THE FOREIGN DIRECT INVESTMENT JOB MULTIPLIER DURING A RESOURCE BOOM

EVIDENCE FROM MONGOLIA

Nagham Sayour and Marcel Schröder

NO. 642

December 2021

ADB ECONOMICS WORKING PAPER SERIES

ASIAN DEVELOPMENT BANK

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ADB Economics Working Paper Series

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No. 642 | December 2021

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We thank seminar participants at the Asian Development Bank. We are also grateful to Nedelyn M. Ramos for her excellent research assistance.

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ISSN 2313-6537 (print), 2313-6545 (electronic)
Publication Stock No. WPS210454-2
DOI: http://dx.doi.org/10.22617/WPS210454-2

Note:
In this publication, "$" refers to United States dollars.

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ABSTRACT

This paper explores the job creation impacts of the large foreign direct investment (FDI) inflows to Mongolia's non-resource sector following the signing of the investment agreement for the Oyu Tolgoi mine in 2009. Using FDI project and national employment data over 2009–2013, we employ a triple difference methodology on the sector–province (*aimag*)-year level. The results suggest that each FDI job and every $1 million FDI inflow displace 5.5 and 20 local jobs, respectively. Several factors may explain this result: the majority of FDI was targeted at sectors such as transportation and retail where efficiency gains led to job losses; the low skill-intensity of FDI jobs in those sectors; the low labor supply elasticity in Ulaanbaatar where most of the FDI projects are concentrated; and the limited extent of localized supply chains.

Keywords: resource boom, foreign direct investment, local job multiplier, Mongolia

JEL codes: F21, J21, O11, Q32, Q33

I. INTRODUCTION

Resource booms can lead to impressive growth rates in resource-rich developing countries (RRDCs).[1] Nevertheless, many observers consider these economies subject to the resource curse[2] and perceive resource-based growth as not inclusive because, among others, the extractive sector's capital and skill intensity tends to impede sufficient job creation.

In this paper, we examine one job creation channel during a resource boom in Mongolia. Specifically, we estimate the local job multiplier associated with the large foreign direct investment (FDI) inflows to the country's non-resource sector that were triggered by the signing of a $10 billion investment agreement (IA) between Rio Tinto and the government for the Oyu Tolgoi (OT) gold and copper mine in the Southern Gobi Region in October 2009. We focus our analysis explicitly on the non-resource sector where the positive economic effects of FDI are more pronounced than in the extractive sector (Alfaro and Charlton 2013).

Toews and Vezina (2020) is the only previous study examining the above job creation channel in an RRDC context. They first show that these countries experience an increase in FDI into non-resource sectors such as retail, manufacturing, and construction by 56% on average in the 2 years following large oil and gas discoveries. They then study the labor market impacts of an FDI boom in Mozambique, where a large offshore natural gas field was discovered in 2009. They estimate the local FDI job multiplier and find that each FDI job in the non-resource sector has led to 4.4 additional jobs for a total of 893,000 out of around 8.9 million jobs in Mozambique. However, it is not clear that their result can be generalized across RRDCs given that the labor market effects of FDI and the sign of job multipliers are both a priori ambiguous (Moretti 2010; UNCTAD 1994).

We use project-level data from the Financial Times' fDi Markets database to disentangle FDI inflows to the extractive sector from those of the non-resource sector. Since the deposit discovery in the OT area and negotiation of a formal IA stretched over years, we argue that the actual event and timing of the IA signature was unpredictable and thus akin to an "exogenous news shock," which attracted significant FDI inflows to Mongolia.

In the 4 years after the IA, we find that foreign investors initiated 34 non-resource projects in sectors such as retail and transportation, which totalled $3.25 billion and created around 4,600 direct jobs; a substantial increase compared to the 24 projects totalling $970 million and 2,200 jobs in 6 years preceding the IA.

To estimate the FDI local job multiplier, we match the fDi Markets data to the total number of jobs by sector, *aimag*,[3] and year against the data from the National Statistics Office of Mongolia (NSOM). Due to data constraints, the beginning of the sample period is 2009 while we set the end point to 2013, which is the end of OT's construction period and just before the commodity price drop in July 2014 and the tax dispute between the government and Rio Tinto—both major shocks adversely affecting FDI inflows to Mongolia. Using a triple differences model at the *aimag*-sector-year level, we estimate two multipliers of around −5.5 and −20. The first multiplier suggests that every FDI job

[1] For example, Papua New Guinea's gross domestic product (GDP) grew by 15.4% in 2014, Mongolia's 17.3% in 2011, and Equatorial Guinea's 17.8% in 2008.

[2] For detailed reviews on the reasons behind the resource curse, see Frankel (2010) and van der Ploeg (2011).

[3] Provincial administrative unit in Mongolia.

created displaces 5.5 jobs while the second multiplier implies that every $1 million FDI inflows result to around 20 job losses in the Mongolian local economy. We argue that several factors may explain the negative FDI job multiplier in Mongolia. Briefly, these include the fact that the majority of FDI inflows targeted at sectors such as transportation and retail where efficiency gains led to job losses; the low skill-intensity of FDI jobs in those sectors; the low labor supply elasticity in Ulaanbaatar where most of the FDI projects are concentrated; and a potentially limited extent of localized supply chains.

This paper fits in the vein of previous studies examining the link between resource booms and job creation. Theoretical models building on Corden and Neary's (1982) seminal work on the Dutch disease predict that a resource boom causes real exchange rate appreciation, which may lead to lower output in the manufacturing sector and higher unemployment (Eastwood and Venables 1982, van Wijnbergen 1984). Empirically, the association between job growth and resource booms in developing economies is mixed. For instance, economies such as the United Arab Emirates (UAE), Qatar, and Papua New Guinea (PNG) experienced employment growth more than the population growth rate during the recent commodity price boom,[4] while sluggish employment creation in Uzbekistan resulted in significant outward migration. In any case, it is difficult to fully assess a resource boom's impact on the labor market, especially at the national level since the counterfactual is not known. Several studies thus rely on quasi-experimental designs at the subnational level to study this issue (Black, McKinnish, and Sanders 2005; Marchand 2012; Weber 2012; Fleming and Measham 2015; Komarek 2016), but not in developing economies, which lack the required census data.

