income countries. More specifically, the empirical results suggest that mining FDI crowds in manufacturing FDI for some country groups (such as lower middle income and Europe and Central Asia groups of countries). We also find a negative impact of mining FDI on services FDI in upper middle income and high income groups of countries. However, these results do not reflect if mining FDI has differential impact on financial services FDI and non-financial services FDI.

Differentiating between the impacts of mining FDI on non-financial and financial services FDI paints two different pictures. First, there is an insignificant impact of mining FDI on non-financial services FDI in almost all country groups. On the other hand, we find a significant impact of mining FDI on financial services FDI on the whole, but with mixed results observed across different country groups. Mining FDI is observed to have crowding in effect in South and East Asia and the Pacific group of countries and in lower middle income countries group, while for high income countries, mining FDI is observed to have crowding out effect. These results cohere with the extensive literature on extractive industries, suggesting that mining FDI could still crowd in other types of FDIs, if the former is able to induce productivity spillovers in the host country economy through forward and backward linkages.

I. Review of Literature

Much of the literature on FDI seeks to examine its impact on macroeconomic variables such as economic growth. Now widely cited studies include those by Borensztein, De Gregorio and Lee (1998), for example, which found a positive impact of aggregate FDI on economic growth, conditional on the human capital level of host country. Sector-specific FDI studies only recently proliferated with the release of novel datasets that disaggregated FDI per sector in each country. These recent studies have found remarkable differences on the implications of FDI in different sectors.

Real Exchange Rate and Economic Growth as Determinants of FDI

Barell and Pain (1996) developed a theoretical model which shows that an expected exchange rate appreciation in the home country can induce a postponement of FDI in the future, when it is expected to have greater command over other currencies. Walsh and Yu (2010) and Severiano (2011) found appreciation of host country exchange rate to be negatively associated with FDI inflow in the manufacturing sector. On the other hand, the impact of exchange rate on the services sector appears to be ambiguous. While Moshirian and Pham (1999) found evidence supporting the hypothesis presented by Barell and Pain (1996) in the case of outward banking FDI in Australia, exchange rate was not a significant determinant of financial services FDI inflow for Portugal (Severiano, 2011). Meanwhile, Walsh and Yu (2010) found real exchange rate appreciation (in host country) to be a positive determinant of services FDI inflow.

UNCTAD (1998) listed economic growth as one of the potential economic determinants of market-seeking FDI (along with real GDP and real GDP per capita) as it represents the market growth potential of the host country's economy. FDI in services sector tends to be market-seeking as some services are still non-tradable and requires large initial investments (Chakraborty and Nunnenkamp 2008; Ramsamy and Yeung 2010). However, evidence appears to be mixed. Economic growth appeared to be a significant determinant of services FDI in some studies (Moshirian and Pham 1999 for Australian banking FDI; Ramsamy and Yeung 2010; Walsh and Yu 2010), while other studies (such as Kolstad and Villanger 2008) did not find any significant evidence for the producer services sectors considered.

FDI in Manufacturing and Services

Numerous studies arrived at evidence that manufacturing FDI is linked positively to other types of FDI, notably FDI in the financial services sector. For instance, using data from OECD countries during the period 1980 to 2003, Ramsamy and Yeung (2010) found evidence showing the lagged value of manufacturing FDI to be a significant determinant of FDI in services sector. Furthermore, the manufacturing FDI variable appears to be one of the most important determinants of services FDI in the model, based on the value of the standardized coefficients of all the explanatory variables.

In addition, Kolstad and Villanger (2008) found evidence that FDI in the manufacturing sector appears to be positively related to services FDI. In their analysis of panel data from 57 countries covering the period 1989 to 2000, they observed that FDI in manufacturing is positively related only with FDI in financial services and in the transport industry (with a longer lead time observed in the transport industry). Financial services and services from the transport industry are producer services necessary in establishing links in an international chain of production. While the trade industry (wholesale and retail) is also a producer service, there was less evidence on its link to manufacturing. It is possible that FDI in the trade industry is merely host country market-oriented as the host country market indicator is positively and significantly related with FDI inflow in their regression runs.

Moshirian and Pham (1999) also found evidence on the relationship between manufacturing FDI and FDI in financial services. Using data from 1985 to 1995, these authors studied Australian FDI and found evidence that its stock of manufacturing FDI abroad is a

significant determinant of its FDI in banking abroad (Other factors included the real effective exchange rate, relative wages between Australia and host countries, and relative economic growth.). A similar study was conducted by Qian and Delios (2008) which looked into the determinants of foreign banking activity of 21 Japanese banks over the period 1980 to 1998. A discrete time binomial logit model was used to estimate the results. The authors found that client entry in a host country (as measured by the logarithm of the clients' new entries to a host country in a year) is associated with higher probability of a Japanese bank establishing a subsidiary, branch or representative office in the same host country.

On the other hand, Wezel (2004) examined non-financial sector FDI (instead of manufacturing FDI) and found it to be a significant determinant of financial sector FDI in an empirical analysis of FDI patterns in 20 emerging market economies. Similarly, Cazzavillan and Olszewski (2012) found non-financial FDI to be a positive and significant determinant of FDI in financial services in an analysis of FDI in nine transitional economies covering the period 1996 to 2007. The study also found evidence indicating positive impact of FDI in financial services to non-financial FDI and manufacturing FDI both in the short run and in the long run.

A possible explanation on the observed positive impact of manufacturing and non-financial FDI on financial FDI is the "follow-the-client" hypothesis. Financial sector firms open subsidiaries in the host country to prevent their clients from subscribing to their competitors' (both domestic and foreign) services. This occurs despite the inherent competitive advantage of home country financial firms over their host country counterparts, as their longstanding relationship with their MNC clients makes them more aware of the unique financial needs of the latter. In this case, setting up a subsidiary in the host country enables home country financial firms to more quickly and more efficiently respond to the needs of their clients (Wezel, 2004)[1].

On the other hand, Raff and von der Ruhr (2001) made use of knowledge-based and differentiated nature of producer services (which includes financial services) in developing a theoretical model that relates FDI in producer services to FDI in manufacturing. Given that determining the quality of service is difficult upon purchase,[2] multinational services firms have the incentive to offer low quality product in the host country at a higher price. To the extent that host country potential clients are aware of this moral hazard problem, the latter will purchase

[1] See Box 1 for examples of Japanese banks that have followed their home-country clients abroad.
[2] See also Ramsamy and Yeung (2010) on this point.

from host country producer services firms. In this case, the presence of multinational manufacturing firm clients in the host country entices MNCs in producer services to offer high quality products and thus enables them to have a pool of customers from which they can showcase to potential host country clients the quality of their products (Raff and von der Ruhr, 2001; Ramsamy and Yeung, 2010).

Box 1: The Case of Japanese Banks

Japanese banks have started establishing operations abroad since the latter part of the 19th century. Many of these were small-sized banks which established offices in areas under the Japanese control (such as Korea and Manchuria), and in other areas (such as Brazil and the United States) to serve as a conduit through which Japanese migrants send their remittances. On the other hand, some Japanese banks (such as the Yokohama Specie Bank, Sumitomo Bank, Mitsui Bank and Mitsubishi Bank) have established branches in London, New York and other major cities to facilitate trade between Japan and the rest of the world through foreign exchange business. However, these were halted by the defeat of Japan in the Second World War, and Japanese banks had to start from scratch in expanding their international operations after the war (Kasuya, 2012). Other than conducting foreign exchange business, Japanese banks re-established operations abroad to tap external funds (such as the low-cost funds from the Eurodollar market) to finance the Japanese industrial expansion (Ozawa, 1989).

The overseas expansion of their home country clients (such as Japanese manufacturing firms and trading companies) also served as an impetus for the expansion of Japanese banks abroad in the post-war period. As Ozawa (1989) noted, many Japanese banks have fostered close relationship with their industrial clients, which in turn instilled a sense of obligation to follow their clients abroad. Ozawa (1989) cited the case of the Tokai Bank which opened a representative office in Lexington, Kentucky to serve an assembly plant of Toyota in the said town.

Presently, Japanese banks have a significant presence in various countries abroad. For instance, the Mizuho Corporate Bank has 69 offices in 32 countries, 34 of which are located in Asia outside Japan (Mizuho Financial Group, 2012). On the other hand, the Bank of Tokyo- Mitsubishi UFJ has established an extensive office network outside Japan, particularly in North and Latin America, Europe and Central Asia, Middle East and Africa, and Asia and Oceania regions (Mitsubishi UFJ Financial Group, 2012). While various factors such as the positive economic outlook in emerging markets are considered as explanations for the recent expansion of overseas activities by Japanese banks, the need to follow the client is also cited as a motivation of the Japanese banks. Recently, the Mizuho Corporate Bank has expanded its operation in Brazil, with the purchase of the Brazilian subsidiary of the German Bank West LB whose total assets are valued at US $ 1.5 billion (Mizuho Corporate Bank, 2012). The bank cited in its official statement the current trade ties between Japan and Brazil and the positive economic outlook of Brazil as some of the reasons behind the purchase. Further, the bank added in its statement that the expansion would enable it to improve its service to its existing clients in Brazil and facilitate the entry and expansion of its clients' presence in the country (Mizuho Corporate Bank, 2012). The bank has been involved in co-financing different projects in Brazil, among which are the Espadarte FPSO (Floating, Production, Storage and Offloading) project (in which the Mizuho Corporate Bank is the mandated lead arranger of the loan), and the Sao Paulo Metro Line 4 Extension project. Mitsubishi Corporation and Mitsui & Co, Ltd have equity interests in the first project, while Japanese firms are participating in the operation of the second project (JBIC, 2006; JBIC, 2010)

Literature on Vertical Spillovers

Several studies have looked into the spillover effects of FDI via its backward (relationship with domestic upstream suppliers) and forward (relationship with downstream domestic clients) linkages. Javorcik (2004) noted that there are three ways through which backward spillover can occur. First, direct knowledge transfer can take place as a result of interaction between multinationals and their domestic suppliers, and multinationals can induce incentives for suppliers to improve their efficiency by setting higher product quality standards. In addition, multinationals can increase the demand for intermediate products, which can allow domestic suppliers to reap the benefits of economies of scale. Finally, forward productivity spillover can take place, to the extent that multinationals are able to introduce new intermediate inputs (or increase the variety of intermediate inputs) which can enhance the efficiency and productivity of downstream domestic producers (Kugler 2005).

Javorcik (2004) tested the presence of inter-industry and intra-industry spillovers using a sample of manufacturing firm-level panel data from Lithuania. Productivity spillover via backward linkage is the only inter-industry channel that is significant and robust to various specifications. Kugler (2005) also arrived at the same result using firm-level panel data from the Colombian manufacturing sector. On the other hand, Fernandes and Paunov (2011) found evidence of forward linkage spillover effect using a sample of Chilean manufacturing firms. The study showed positive impact of FDI in services sector to total factor productivity of manufacturing firms, with greater impact for firms that tend to use services more intensively. Further, the study found evidence showing that within each industry in the manufacturing sector, laggard firms benefit more as compared to their more technologically-advanced counterparts. Arnold et al (2011) also found positive spillovers associated with FDI in services sector in their analysis of the impact of service sector liberalization to manufacturing firms in Czech Republic. Among the service liberalization indicators used (i.e., presence of foreign providers, extent of privatization and competition in services sector), the presence of foreign providers appears to be the only robust channel through which liberalization affect manufacturing firm's total factor productivity. Similarly, Doytch and Uctum (2011) found evidence that financial services FDI tend to spur economic activities in both the services and the manufacturing sectors for South East Asia and the Pacific, high income countries and service-based groups of countries.

However, spillovers associated with backward and forward linkages do not appear to be automatic. Using manufacturing firm-level panel data from the Philippines, Aldaba and Aldaba (2010) found no evidence of spillovers to upstream suppliers and downstream clients (in terms of value-added per worker and employment). This can be attributed to the weak forward and backward linkages that currently exist between large firms (domestic and multinationals) and small domestic firms. The study suggests that a sufficient depth of linkage and absorptive capacity of domestic firms preclude significant spillovers.

Some studies have looked into the presence of forward and backward productivity spillovers of FDI across different sectors. Lesher and Miroudot (2008) used firm-level panel data from 15 OECD countries in determining the presence of horizontal, forward and backward FDI spillovers. Results were estimated using fixed-effects approach. Some services sub-sectors (such as hotels and restaurants, and telecommunication) and construction industry have shown strong FDI spillovers via backward linkages while strong spillovers via forward linkages are seen in agriculture, mining and quarrying, and some service sub-sectors (such as land transport and wholesale and retail trade).

On the other hand, Tondl and Fornero (2010) looked into the spillover effects associated with FDI to productivity of other economic sectors in 14 Latin American countries from 1990 to 2006. Results were estimated using GMM. Manufacturing FDI appears to have positive productivity spillover effect to the following sectors: agriculture, trading, hotels and restaurant, and utilities (i.e., electricity, gas and water). Agricultural products serve as inputs to some industries in the manufacturing sector while the services offered by trading and utilities sectors are necessary inputs for the manufacturing sector, indicating possible evidence of backward spillover effect. Meanwhile, FDI in the transportation and telecommunication sector are also associated with productivity spillover to various sectors, some of which are the agriculture and the manufacturing sectors which utilize transport and telecommunication services in their operations. Further evidence of forward spillover effects are seen in the case of FDI in the mining and quarrying and the financial services sectors, both of which are associated with positive productivity spillover effects to the manufacturing sector.