The rest of the paper is organized as follows. Section II sheds light on the links between a resource boom, non-resource FDI inflows, and job creation. Section III provides contextual information on the Oyu Tolgoi mine. Section IV describes the data, estimates the local FDI job multipliers, and presents the results. Section V concludes the paper.

II. RESOURCE BOOMS, NON-RESOURCE FOREIGN DIRECT INVESTMENT, AND LOCAL JOB MULTIPLIERS

This section discusses the link between resource booms triggered by new resource projects and FDI inflows into the non-resource sector on the one hand, and FDI and job creation on the other. In relation to the former, this is driven by a need for direct support of the extractive sector such as transportation, accommodation, professional services, and others. Another factor is multinationals' anticipation of higher national income and thus, demand for construction, retail products, or manufactured products. Using fDi Markets data on a sample of 29 economies which had oil and gas field discoveries between 2003 and 2014, Toews and Vezina (2020) estimate that non-resource FDI inflows increase on average by 56% in 2 years following the discoveries in these economies. They also find that this increase is driven by the extensive margin in the number of FDI projects, source economies, and targeted sectors.

In this paper, we are specifically interested in the local job multiplier associated with FDI inflows. That is, every time an FDI project creates a new job, the multiplier measures how many

[4] As per national employment data, the average annual employment growth rate was 9.5% between 2002 and 2011 in the UAE, 13.2% between 2006 and 2012 in Qatar, and 4.6% between 2002 and 2012 in the formal sector in PNG.

additional jobs will be created or displaced in the local economy. In general, one expects a positive multiplier as the initial increase in jobs boosts income and thus demand for local goods and services; although general equilibrium effects through higher wages and prices partially offset this positive impact on employment (Moretti 2010). However, in the tradable sector where prices are set internationally and thus cannot adjust, the higher labor costs could even result in a negative job multiplier. In general, the magnitude of the multiplier positively depends on the skill-intensity of the new jobs created, the extent to which supply chains are localized, and the labor supply elasticity.

How do FDI inflows affect employment? Theoretically, the relationship between FDI and job creation is ambiguous and depends on a host of factors (UNCTAD 1994). There could be a direct positive impact on employment as FDI inflows add to the capital stock in expanding industries. Indirect positive effects can also be generated through forward and backward linkages of foreign affiliates with firms in the domestic economy. FDI also leads to higher wages (Hale and Xu 2016), which can boost employment through the increase in demand for domestic goods and services. Conversely, job losses may occur when foreign acquisitions lead to rationalization or foreclosures of existing firms because of increased competitive pressure. Likewise, when FDI targets well-established but inefficient sectors, ensuing sectoral productivity gains can lead to local job displacement.

Accordingly, empirical results on the FDI-employment nexus are mixed, although they lean towards a positive effect.[5] For example, Coniglio, Prota, and Seric (2015) find that foreign firms in Sub-Saharan Africa create relatively more unskilled jobs than local ones. Other studies by Karlsson et al. (2009) and Waldkirch, Nunnenkamp, and Bremont (2009) conclude that FDI has a positive impact on employment in the People's Republic of China's manufacturing sector or Mexico's non-maquiladora industry, while Marelli, Resmini, and Signorelli (2014) and Atkin, Faber, and Gonzalez-Navarro (2017) find no such effect in Mexico or Eastern and Central Europe. Among the studies suggesting that FDI reduces employment are those of Jude and Silaghi (2016) and Neumark, Zhang, and Ciccarella (2008).

In summary, we conclude that the sign and magnitude of the FDI job multiplier are both a priori ambiguous.

III. OYU TOLGOI CONTEXT

There is evidence that the history of copper extraction in the Oyu Tolgoi (OT) or Turquoise Hill area goes as far back as to the Bronze Age. In modern times, it was first Soviet geologists conducting a study that reported possible copper deposits in 1957. In the early 1980s, Mongolian scientists carried out preliminary geological and geochemical mapping. After the fall of the Soviet Union in 1991, Western mining companies entered the playing field in Mongolia. In the OT area, BHP (formerly BHP Billiton) received an exploration license in 1997, which was then acquired by the Canadian mining company Ivanhoe Mines in 1999. Ivanhoe Mines continued major exploration works in the following years, but the Hugo Dummett deposit, which contains one of the world's highest-grade coppers, was only discovered in 2005.

[5] For a comprehensive literature review, refer to Hale and Xu (2016).

In September 2006, the Government of Mongolia initiated a committee to work out a formal Oyu Tolgoi IA. A month later, Rio Tinto formed a strategic partnership with Ivanhoe Mines. In October 2009, the Government of Mongolia signed with Rio Tinto and Invanhoe Mines a formal IA, which specified tax arrangements, the 34% ownership stake of the government in the project, and the next development phases. The OT project has progressed in two stages. First, the open pit mine underwent construction from 2010 to 2013.[6] Second, the underground pit where over 80% of OT's value lies is under development.

Toews and Vézina (2020) and Arezki, Ramey, and Sheng (2017) consider the discovery of oil and gas fields an exogenous news shock that triggers FDI inflows. However, a resource discovery is often not immediately succeeded by the construction and extraction phases. Especially in RRDCs, the development of large-scale resource projects is typically preceded by detailed negotiations between the government and multinational companies about tax payments and other issues. Foreign investors seek to reduce their risks by agreeing on terms that allow a quick recovery of their substantial capital expenditures (often amounting to several billion dollars) such as accelerated depreciation or special tax credits.[7] Provisions of this kind are typically not stipulated in RRDCs' standard mining tax codes.[8] If the negotiations between the government and multinational companies fail, the project is unlikely to proceed.

Therefore, we argue that the factor attracting FDI inflows is not the deposit discovery, but a formal IA. In the case of OT, the deposit discoveries stretched over several years and the government had already established a committee to negotiate an IA in 2006. To further corroborate this idea, Figure 1 shows that Mongolia's country risk, a proxy for market expectations, immediately dropped, to the lowest level during the first quarter (Q1) of 2007 until Q2 2020, when the IA was signed.[9] We argue that the event and actual timing of the IA in October 2009 was unpredictable for economic actors and thus akin to an exogenous news shock.

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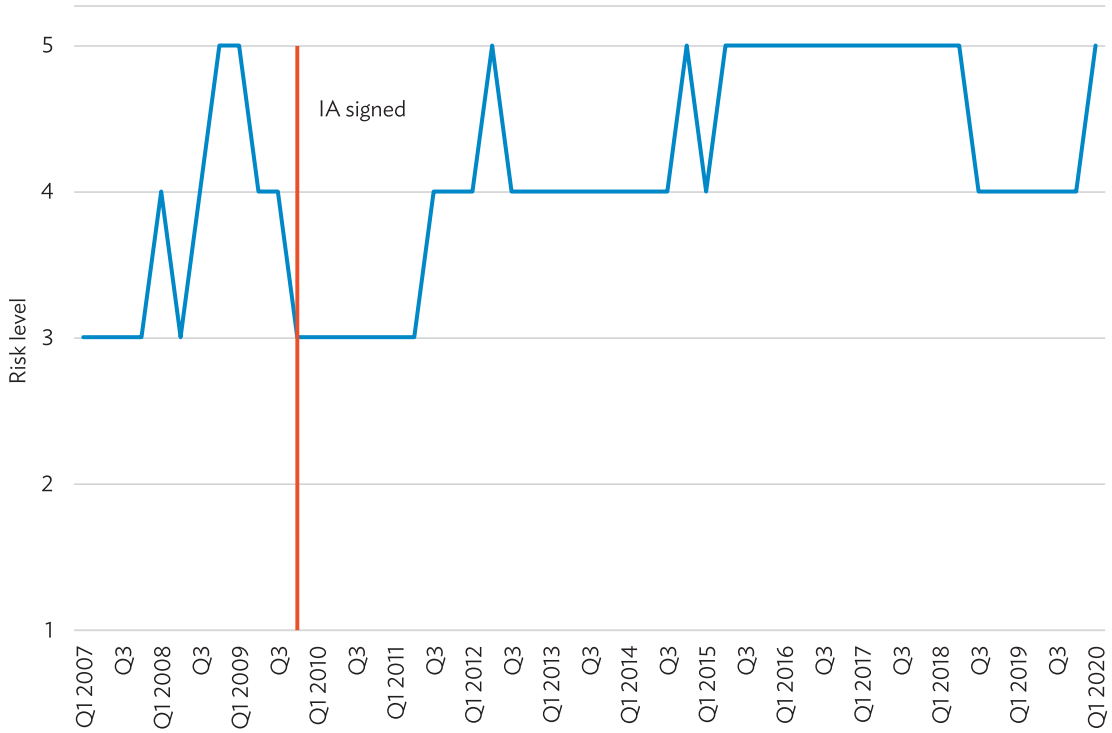
6 In 2012, Rio Tinto became majority stakeholder in Ivanhoe Mines whose name then changed to Turquoise Hill Resources.

7 The Government of Mongolia has agreed to a number of tax and financing incentives for OT such as accelerated depreciation; loss carry-forward provisions allowing Rio Tinto to deduct initial investments (losses) from taxable income; and a 10% tax investment credit meaning taxable income is reduced by 10% of the total qualifying investment value (Namkhaijantsan and Schröder 2020).

8 In simplified form, Mongolia's mining law mandates the royalty rate (5% of sales), additional royalty (2.5%–5.0%), corporate income tax (25%), dividend withholding tax (20% for nonresidents), the right for the government to acquire up to 34% interest in a resource project if a private company made the initial deposit discovery, and others. Note that the provisions in the OT IA discussed in note 7 are not part of the standard mineral law (see Namkhaijantsan and Schröder 2020).

9 To our knowledge, this is the longest available measure of country risk for Mongolia.

Figure 1: Country Risk, Mongolia, Q1 2007–Q1 2020



IA = investment agreement, Q=quarter.

Note: Country risk level is classified as 1= very low, 2=low, 3=medium, 4=high, and 5=very high.

Source: PricewaterhouseCoopers. Country Risk Map. https://www.pwc.com/gx/en/issues/economy/country-risk-premia-quarterly-update.html.

IV. THE FOREIGN DIRECT INVESTMENT LOCAL JOB MULTIPLIER

This section estimates the local job multiplier of FDI inflows into Mongolia's non-resource sector. We begin by laying out the data sources and then show that FDI to Mongolia has indeed increased substantially in the years after the signing of the IA for OT in 2009.

A. Foreign Direct Investment Inflows: Data, Trends, and Patterns

We use fDi Markets data by the Financial Times Group, which provide information on FDI inflows to Mongolia at the project level since 2003. The data track cross border greenfield FDI flows and specifies for each project the total value;[10] the number of jobs created; the source country; the destination city; and the targeted sector. The data allow us to distinguish between projects in the

[10] We deflate FDI inflows by the US consumer price index (CPI).

extractive and non-resource sectors. We note that the fDi Markets data may be measured with error in some cases because of several potential sources. First, the data are based on announcements, which may differ from actual realizations. Second, some projects are carried out over multiple years, but are attributed only to a specific year. Third, a project's value and/or the number of jobs is estimated in instances where investors do not disclose information. And fourth, the reported location refers to the headquarters of the company, but the actual operations may be carried out in a different location. We are not aware of alternative data sources at the project level in the case of Mongolia, which leaves us with carrying out the analysis below with these caveats in mind.

The sample period of our analysis is 2003–2013. The end point coincides with the boom triggered by OT's first construction phase and precedes the sharp commodity price drop in July 2014 and a tax dispute between the government and Rio Tinto that both acted as major shocks to FDI flows to Mongolia.[11] Since we are interested in the labor market effects of the exogenous FDI inflows triggered by the IA, this is the appropriate sample period.[12] Table 1 reports summary statistics for the 58 non-resource FDI projects over 2003–2013. Comparing the average FDI project after the IA to the one before, the value more than doubled from about $40 million to $95 million, while total inflows increased from $980 million to $3.25 billion (Panels B and C). FDI projects also created more direct jobs on average in the post IA years, which resulted in a total of 4,663 jobs compared to 2,241 before. Foreign investors' projects also targeted more sectors post the IA.