Mining FDI: Determinants and Host Country Impacts

Evidence suggests that macroeconomic variables appear to have a minimal effect in attracting mining FDI. For example, Walsh and Yu (2010), in their analysis of data on a sample of 27 advanced and emerging market economies over the period 1985 to 2008, found that primary sector FDI stock (which is an indicator for clustering effect) is the only variable that significantly determines FDI in the primary sector.

Severiano (2011) also arrived at the same result when she analyzed FDI in mining and quarrying in Portugal using time series data from 1980 to 2009. Macroeconomic variables in her empirical model explained the least variation in FDI inflow in the mining and quarrying sector. Analysts contend that the said observed results can be attributed to the resource-seeking nature of mining FDI (UNCTAD, 1998). Furthermore, outputs of mining sector are usually priced in dollars (instead of host country currency); and the mining sector has limited linkage with the rest of the economy as it employs relatively less host country labor and has fostered minimal connection with the host country financial sector (Chakraborty and Nunnenkamp, 2008; Walsh and Yu, 2010).

On the other hand, numerous studies analyzed the empirical relationship between mining FDI and economic growth. Using data from 47 countries for 1981 to 1999, Alfaro (2003) found that FDI in the primary sector (which includes mining) is negatively associated with host country's economic growth, while an opposite relationship was observed between FDI in manufacturing sector and economic growth. A similar analysis was conducted by Khaliq and Noy (2007), using sectoral panel data from Indonesia over the period 1997 to 2006. Among the nine sectors considered, mining FDI appeared to be negatively correlated with economic growth while FDI in construction sector exhibited positive association with economic growth. Chakraborty and Nunnenkamp (2008), in their analysis of sectoral FDI in India, found no evidence of causality between FDI in primary sector and primary sector output growth in either direction, both in the short run and in the long run. The authors cited the enclave nature (i.e., limited linkage with domestic firms) of many primary sector FDI projects as a possible explanation on the observed result. Further, the same authors posited that the observed insignificant or negative impact of mining FDI on total output growth on many empirical studies can also be attributed to the volatility of FDI flow in primary sector to international commodity prices, and to the Dutch Disease effect and rent-seeking activities that a large scale resource-

seeking FDI can induce[3]. In contrast, some studies found evidence on the potential of mining FDI to spur growth (see for instance, Doytch, Zhang and Mendoza, forthcoming). Vu et al (2008) examined the impact of sectoral FDI on sectoral output for China and Vietnam. Results show that FDIs in almost all sectors are positively and significantly associated with sectoral output growth, with greater magnitude observed for capital-intensive sectors such as the mining and quarrying sector in China and the oil and gas sector in Vietnam[4]. Breisinger and Thurlow (2008) developed a simple Computable General Equilibrium (CGE) model of Zambia to analyze the impact of foreign investment in the mining sector. The authors found evidence that higher mining capital can increase mining production and exports, leading to a higher demand for high-skilled workers, and an increase in average GDP per capita. The distribution of benefits however varies across sectors, with the agriculture and manufacturing sectors (particularly the export-intensive subsectors) being adversely affected by the real exchange rate appreciation induced by higher mining export. Further, the study found that urban households benefit more than rural households, and in the case of rural households, greater benefits (in terms of per capita income and per capita consumption expenditure) are obtained by those who belong to higher income quintiles. A similar analysis was conducted by Lay, Thiele and Wiebelt (2006) which examined the distributional effects of a foreign investment-induced boom in the natural gas sector of Bolivia using a CGE model linked to a microsimulation model. While the extraction of gas from new fields can cause an increase in real GDP growth, both the extraction and the preceding exploration activity can cause real exchange rate appreciation, which has adverse impact on production of trade-oriented sectors (such as heavy manufacturing and modern agriculture), leading eventually to reallocation of resources to less trade-oriented sectors. Chand and Levantis (2000) developed a CGE model of Papua New Guinea, where mining capital is mostly foreign-owned, to examine the impact of new capital investments in the gold mining industry. Results show that higher capital investments in gold mining can lead to an increase in real GDP, real consumption expenditure and trade surplus. However, the increase in trade surplus is less than the predicted contribution to total exports of the new mining capital, which the authors attributed

[3] A related study by Sala-i-Martin and Subramanian (2003) analyzed the impact of natural resource endowment (particularly endowment of oils and minerals) on economic growth using data from Nigeria. Among the three possible channels identified through which natural resource endowment can impact economic growth (i.e., Institutional quality, Volatility of prices and Dutch disease), only through institutional quality did natural resource endowment appear to impact economic growth.

[4] For sectoral FDI determinants see also Doytch and Eren (2012)

to increase in imports associated with increased mining activity, and to a possible Dutch Disease effect of higher investment in gold mining.

The studies cited above suggest that while mining FDI can positively affect economic growth and per capita output, it can also undermine the potential for structural diversification to the extent that mining FDI can induce Dutch disease effect to other export-oriented sectors. Governments of some countries have adopted strategies to utilize the benefits attained from the mining boom to investments that aim to diversify the economic base. In the case of Indonesia, the government invested a significant amount of its accumulated oil revenues on infrastructures in transportation, energy and education sectors and on agricultural development[5] (Rosser, 2007; Gurbanov and Merkel, 2010). In Chile, considered as the world's largest producer of copper, the government channels a portion of its mineral royalties to a Fund for Innovation for Competitiveness (ICF) utilized by the state in managing and funding the components of its innovation and competitiveness initiatives, such as research and development programs, provision of technical assistance and subsidies. The government of Chile also created a National Council of Innovation for Competitiveness, which serves as an advisory body to the president regarding proposals on the development of human capital and policies for further innovation (Mendoza, McArthur and Ong Lopez, 2012; Fuentes, 2011: 102; Varas, n.d.).

II. Selected Stylized Facts

FDI has become synonymous with technological innovation and catching up for the developing world. FDI has been considered as a vehicle for "leapfrogging", South-South cooperation, and softening poverty in the least developed economies (UNCTAD, 2011). Global aggregate FDI net inflows have increased by approximately thirty times since 1980- from US$ 53.5 billion to US$ 1,454.5 billion. From 1990 to 2009, global manufacturing FDI net inflows have increased by almost 3.5 times (from US$ 50 billion to US$ 174 billion), with the said investment peaking up in 2008 at US$ 347.5 billion. Annual global financial services FDI net inflows have increased by more than 9 times over the same period (1990 to 2009), from US$ 40 billion to US$ 365.5 billion. Its peak was in 2007 at US$ 618 billion. On the other hand, during the same period, non-financial services FDI net inflows have increased by 174 times, from US$ 1.5 billion to US$ 268

[5] Among the initiatives by the Indonesian government to support agricultural development are investments in irrigation, rice production research, and provision of subsidies on fertilizer.

billion, attaining its peak in 2007 at US$ 682.5 billion (See Figure 1). Annual FDI net inflows have decreased during the recent global financial crisis and have recovered since then. In this case, the FDI recovery has two characteristics. The first one pertains to a sectoral pattern change, putting an end to a financial services FDI era. Business services, transport and communications, but especially finance FDI continued to decline, while manufacturing FDI surged once again (See Figure 1). Secondly, developing countries FDI inflows have played an unprecedented role in the world scene, as developing and transition economies together attracted for the first time more than half of global FDI flows in 2010

On the other hand, annual global mining FDI net inflows have increased by more than 4 times (from US$ 14 billion to US$ 59 billion) from 1990 to 2009 (Figure 1) and have stayed resilient throughout the crisis. High income economies hold the highest share of world extractives FDI (ranging from 30% to 90% for the examined period), followed by upper middle income countries (ranging from 5% to 40% for the examined period). In both cases, the shares are characterized by high volatility (Figure 2)

III. Methodology and Data

This section briefly outlines the methodology and data, drawing extensively on earlier theoretical and empirical work on FDI and its spillover effects.