Table 1: Descriptive Statistics

	Panel A 2003–2013		Panel B 2003–2009		Panel C 2010–2013	
Variable	**Total**	**Mean**	**Total**	**Mean**	**Total**	**Mean**
Number of jobs created	6,904	119.03	2,241	93.38	4,663	137.15
		(160.08)		(79.68)		(197.53)
Inflows per project ($ million)	4,224.70	72.84	973.88	40.58	3,250.82	95.61
		(178.49)		(53.47)		(227.47)
Number of projects per year	NA	5.27	NA	3.43	NA	8.50
		(3.77)		(2.82)		(3.11)
Number of economies per year	NA	4.18	NA	3.0	NA	6.25
		(2.52)		(2.08)		(1.89)
Number of sectors per year	NA	3.73	NA	2.86	NA	5.25
		(2.20)		(2.19)		(1.26)

NA = not applicable.

Notes: Panel A reports the total, mean, and standard deviation (in parentheses) for the whole sample (N=58), Panel B for the period before the IA (N=24), and Panel C for after the IA (N=34).

Source: Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020).

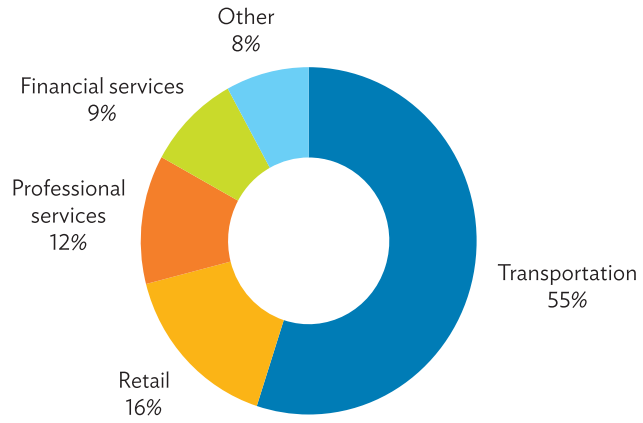
Figure 2 illustrates the sectoral breakdown of direct FDI jobs created in 2010–2013. More than half of the jobs sprang up in the transport sector, one out of six in retail, and about one out of eight in the professional services sector. In total, these three sectors account for over 80% of all direct FDI jobs. A slightly different picture emerges in terms of FDI inflows by sector as shown in Figure 3.

[11] For more details on this period, we refer to Namkhaijantsan and Schröder (2020).

[12] For robustness, we also consider different end points as shown in Table 1.

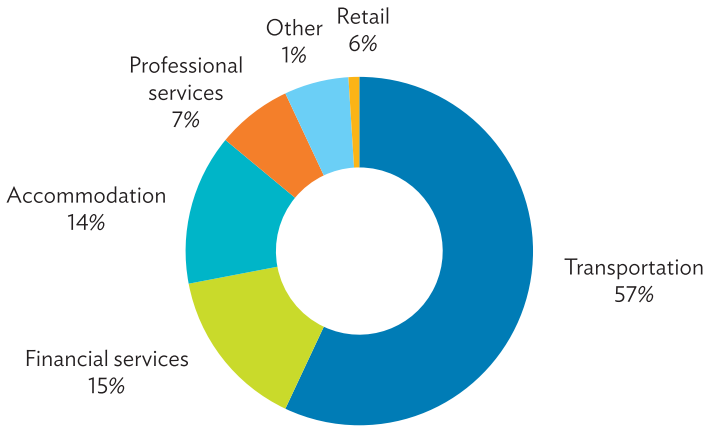
Close to 60% of FDI inflows were directed at the transport sector, while retail and professional services combined only constitute 13% of the total, which reflects the labor-intensity of these sectors.

Figure 2: Foreign Direct Investment Jobs by Sector, 2010–2013



Source: Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020).

Figure 3: Foreign Direct Investment Inflows by Sector, 2010–2013



Source: Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020).

To formally test the impact of the IA on FDI, we begin by estimating the following equation:

$$Y_t = \beta_1 post_t + u_t \quad (1)$$

We use the following dependent variables, Y_t (each referring to non-resource sectors): the number of FDI jobs created in year t; the total FDI inflows; the number of FDI projects in non-resource sectors; the number of source economies; and the number of targeted sectors. The dummy

variable $post_t$ indicates the years after the IA, i.e., 2010–2013. The coefficient β_1 captures any changes in the FDI characteristics before and after the IA signature.

Table 2 presents the results. All point estimates of β_1 are positive and significant. They suggest that between 2010 and 2013, the number of FDI jobs increased by 846, the total value of FDI inflows by $674 million, the number of FDI projects by 5.1, the number of source economies by 3.25, and the number of destination sectors by 2.4. Overall, this analysis demonstrates that there was a substantial increase in FDI after 2009 in all aspects, and that foreign investors came from more source economies and broadened their destination sectors.

Table 2: Foreign Direct Investment Characteristics

	(1) FDI jobs	(2) Total inflow	(3) Projects	(4) Source economies	(5) Destination sectors
Post	845.6**	673.6**	5.071**	3.25**	2.393*
	(315.4)	(227.5)	(1.830)	(1.267)	(1.211)
R-squared	0.444	0.493	0.460	0.423	0.302

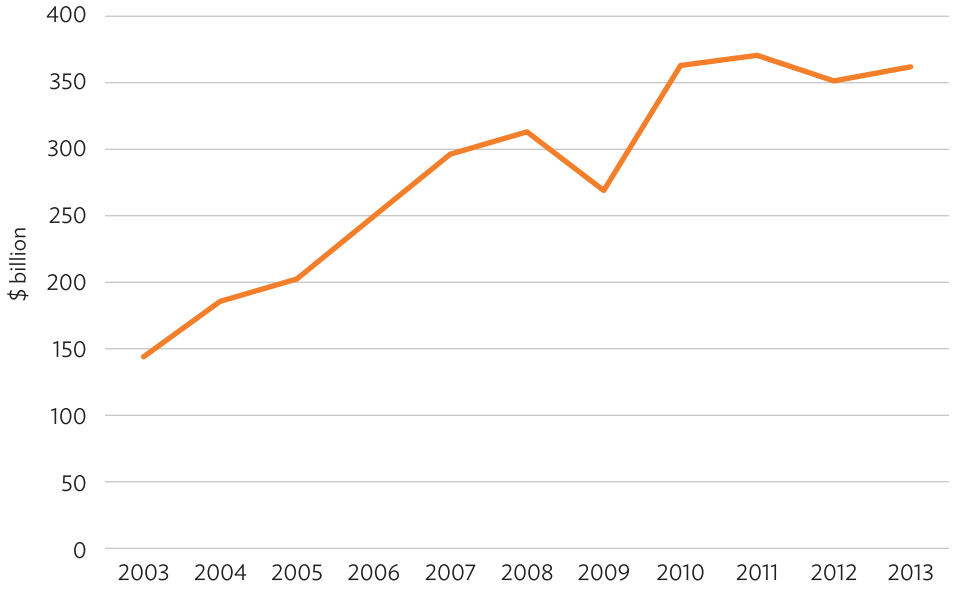
FDI = foreign direct investment.

Notes: ***, **, * denote levels of significance at 1%, 5%, and 10%. Standard errors in parentheses. Sample period is 2003–2013. Sample size is 11.

Source: Authors' estimate using data from Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020).

An issue is that the above regressions cannot disentangle the effect of the IA from other factors that might have also attracted non-resource FDI such as a general boost to foreign investment in developing economies after the global financial crisis (GFC) in 2009. To explore this possibility, Figure 4 plots total FDI inflows to developing Asia. The evolution of foreign investment in developing Asia resembles a general linear upward trend, except in 2009 during the GFC, when FDI inflows took a temporary hit. This is in contrast to the pattern of non-resource FDI flows to Mongolia over 2003–2013, which surged substantially only after the OT IA in 2009, and particularly in the years 2010 and 2013 (Figure 5).

Figure 4: Foreign Direct Investment Inflows to Developing Asia, 2003–2013

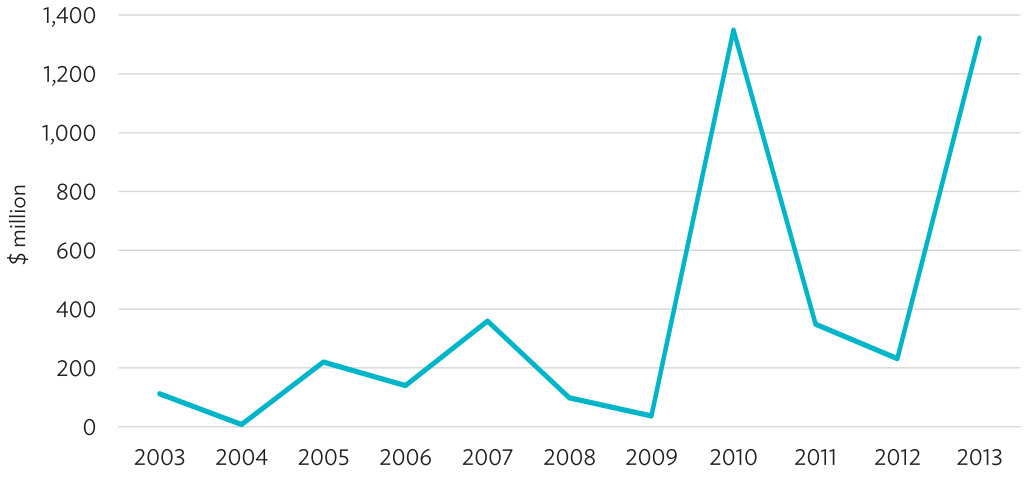


Notes: Foreign direct investment inflows are deflated using the US consumer price index. Developing Asia in this figure comprises the following economies: Afghanistan*; Armenia; Azerbaijan; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Kazakhstan; Kiribati; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Maldives; the Marshall Islands; Myanmar; Nepal; Pakistan; Palau; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Samoa; Singapore; Solomon Islands; Sri Lanka; Taipei,China; Tajikistan; Thailand; Timor-Leste; Tonga; Turkmenistan; Tuvalu; Uzbekistan; Vanuatu; and Viet Nam.

* ADB placed on hold its assistance in Afghanistan effective 15 August 2021.

Source: UNCTAD. UNCTADstat. https://unctadstat.unctad.org/EN/ (accessed 7 October 2020).

Figure 5: Non-resource Foreign Direct Investment Inflows to Mongolia, 2003–2013



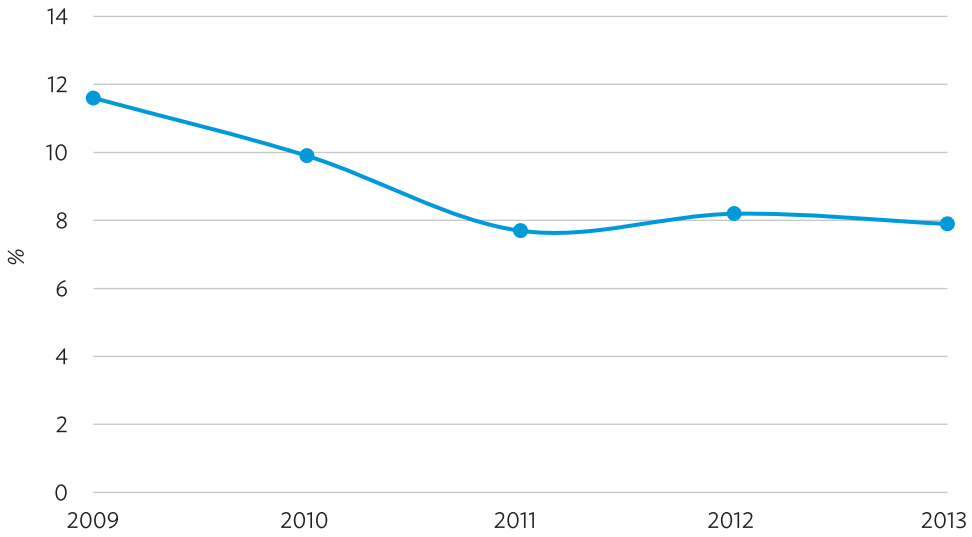
Source: Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020).

To explore these patterns more formally, we regress total FDI inflows to developing Asia first on $post_t$ and second on $post_t$ and a linear trend. The results suggest that a linear trend best describes FDI inflows to developing Asia, but not non-resource FDI to Mongolia (Appendix Table A1). Hence, considering the pattern together, we conclude that the IA was the decisive trigger for the observed increase in non-resource FDI to Mongolia.