Conceptual Framework

We base our conceptual model on an augmented gravity equation for FDI, following the General Equilibrium Model by Helpman et. al (2008) and Anderson and van Wincoop (2003), summarized by Wagle (2011):

$$FDI_{ij} = \frac{Y_i Y_j}{Y}\left[\frac{\tau_{ij}}{\Pi_i P_j}\right]^{1-\sigma} V_{ij}$$

where *i* is an index for home country and *j* is an index for host country; Y indicates income; Π_i is outward, multilateral resistance; P_j represents barriers to inward FDI; V_{ij} captures the fraction

of the firms that are able to undertake FDI; τ_{ij} represents transaction costs; and σ is a constant elasticity of demand.

The aggregate location of FDI across the world depends on the decisions of millions of multinational enterprises, influenced by both host country and home country factors. At the national level, inward FDI is determined by a set of exogenous macroeconomic factors and policies[6].

Empirical Methodology

To determine the impact of mining FDI to FDI in other sectors, the following empirical model is tested:

$$\log(FDI^j)_{it} = \beta_0 + \beta_1 \log(FDI^j)_{it-1} + \beta_2 \log(y_{it}) + \beta_3 MiningFDI_{it} + \beta_4 School_{it} + \beta_5 Res_{it} + \beta_6 RER_{it} + \beta_7 Inst_{it} + u_i + n_t + \varepsilon_{it}$$

where i, j and t are country, sector and time indices, respectively with $i = 1,2,\dots,70$, j = manufacturing, services, financial services and non-financial services and $t = 1,2,\dots,26$. Furthermore, the following definitions elaborate further on the variables of interest.

- $\log(FDI^j)_{it}$ is defined as the natural logarithm of the ratio of respective sectoral FDI inflows and GDP. Data on FDI for each sector are sectoral net FDI inflows and are expressed in current US dollars. The main sources of data on net FDI inflows are as follows: *Organization for Economic Cooperation and Development* website (for FDI inflows in all OECD countries considered), *United Nations Conference on Trade and Development* (UNCTAD), Statistics of FDI in ASEAN, and government institutions and investment agencies' web sites[7]. Data on net FDI inflows by sector primarily came from

[6] At the firm level, the question about FDI activity, and particularly what motivates a firm to choose an affiliate production, rather than exporting, is answered with firm-specific intangible assets, such as technologies or managerial skills for instance. According to the transactions costs theory of Williamson (1981), when it is difficult to appropriate the rents from firm-specific intangible assets through a contract with external party, it may be optimal for the firm to internalize the market transaction, establishing its own production affiliate. The opposite situation is also possible- an acquisition that seeks access to another firm's specific intangible assets (Kogut and Chang, 1991; Blonigen 1997). Dunning (1993) outlines the motives for FDI as follows: to have access to resources; to have access to markets; to attain efficiency gains; and to acquire strategic assets.

[7] FDI's financial life-cycle reflects the evolution of its shares: profits, reinvested earnings, and repatriated dividends (Brada and Tomšík, 2009). In some country groups, such as transitional economies, the imputed reinvested earnings can be distorted and thus can exaggerate current account deficit (Brada and Tomšík, 2009).

specialized investment government boards and agencies and to some extent, general statistical agencies or ministries[8].

- $\log(y_{it})$ in this case represents the natural logarithm of the real GDP per capita which is similar to the variable used by Kolstad and Villanger (2008) to control for market size potential
- $MiningFDI_{it}$ represents the main explanatory variable of interest for this study which is the natural logarithm of net mining FDI inflows as a share of GDP.
- $School_{it}$ stands for gross secondary school enrollment ratio which is equal to the proportion of the population, regardless of age, enrolled in the secondary level. The indicator serves as a control for host country human capital endowment. Sources of data are the World Development Indicators (WDI) and United Nations Educational, Scientific and Cultural Organization (UNESCO).
- Res_{it} is defined as the share of natural resources rents to GDP, including rents generated by coal, forest, mineral, natural gas, and oil resources.[9] The said indicator is included to control for host country natural resource endowments. Some of the previous studies that considered the impact of natural resource endowment to FDI inflows include Asiedu and Lien (2011) which found democracy to have positive impact on attracting FDI in countries where natural resource exports are low; Doytch and Eren (2012) which found evidence using data from countries in Eastern Europe and Central Asia that indicate a positive impact of natural resource endowments on agricultural and manufacturing FDI; and Poelhekke and van der Ploeg (2012) which found resource discovery to have a crowding in effect on natural resource FDI and crowding out effect on non-resource FDI using data on FDI outflows from Netherlands for the period 1984 to 2002;
- RER_{it} is the real effective exchange rate of the host country. Figures for this indicator are derived by dividing nominal effective exchange rate (measurement of value of host country currency against a weighted average of several foreign currencies) with a price

[8] Manufacturing refers to industries belonging to International Standard Industrial Classification (ISIC), revision 3, divisions 15-37. Services correspond to ISIC divisions 50-99. Services include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling.

[9] Estimates are based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium" (World Bank, 2011).

deflator or index of costs. The source for this variable is the World Bank's World Development Indicators (WDI) database.

- $Inst_{it}$ represents the host country institutional quality. The institutional quality variables considered in this study are the government stability and democratic accountability variables[10]. Data for these variables are gathered from the International Country Risk Guide (ICRG). The two institutional controls of this study are *government stability* and *democratic accountability*. *Government stability* measures both of the government's ability to carry out its declared program(s), and its ability to stay in office[11]. On the other hand, *democratic accountability* measures how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one[12].
- Lastly, the variables μ_i and η_t are, respectively, country-specific and a time-specific effect represented by year dummies.

The method we choose for this study is the dynamic Blundell-Bond "system" GMM estimator. The static counterpart methods are *pooled OLS* and *fixed effects*. They, however, fail to account for some important characteristics of the data. Pooled OLS fails to account for the time-series dimension of data and for the unobserved country-specific (fixed) effects that cause omitted variable bias and potential endogeneity problems. The fixed effects method corrects for the unobserved country-specific time-invariant effects by taking deviations from time-averaged sample means. Such a procedure strips the dependent variable of its long-run variation and does not allow for capturing the dynamic characteristics of the data.