B. Trends and Patterns in Employment

Table 3 reports employment data by sector retrieved from the NSOM for 2009 and 2013. The data are only available at annual frequency starting in 2009.[13] The overall employment situation improved markedly in the 4 years after the IA in that the Mongolian economy added almost 100,000 jobs, representing a yearly growth rate of 2.3%—a rate of growth that is higher than the 2.0% growth in the labor force (ages 15 and over). This translated into a decline in the unemployment rate from 11.6% in 2009 to 7.9% in 2013 (Figure 6).

Figure 6: Unemployment Rate, Mongolia, 2009-2013



Source: National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 30 October 2020).

The largest number of jobs were added in construction, public administration and others, and processing industries after 2009, whereas agriculture, the largest sector, continued to shrink. These outcomes are not surprising because resource booms spur demand for real estate and ease the government's budget constraint resulting in an increase in public sector employment. The fastest-growing sectors were financial services, information and communication technology (ICT), and professional services, which all experienced annual growth rates of over 10%. Even mining, which is

[13] The data used in this study do not contain information on wages and whether firms provide training for workers, and also do not distinguish between formal and informal employment. This prevents the analysis from examining job quality aspects as other studies of FDI and labor market effects such as Almeida (2007), Javorcik (2015), or Blanas, Seric, and Viegelahn (2019).

often considered skill and capital intensive and thus a small contributor to job growth, added a sizable 15,000 jobs. However, this is not an indication that Mongolia's mining sector is different, rather it reflects the huge size of the OT project relative to the rest of the economy and that this job growth took place during the construction phase, which involves more labor-intensive tasks than during the production phase.

Noteworthy is that the two largest sectors in terms of FDI jobs created—retail and transportation—recorded negative overall employment growth between 2009 and 2013. Retail, the third largest sector by employment, lost over 4,000 out of 160,000 jobs, while the number of workers in the transportation declined by almost 3,000 to about 66,000 during this period. This points to possible job displacement effects of the non-resource FDI inflows, which we examine in more detail below.

C. Estimating the Foreign Direct Investment Local Job Multiplier

In this section, we examine how the increase in the number of FDI jobs and FDI inflows following the IA in 2009 affected local non-FDI jobs. To do so, we match the fDi Markets observations to national labor market data retrieved from the NSOM on the total number of jobs per sector, *aimag*, and year. We consider the 13 non-resource sectors as listed in Table 3: accommodation; agriculture; arts; construction; electricity, gas, air conditioning supply; financial services; ICT; processing industries; professional services; public administration and other; retail; transportation; and water supply, sewage, waste management.

Table 3: Employment by Sector, 2009 and 2013

Sector	2009	2013	Change	Annual Growth (%)
Total	1,006,287	1,103,601	97,314	2.3
Accommodation	23,306	31,716	8,410	8.0
Agriculture	348,794	329,058	–19.736	–1.5
Arts	6,916	9,248	2,332	7.5
Construction	49,585	72,352	22,767	9.9
Electricity, gas, air conditioning supply	9,540	13,829	4,289	9.7
Financial services	12,265	20,909	8,644	14.3
Information and communication technology	10,143	16,746	6,603	13.4
Processing industries	62,730	80,989	18,259	6.6
Professional services	19,925	29,381	9,456	10.2
Public administration and other	193,225	219,324	26,099	3.2
Retail	160,311	155,982	–4,329	–0.7
Transportation	68,652	65,890	–2,762	–1.0
Water supply, sewage, waste management	6,097	7,905	1,808	6.7
Mining and quarrying	34,799	50,271	15,472	9.6

Source: National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 30 October 2020).

To estimate the FDI local job multiplier we employ a triple difference methodology and run the following regression:

$$Jobs_{ijt} = \alpha_{ij} + \beta_{it} + \gamma_{jt} + \theta FDI_{ijt} + \varepsilon_{ijt} \quad (2)$$

where the dependent variable, $Jobs_{ijt}$, is the number of local jobs in sector *i*, *aimag j* at time *t*, calculated as the difference in the total number of jobs (retrieved from NSOM) and the number of FDI jobs (retrieved from fDi Markets). FDI_{ijt} is the total number of FDI jobs, or the total value of FDI inflows ($ million) over 2010–2013. The term α_{ij} represents sector-*aimag* fixed effects that control for geographic impacts in specific sectors, β_{it} captures yearly effects in specific sectors, γ_{jt} are *aimag*-year fixed effects controlling for yearly shocks in *aimags*, and ε_{ijt} is the error term. We deal with the issue of serial correlation by clustering the standard error on the sector-*aimag*-year level (Bertrand, Duflo, and Mullainathan 2004). The coefficient of interest is θ, which captures the multiplier effect of FDI (jobs or inflows) on local jobs. If FDI were to have any impact on local jobs, we expect θ to be statistically significant.

Table 4 presents the results. In Column 1 the regressor is FDI jobs, while in Column 2 it is the total value of FDI inflows. The first row reports the triple difference point estimate of the FDI job multiplier, θ. The clustered standard errors are reported in parentheses below. For both regressors, the point estimate of θ is negative and statistically significant at conventional levels. The magnitude of the FDI job multiplier in Column 1 is −5.5, suggesting that each additional FDI job displaces 5.5 jobs in the local Mongolian economy. Since around 4,600 direct FDI jobs were created through new greenfield FDI projects over 2010–2013, this implies a total job loss of about 25,300 during this period. In Column 2, the point estimate of the FDI job multiplier is around −20, which indicates a local job loss of 20 for every $1 million of inflow. These are our baseline results.

Table 4: Triple Difference Results for Foreign Direct Investment Local Job Multiplier—Main Results

	(1) FDI jobs	(2) Total inflows
FDI job multiplier	−5.509**	−19.75**
	(2.398)	(8.843)
R-squared	0.972	0.972

FDI = foreign direct investment.

Notes: ** denotes significance at 5%. The dependent variable is non-FDI jobs. Regressions include sector-*aimag*, sector-year, and *aimag*-year fixed effects. Standard errors clustered on the sector-*aimag*-year level are reported in parentheses. Sample period is 2009–2013 and sample size is 1,235.