The *Blundell-Bond System GMM* uses lagged level observations as instruments for differenced variables and lagged differenced observations as instruments for level variables, thereby constructing a matrix of "internal" instruments. It has one set of instruments to deal with

[10] The inclusion of this variable is motivated by the arguments in LaPorta et al. (1998), which posited that "risk of repudiation of contracts by government", "risk of expropriation" and "shareholder rights" also matter. "Investment profile" also captures instabilities in the business environment as per the discussion in Brada, Kutan, and Yigit (2006).

[11] These two outcomes depend on the type of governance, the cohesion of the government and governing party or parties, the closeness of the next election, the government's command of the legislature, popular approval of government policies, and so on (ICRG).

[12] Assessing democratic accountability is a complex process, which captures more than free and fair elections. Even democratically elected governments face unpopular policies. This variable captures how likely it is that the government then falls peacefully (ICRG).

endogeneity of regressors and another set to deal with the correlation between lagged dependent variable and the induced MA (1) error term. A necessary condition for the "system GMM" is that the error term is not serially correlated, especially of second order; otherwise, the standard errors of the instrument estimates grow without bound. For this reason, Arellano and Bond (1991) have developed a second order autocorrelation test from which we base our analysis.[13] The "system GMM" estimator requires one more additional condition: that, even if the unobserved country-specific effect is correlated with the regressors' levels, it is not correlated with their differences.[14]

III. Analysis of Results

The main results on the coefficients of interest (i.e., different sectoral FDI as the dependent variables, and mining FDI as the explanatory variable of interest) across different country groups are summarized in Tables 1, 2 and 3. Table 1 presents the coefficients of mining FDI variable on regression results whose specification includes the government stability variable, while Table 2 contains mining FDI coefficients on regression results whose specification includes the democratic accountability variable. On the other hand, the results in Table 3 are from regression runs that control for both government stability and democratic accountability. For each table, four dependent variables are considered, among that are the manufacturing FDI, services FDI, financial services FDI and non-financial services FDI. In addition, Tables 4 to 8 report the empirical results for different country groupings based on income and region.

Overall, the results suggest the presence of some crowding-in effects for lower middle income countries and also in the geographical region of South and East Asia and the Pacific, and crowding-out effects in high income economies. The details are presented in the next sub-sections.

[13] By construction, the differenced error term is first-order serially correlated even if the original error term is not.

[14] The condition also means that the deviations of the initial values of the independent variables from their long-run values are not systematically related to the country-specific effects. A potential problem of overidentification could arise with *system GMM* if the instruments are too many. Unfortunately, there is no good answer of how many instruments are "too many" (Roodman 2006, Rudd 2000). A recommended rule of thumb by Roodman is that instruments should not outnumber individuals (or countries). In this study, we experimented with both instrumental matrices with maximum number and minimum number of lags. The results were largely consistent. The results we present are based on the minimum optimum lags- an approach that we selected to preserve the degrees of freedom.

Impact on Manufacturing FDI

Looking at different income groups, Table 1 shows that mining FDI appears to have positive impact on manufacturing FDI in lower middle income countries group, and in Europe and Central Asia group. On the other hand, including democratic accountability instead of government stability variable (see Table 2) and including both government stability and democratic accountability variables (see Table 3) yield the same set of results, with mining FDI observed to crowd in manufacturing FDI only in lower middle income countries and countries in Europe and Central Asia.

This result complements previous empirical findings by Lesher and Miroudot (2008) and Tondl and Fornero (2010) regarding the spillover effect of mining FDI to total factor productivity of host country manufacturing sector via forward linkages[15]. The observed result is also consistent with the fact that some industries in the manufacturing sector intensively use mining products as inputs. For developing countries, mining FDI can be important in providing the capital necessary for vast extraction of raw materials and other resources which can translate to lower cost of access to these inputs for foreign manufacturing firms if they decide to establish operations in the host country. Drawing on the policy literature on mining and extractive industries, it is also possible that strategies to develop these sectors seek to leverage their full positive linkages to other sectors, notably manufacturing. Many countries have since tried to develop downstream processing and links with manufacturing, as well as increase the potential for technology spillovers when it comes to developing extractives sectors (see among others Collier and Venables, 2011).

Impact on Services FDI

Table 1 further shows that mining FDI appears to have positive impact on services FDI in Europe and Central Asia group. However, the same table shows that mining FDI crowds out services FDI in upper middle income and high income countries. Mixed results can also be observed if the democratic accountability variable is used instead to represent institutional quality (see Table 2). However, there are some changes in the results if both government stability

[15] As Tondl and Fornero (2010) noted, it is possible that foreign mining firms demand a more efficient processing of the extractive products by the downstream firms.

and democratic accountability are included in the specification. In this case, mining FDI is still observed to have negative effect on services FDI in upper middle income and high income countries but has no significant impact on services FDI in Europe and Central Asia group.

It might be possible that the impact of mining FDI differs on each services sub-sector and in this case, similar to the methodology used by Doytch and Uctum (2011), the impact of mining FDI on non-financial services FDI and financial services FDI for each country group are also examined separately.

- *Impact on non-financial services FDI.* Mining FDI appears to have no significant effect on non-financial services FDI. The mining FDI variable is insignificant in almost all country groups across all specifications except for South and East Asia and the Pacific group, where mining FDI is observed to have positive impact (significant at 5%) on non-financial services FDI on the second specification (which controls for democratic accountability). The lagged value of non-financial services FDI appears to be the strongest determinant of non-financial services FDI (see Tables 4 to 8). Interestingly, the logarithm of real GDP per capita (which is an indicator for market size) appears to have negative and significant impact (at 5% and 10%) on non-financial services FDI in some groups (i.e., upper middle income countries, high income countries, and Europe and Central Asia groups).
- *Impact on financial services FDI.* For the three specifications (government stability only, democratic accountability only, both government stability and democratic accountability), mining FDI appears to have significant impact on financial services FDI on more country groups relative to the previously observed results for total services and non-financial services FDI. Mining FDI is observed to have strong negative impact on financial services FDI across all specifications in high income countries group. Further, the observed negative impact stays even after some countries (such as Norway, Australia and Canada) are removed from the sample. On the other hand, the negative impact of mining FDI on financial services FDI on other groups appears to be less robust, with the observed impact for upper middle income countries group evident only in Tables 2 and 3, and the observed impact for Europe and Central Asia group only evident on the specification that controls for democratic accountability. A positive impact of mining FDI can be observed for all specifications in the lower middle income countries group. Also,

mining FDI appears to crowd in financial services FDI in South and East Asia and the Pacific group and this result is robust to all specifications.

The observed results for the lower middle income and high income groups of countries are very noble findings in the literature, and few if any have come across and have looked into them. For the lower middle income countries, a possible explanation on the observed crowding in effect of mining FDI hinges on the follow-the-client hypothesis previously cited in the literature. The imperfection of capital markets is more pronounced for this country group (relative to upper middle income and high income countries) and this, together with the information intensive nature of financial services, implies that the multinational firm will more likely maintain its links with the home country financial institution in financing its host country affiliate. The home country financial institution, in turn, has incentive to also establish an affiliate in the host country to better serve the needs of its client firm and eventually, to utilize its affiliate in expanding its market base (Raff and von der Ruhr, 2001). Another possible explanation that can be tested by future studies hinges on the cost-benefit calculus associated with establishing financial services operations in a host country. Mining FDI has the potential to generate large amount of export earnings and given the relatively underdeveloped nature of financial markets in lower middle income countries (which makes their financial markets less capable of absorbing the export earnings), foreign financial firms can attain potential benefits from tapping the said funds generated by the mining investment. In contrast, for the high income countries, financial markets are more capable of absorbing the export earnings, which possibly implies fewer funds (relative to lower middle income countries) which the foreign financial institutions can tap. Thus, it is possible that the net benefits (i.e., difference between the benefits and costs) that foreign financial firms can attain from establishing an affiliate or an additional branch are lower in high income countries as compared to lower middle income countries.

V. Conclusion

The study examined the impact of mining FDI on FDI in other sectors via intersectoral linkages that are part of production chains. We used a novel dataset with information on disaggregated sectoral FDI flows across 70 countries from 1985 to 2010. Results were estimated using GMM and show that the impact of mining FDI varies across FDI in different sectors, and depends also

on the country group being examined. Mining FDI appears to crowd-in manufacturing FDI in lower middle income and Europe and Central Asia groups while the crowding out effect of mining FDI is observed on total services FDI in upper middle income and high income countries. However, these results mask the impact of mining FDI on services sub-sectors and analysis was also made on the impact of mining FDI on financial services FDI and non-financial services FDI.

While mining FDI appears to have no significant impact on non-financial services FDI across almost all groups considered, mining FDI appears to crowd in financial services FDI for some groups (lower middle income countries and South and East Asia and the Pacific group), while a possible crowding out effect can be observed for High income countries. Summing up the results shows that lower middle income countries appear to benefit significantly from mining FDI, with crowding in effect on both manufacturing FDI and financial services FDI observed for this group.

The results indicate that contrary to some claims, mining FDI has some linkages with other sectors. The potential of mining FDI to attract manufacturing FDI and financial services FDI for some cases indicates its potential to attract activities that can induce potential spillover effects (as cited in previous studies) to the host country economy.

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Appendix 1: Figures

Figure 1. World Sectoral FDI Net Inflows, 1990-2010

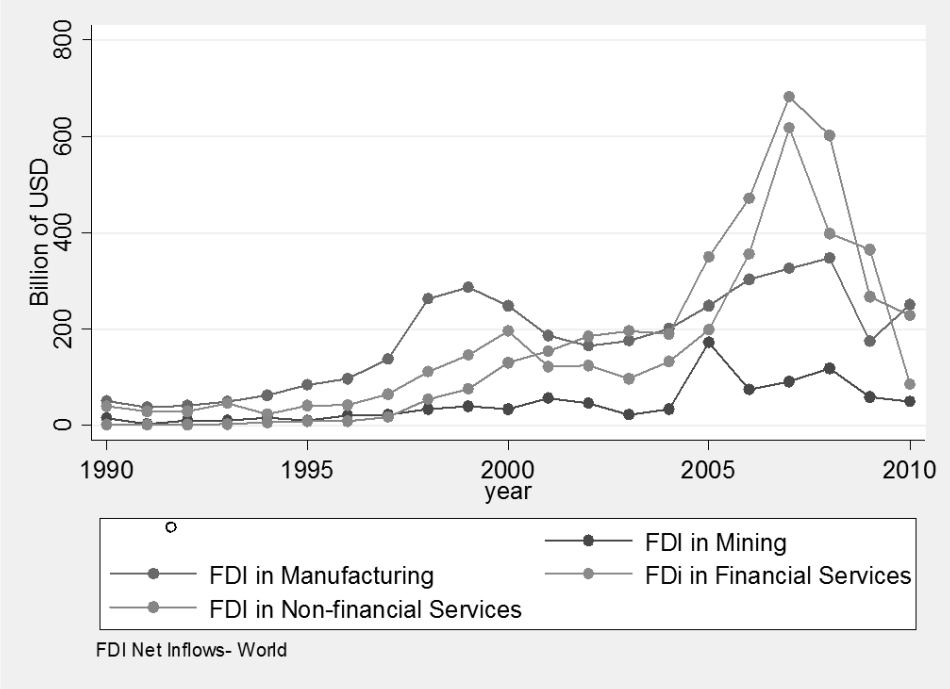
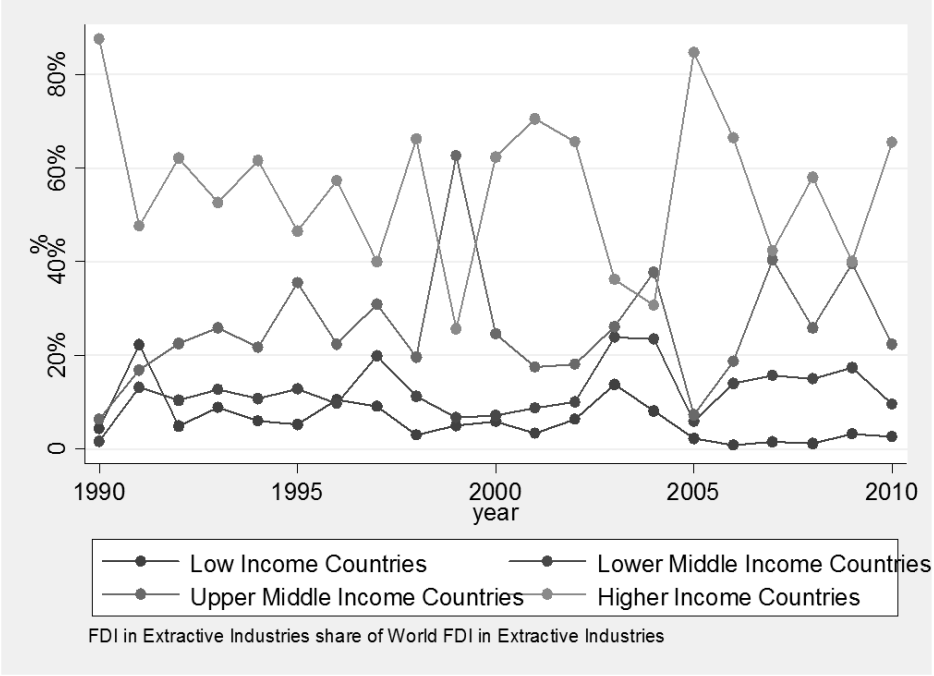


Figure 2.Income Group FDI in Extractive Industries as a Share of World FDI in Extractive Industries



Appendix 2: Countries and Years of Data

Lower Middle Income Countries:

Albania 2004- 2006, Armenia 1998- 2002; 2008-2009, Azerbaijan 1995- 2008, Bolivia 1974- 2008, Bosnia and Herzegovina 2004- 2009, China 1997-2008, Colombia 1994- 2009, Dominican Republic 2001- 2010, Ecuador 1986-2010, El Salvador 2007-2008, Guyana 1992- 1999, Indonesia 1999- 2010, Jamaica 1998- 2009, Macedonia, FYR 1997- 2010, Morocco 1996- 2010, Nicaragua 1991- 2010, Paraguay 1991-1993, Peru 1974- 2010, Philippines 1974-2010, Syrian Arab Republic 2004- 2008, Thailand 1970- 2010, Tunisia 1980- 2010, Ukraine 2003- 2004.