Sources: Authors' estimate using data from Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020); National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 20 May 2020).

D. Robustness

We conduct a number of robustness checks. We check whether clustering at the sector-*aimag*-year level affects the results. Table 5 reports standard errors without clustering (Column 1), clustering at the sector-*aimag* level (Column 2), *aimag*-year level (Column 3), and sector-year level (Column 4). In all cases, the results remain significant. When we control for *aimag*-specific time trends to relax

the assumption of common trends across *aimags*, the results remain virtually the same as in the baseline (Column 5).

Table 5: Foreign Direct Investment Local Job Multiplier—Robustness

	(1)	(2)	(3)	(4)	(5)
FDI jobs	−5.509***	−5.509*	−5.509***	−5.509**	−5.509**
	(1.291)	(2.949)	(1.205)	(2.471)	(2.398)
Total inflows	−19.75***	−19.75**	−19.75***	−19.75***	−19.75**
	(3.734)	(9.436)	(4.021)	(6.630)	(8.843)
Cluster	No	sector-*aimag*	*aimag*-year	sector-year	sector-*aimag*-year
Time trend	No	No	No	No	Yes

FDI = foreign direct investment.

Notes: ***, **, * denote levels of significance at 1%, 5%, and 10%. The dependent variable is non-FDI jobs. Each column reports the results of two regressions: 1) FDI jobs as the independent variable; and 2) total FDI inflows as the independent variable. Each column corresponds to a different clustering levels. Sample size is 1,235.

Sources: Authors' estimate using data from Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020); National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 20 May 2020).

As a comparison, we extend our sample period to subsequent years, namely, 2014, 2015, and 2016. Table 6 shows that the magnitude of the negative FDI job multiplier is declining as the sample period is extended. When the end point is 2014, the multiplier in absolute value decreases to 5.1 (Panel A) and to 2.7 during the 2009–2016 sample period (Panel C). However, the latter still implies a local job loss of about 12,500 because of the multiplier during the period.

A peculiar feature of the Mongolian economy is the high degree of centralization. More than half of GDP is generated in the capital Ulaanbaatar, which also attracted the vast majority of FDI—31 of the 34 FDI greenfield projects over 2010–2013. To check the robustness of the baseline results, we re-estimate the FDI job multiplier restricting the sample to Ulaanbaatar. Since in this case the variation occurs at year-sector level only, we run the following difference-in-differences:

$$Jobs_{it} = \lambda_i + \sigma_t + \delta FDI_{it} + v_{it},$$

where the dependent variable, $Jobs_{it}$, and the regressor, FDI_{it}, are defined as above, but restricted to Ulaanbaatar. The term λ_i represents sector fixed effects, σ_t year fixed effects, and v_{it} the error term clustered on the sector-year level.[14] Panel D in Table 6 shows that the double differences results are similar to the triple differences baseline results. In particular, we find that each FDI job decreases local jobs by about 5.3, while every $1 million FDI inflow displaces about 19.5 local jobs.

[14] The results without clustering and when clustering at the sector level are also all negative and significant. These are available from the authors upon request.

Table 6: Additional Robustness Checks

	(1) FDI jobs	(2) Total inflows
Panel A: 2009–2014		
FDI job multiplier	−5.144**	−19.26**
	(2.284)	(8.497)
R-squared	0.969	0.969
Panel B: 2009–2015		
FDI job multiplier	−4.086*	−17.55**
	(2.217)	(8.352)
R-squared	0.968	0.968
Panel C: 2009–2016		
FDI job multiplier	−2.677***	−16.32*
	(0.880)	(8.455)
R-squared	0.968	0.968
Panel D: Ulaanbaatar		
FDI job multiplier	−5.352***	−19.58***
	−1.699	−4.692
R-squared	0.99	0.99
Panel E: Including mining sector		
FDI job multiplier	−5.168**	−21.19**
	(2.383)	(9.604)
R-squared	0.971	0.972

FDI = foreign direct investment.

Notes: ***, **, * denote levels of significance at 1%, 5%, and 10%. The dependent variable is non-FDI jobs.

For Panels A, B, C, regressions include sector-*aimag*, sector-year, and *aimag*-year fixed effects. Standard errors clustered on the sector-*aimag*-year level are reported in parentheses. The different panels correspond to different time frames. Sample size is 1,482 for Panel A, 1,729 for Panel B, and 1,976 for Panel C.

Panel D reports the results of the difference-in-difference on Ulaanbaatar for the time period 2009–2013. Regressions include sector and year fixed effects. Standard errors clustered on the sector-year level are reported in parentheses. Sample size is 65.

Panel E reports the results for the triple difference including the mining sector for the time period 2009–2013. Regressions include sector-*aimag*, sector-year, and *aimag*-year fixed effects. Standard errors clustered on the sector-*aimag*-year level are reported in parentheses. Sample size is 1,330.

Sources: Authors' estimate using data from Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 20 May 2020); National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 20 May 2020).

Finally, as mentioned, there was substantial employment creation in the mining sector during the sample period. Another possible interpretation is that the job losses in retail and transportation reflect a "resource movement" type of effect, which the baseline regressions do not control for. To remedy this, we also include the mining sector in the triple-difference specification. The point estimate of the FDI job multiplier in absolute value decreases slightly to about 5.2, suggesting only a small resource movement effect not captured in the baseline (Panel E). We conclude that the main results are robust to the various tests conducted in this section.

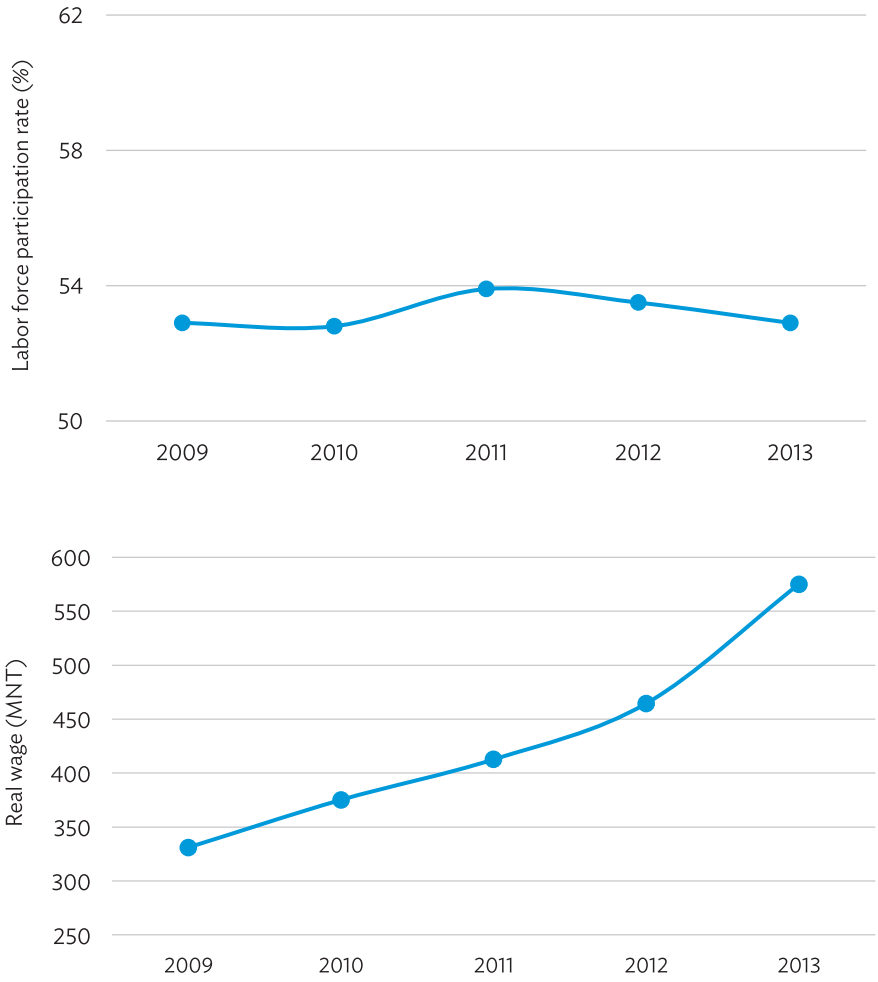
V. CONCLUSIONS

This paper studies the employment creation effects of the large FDI inflows to Mongolia's non-resource sectors following the signing of the OT IA in 2009. We use greenfield fDi Markets data spanning the period 2003 until 2013, showing that the number of FDI jobs as well as FDI inflows increased significantly after the IA. We apply a triple difference methodology on the sector-*aimag*-year level to estimate the FDI multiplier on local jobs by matching the fDiMarkets data to that of the National Statistics Office of Mongolia (NSOM). We find that every FDI job displaces 5.5 jobs in the local Mongolian economy, and every $1 million in FDI inflows reduces the number of local jobs by 20.

The results are in stark contrast to those of Toews and Vézina (2020), who estimate a positive FDI job multiplier of 4.4 for Mozambique. While there is a consensus on the overall positive impact of FDI in developing economies, it is well possible that such flows cause local job losses—for instance when foreign investors target well-established but inefficient sectors. This mechanism seems to describe well the Mongolian case. During the 4 years after the IA, foreign investors targeted the majority of the 34 greenfield FDI projects in Ulaanbaatar's established sectors such as retail and transportation (see Figure 2 and Figure 3), both of which operate inefficiently (ADB 2018; UNCTAD 2020). In this regard, the Mongolian experience contrasts that of Mozambique where non-resource FDI inflows were more evenly distributed across the country and targeted at sectors still at a nascent stage such as ICT or in which local job displacement is less likely such as construction. Additionally, new FDI jobs are relatively more skill-intensive in sectors such as ICT or banking than in retail or transportation, which further explains the difference between Mongolia and Mozambique (see discussion in Section 3). Another contributing factor to a negative FDI job multiplier is that the labor force participation rate has remained low at around 50% even though the monthly real average wage increased by half over the sample period, which implies a low labor supply elasticity (Figure 7). Finally, a negative job multiplier points to a limited extent of localized supply chains.

A negative FDI job multiplier does not necessarily mean that the surge in non-resource FDI inflows was not overall beneficial for Mongolia's economy. Besides jobs, there could have been productivity gains through technology transfers, efficiency improvements, and other positive spillovers—for example domestic firms adjusting to the new foreign competition. The decreasing FDI job multiplier in absolute value over time (see Table 6) is an indication supporting this idea, but providing definite evidence is out of the scope of this paper and left for future research. Hence, the government should avoid a tendency to restrict FDI despite the finding of initial job losses, and instead seek to maximize the benefits of these inflows. One way is to address the low labor force participation rate in Ulaanbaatar. A particularly effective way is to implement policies and actions that promote gender equality in the labor market to boost the female labor force participation rate (ADB 2020).

Figure 7: Labor Force Participation Rate and Monthly Average Real Wage, Ulaanbaatar, 2009–2013



Source: National Statistics Office of Mongolia. General Statistical Database. http://www.1212.mn/ (accessed 20 September 2021).

APPENDIX

Table A1: Foreign Direct Investment Inflows

	(1) Developing Asia	(2) Developing Asia	(3) Mongolia
Post	124,581***	5,720	674.5
	(24,241)	(41,832)	(398.0)
Trend		21,611***	-0.176
		(5,968)	(44.96)
R-squared	0.630	0.876	0.493

Notes: Column 1 reports the foreign direct investment (FDI) inflows for economies in developing Asia. Column 2 adds a time trend. Column 3 reports the FDI inflows with a time trend for Mongolia. *** denotes significance at 1%. Standard errors in parentheses. Sample period is 2003–2013. Sample size is 11.

Source: Authors' estimate using data from Financial Times. fDi Markets Database. https://www.fdimarkets.com/ (accessed 7 October 2020).

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The Foreign Direct Investment Job Multiplier During a Resource Boom

Evidence from Mongolia

This paper explores a particular job creation channel during a resource boom, using Mongolia as a case study. Resource booms can lead to impressive growth rates in resource-rich developing countries. The paper examines the link between resource booms triggered by new resource projects and FDI inflows into the non-resource sector on one hand, and FDI and job creation on the other. The analysis focuses explicitly on the non-resource sector, where the positive economic effects of FDI are more pronounced than in the extractive sector.

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