Upper Middle Income Countries:

Argentina 1978- 2010, Belize 2004-2010, Brazil 1996- 2010, Bulgaria 1999-2010, Chile 1974- 2010, Croatia 1996-2010, Hungary 1999-2010, Kazakhstan 1993-2009, Latvia 1999-2010, Lithuania 1997-2010, Malaysia 1999- 2010, Mexico 1985- 2010, Oman 1992-1995; 2004- 2009, Poland 1994- 2009, Romania 2003-2008, Russian Federation 1998- 2009, Serbia 2004-2008, Slovak Republic 2000-2008, Turkey 1992- 2010, Uruguay 2006- 2008, Venezuela 1976- 2008.

High income Countries:

Australia 1985- 2010, Austria 1998- 2010, Belgium 2002- 2010, Brunei Darussalam 1999- 2003, Canada 1985-2005, Cyprus 1997-2008, Czech Republic 1993-2010, Denmark 1985- 2010, Estonia 1996- 2010, Finland 2002-2010, France 1985- 2010, Germany 1985- 2010, Greece 2001- 2010, Iceland 1988- 2010, Israel 2000- 2007, Italy 1985- 2010, Japan 2009-2010, Korea, Rep. 1985- 2010, Luxembourg 2005- 2009, Netherlands 1991- 2010, New Zealand 1985-1989, Norway 1994- 2010, Portugal 1985- 1995; 2008-2010, Saudi Arabia 2004- 2010, Singapore 1999-2003, Slovenia 2006- 2010, Spain 1985- 2010, Sweden 1989- 2005, Trinidad and Tobago 1974- 2009, United Kingdom 1985- 2010, United States 1985- 2010.

South and East Asia and the Pacific:

Australia, Bangladesh, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Korea, Dem. Rep., Lao PDR, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Thailand, Vietnam.

Europe and Central Asia:

Albania, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Macedonia, FYR, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Ukraine, United Kingdom.

Appendix 3: Tables

Table 1. Coefficient of Mining FDI as a Share of GDP Variable on Specification that Includes Government Stability Variable

Country groups	Manufacturing FDI/GDP	Services FDI/GDP	Financial FDI/GDP	Nonfinancial Services FDI/GDP
All Countries	.056 (1.06)	-.022 (-0.65)	-.106 (-1.48)	-.029 (-1.09)
Lower Middle Income Countries	**.427***** **(4.09)**	0.002 (0.03)	**.419***** **(3.39)**	0.083 (0.53)
Upper Middle Income Countries	0.042 (1.26)	**-.048***** **(-2.65)**	-0.015 (-0.85)	-0.0315 (-1.28)
High income Countries	0.675 (1.62)	**-1.154***** **(-2.69)**	**-1.185***** **(-3.33)**	0.082 (0.19)
Europe and Central Asia	**.397***** **(4.95)**	**.162*** **(1.74)**	-0.103 (1.20)	0.109 (1.15)
South and East Asia and the Pacific	**.175*** **(1.85)**	-0.218 (-0.76)	**.532***** **(4.11)**	0.009 (0.04)

*Each entry represents Mining FDI coefficient (and its z-value) in regressions determining respectively: manufacturing FDI; Total Service FDI; Financial Services FDI and Non-Financial Services FDI.;

* Level of significance: *-10%, **-5%; ***-1%

Table 2. Coefficient of Mining FDI as a Share of GDP Variable on Specification that Includes Democratic Accountability Variable

	Manufacturing FDI/GDP	Services FDI/GDP	Financial FDI/GDP	Nonfinancial FDI/GDP
All Countries	.062 (1.15)	-.019 (-0.57)	-.035 (-1.43)	-.027 (-1.09)
Lower Middle Income Countries	**.398***** **(3.85)**	0.01 (0.14)	**.549***** **(4.26)**	0.094 (0.62)
Upper Middle Income Countries	0.033 (1.08)	**-.052***** **(-3.26)**	**-.033*** **(-1.69)**	-0.021 (-1.36)
High income Countries	0.566 (1.25)	**-1.394***** **(-3.26)**	**-1.218***** **(-2.94)**	0.098 (0.23)
Europe and Central Asia	**.341***** **(5.75)**	**.214**** **(2.56)**	**-.166**** **(-1.99)**	0.056 (0.63)
South and East Asia and the Pacific	0.1 (0.92)	-0.291 (-0.93)	**.649***** **(6.06)**	**.158**** (1.95)

*Each entry represents Mining FDI coefficient (and its z-value) in regressions determining respectively: manufacturing FDI; Total Service FDI; Financial Services FDI and Non-Financial Services FDI.;

* Level of significance: *-10%, **-5%; ***-1%

Table 3. Coefficient of Mining FDI as a Share of GDP Variable on Specification that Includes Both the Government Stability and the Democratic Accountability Variables

	Manufacturing FDI/GDP	Services FDI/GDP	Financial FDI/GDP	Nonfinancial FDI/GDP
All Countries	.059 (1.14)	-.024 (-0.71)	-.027 (-1.22)	-.031 (-1.22)
Lower Middle Income Countries	**.421***** **(4.14)**	0.013 (0.17)	**.501***** **(4.17)**	0.107 (0.72)
Upper Middle Income Countries	0.04 (1.26)	**-.058***** **(-3.43)**	**-.042**** **(-2.23)**	-0.018 (-1.16)
High income Countries	0.587 (1.32)	**-1.388***** **(-3.15)**	**-1.243***** **(-2.66)**	0.142 (0.32)
Europe and Central Asia	**.396***** **(4.8)**	0.162 (1.62)	-0.126 (1.45)	0.058 (0.58)
South and East Asia and the Pacific	0.153 (1.57)	-0.257 (-0.81)	**.628***** **(5.14)**	0.824 (0.03)

*Each entry represents Mining FDI coefficient (and its z-value) in regressions determining respectively: manufacturing FDI; Total Service FDI; Financial Services FDI and Non-Financial Services FDI.;
* Level of significance: *-10%, **-5%; ***-1%

Table 4: Lower Middle Income Countries

Independent variables	Dependent variables (1) Manufacturing FDI/GDP	(2) Services FDI/GDP	(3) Financial FDI/GDP	(4) Non-financial FDI/GDP
Log of Lagged FDI/GDP	**.447*** (6.2)**	**.536*** (5.28)**	**.585*** (4.94)**	**.403*** (2.87)**
Log of Real GDP per capita	-0.00008 (-0.46)	-0.0001 (-1.31)	-0.00005 (-0.45)	-0.00001 (-0.07)
Mining FDI as a share of GDP	**.427*** (4.09)**	0.002 (0.03)	**.419*** (3.39)**	0.083 (0.53)
Government Stability	**.167*** (2.78)**	0.008 (0.19)	**-.168** (-2.52)**	0.015 (0.24)
Gross secondary enrollment ratio	0.418 (0.84)	-0.153 (-0.28)	-0.193 (-0.29)	**-1.360** (-2.36)**
Natural resources rents	-0.501 (-1.09)	**-1.243** (2.27)**	-1.752 (-0.92)	0.62 (0.78)
Real Exchange Rate	-0.132 (-0.04)	0.071 (-0.03)	-1.994 (-0.49)	0.75 (-0.44)
Observations	177	185	99	106
Number of countries	21	21	18	18
AR(2)	0.26	0.009	0.691	0.066

* Level of significance: *-10%, **-5%; ***-1%

Table 5. Upper Middle Income Countries

Independent variables	Dependent variables (1) Manufacturing FDI/GDP	(2) Services FDI/GDP	(3) Financial FDI/GDP	(4) Non-financial FDI/GDP
Log of Lagged FDI/GDP	**.498*** (4.59)**	**.543*** (3.43)**	**.670*** (4.22)**	**.379** (2.12)**
Log of Real GDP per capita	-0.00007 (-1.20)	**-.0001** (-1.96)**	5.90E-06 (0.09)	**-.0001* (-1.68)**
Mining FDI as a share of GDP	0.042 (1.26)	**-.048*** (-2.65)**	-0.015 (-0.85)	-0.0315 (-1.28)
Government Stability	-0.067 (-1.16)	0.032 (0.55)	-0.018 (-0.21)	0.001 (-0.03)
Gross secondary enrollment ratio	0.813 (0.87)	**2.330** (2.06)**	0.665 (0.84)	1.367 (1.04)
Natural resources rents	-0.305 (-0.26)	-0.634 (-0.83)	-0.964 (-1.08)	-0.572 (-0.44)
Real Exchange Rate	1.463 (1.12)	-3.558 (-1.02)	**4.061* (-1.84)**	1.94 (0.80)
Observations	183	182	177	157
Number of countries	19	19	18	18
AR(2)	0.279	0.214	0.81	0.096

* Level of significance: *-10%, **-5%; ***-1%

Table 6. High Income Countries

Independent variables	Dependent variables (1) Manufacturing FDI/GDP	(2) Services FDI/GDP	(3) Financial FDI/GDP	(4) Non-financial FDI/GDP
Log of Lagged FDI/GDP	**.451*** (5.58)**	**.446*** (7.84)**	**.215*** (3.80)**	**.605*** (6.39)**
Log of Real GDP per capita	1.41E-06 (0.14)	-2.68E-06 (-0.21)	**-.00002** (-2.46)**	**-.00002** (-2.41)**
Mining FDI as a share of GDP	0.675 (1.62)	**-1.154*** (-2.69)**	**-1.185*** (-3.33)**	0.082 (0.19)
Government Stability	-0.013 (-0.25)	0.102 (1.56)	0.037 (0.51)	0.03 (0.49)
Gross secondary enrollment ratio	**.994* (1.72)**	0.168 (0.34)	-0.344 (-0.68)	0.49 (0.33)
Natural resources rents	-0.406 (-0.40)	**-1.461* (-1.71)**	-1.083 (-1.59)	0.018 (0.03)
Real Exchange Rate	7.525 (1.57)	1.283 (0.35)	9.535 (1.05)	4.779 (1.01)
Observations	244	235	242	197
Number of countries	24	25	22	21
AR(2)	0.523	0.041	0.162	0.101

* Level of significance: *-10%, **-5%; ***-1%

Table 7. Europe and Central Asia

Independent variables	Dependent variables (1) Manufacturing FDI/GDP	(2) Services FDI/GDP	(3) Financial FDI/GDP	(4) Non-financial FDI/GDP
Log of Lagged FDI/GDP	**.462*** (5.22)**	**.604*** (6.91)**	**.512*** (3.63)**	**.581*** (7.16)**
Log of Real GDP per capita	**-.00001* (-1.81)**	**-.00001** (-2.21)**	-0.00001 (-1.53)	**-.00002** (-2.45)**
Mining FDI as a share of GDP	.397*** (4.95)	.162* (1.74)	-0.103 (-1.20)	0.109 (1.15)
Government Stability	-0.062 (-1.18)	0.056 (1.13)	-0.071 (-.071)	-0.003 (-0.06)
Gross secondary enrollment ratio	**1.509*** (2.69)**	**1.275** (2.46)**	**1.404** (1.97)**	**1.475*** (3.11)**
Natural resources rents	-0.076 (-0.13)	**-1.929** (-2.48)**	**-2.352*** (-3.33)**	-0.361 (-0.44)
Real Exchange Rate	4.014 (1.37)	**5.311* (1.83)**	**10.795** (2.22)**	**6.612** (2.13)**
Observations	290	268	278	238
Number of countries	32	31	30	30
AR(2)	0.654	0.153	0.079	0.054

* Level of significance: *-10%, **-5%; ***-1%

Table 8. South and East Asia and the Pacific

	Dependent variables			
Independent variables	(1) Manufacturing FDI/GDP	(2) Services FDI/GDP	(3) Financial FDI/GDP	(4) Non-financial FDI/GDP
Log of Lagged FDI/GDP	**.557*** (7.54)**	**.372*** (3.9)**	**.434*** (3.71)**	0.254 (1.3)
Log of Real GDP per capita	-0.00002 (-0.96)	**-.00004*** (-4.61)**	-0.00004 (-1.27)	-0.00004 (-1.10)
Mining FDI as a share of GDP	**.175* (1.85)**	-0.218 (-0.76)	**.532*** (4.11)**	0.009 (0.04)
Government Stability	**.178*** (2.87)**	**.154** (2.17)**	**-.183** (-2.13)**	0.095 (0.47)
Gross secondary enrollment ratio	0.534 (1.33)	**.808*** (2.96)**	1.04 (1.29)	0.475 (0.48)
Natural resources rents	0.433 (0.68)	-0.121 (.121)	**6.508* (-1.69)**	4.357 (0.64)
Real Exchange Rate	-2.34 (-0.98)	**-9.846*** (-4.03)**	**-13.078* (-1.96)**	-3.766 (-0.75)
Observations	104	104	70	71
Number of countries	11	13	10	9
AR(2)	0.092	0.375	0.057	0.475

* Level of significance: *-10%, **-5%; ***-1%

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