Unveiling the Determinants of Foreign Direct Investment and Economic Growth in Central Asia

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ABSTRACT

Empirical studies on the determinants of foreign direct investment (FDI) and the nexus between FDI and economic growth have reached mixed findings, leading to a long-standing debate among policymakers and researchers. This study explores the determinants of FDI and examines the impact of FDI on economic growth in Central Asian developing countries during 2000-2020. The Prais—Winsten regression with panels corrected standard errors and IV-2SLS estimation results indicate that trade openness, natural resources, and market size are the main factors determining the FDI location decisions of foreign investors in Central Asia. The estimates for economic growth suggest that foreign direct investment, natural resources, human capital, and infrastructure have a positive and significant impact on economic growth. On the contrary, the effect of trade openness is surprisingly negative.

Keywords: Central Asia, Developing Countries, Economic Growth, Foreign Direct Investment, Trade Openness.

I. INTRODUCTION

In the era of globalization, foreign direct investment has become a significant source of external finance for developing countries to improve economic conditions and deprive international trade boundaries. Given its importance in capital formation in both developed and developing economies, there has been considerable research on its contribution to growth over the years. Though there is no consensus, empirical studies, (Demir & Lee, 2022; Shaari et al., 2012; Doytch & Eren, 2012), provide some mixed evidence that the benefits of FDI have been crucial in the economic growth of developing economies. Therefore, developing countries target to attract foreign direct investment for new technologies, technological expertise, and managerial practices to attain long-term economic growth. Furthermore, FDI is also perceived to encourage the transition process of once socialist economies into market-based economies, providing international competitiveness and increasing employment opportunities (Jude, 2019).

Though Central Asian countries are landlocked, they possess a considerable consumer market with over 76 million people living in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The stable economic condition and geographical location of these countries provide a significant advantage for foreign investors to invest and gain stress-free access to the Central Asian and Eurasian markets. Nevertheless, despite the numerous appealing benefits, a substantial proportion of FDI inflows went to developing large oil and gas projects, creating a disproportionate distribution of foreign investment in the region. Recent studies have suggested that variances in income levels, natural resource endowments, preferences, and human capital are important factors affecting bilateral trade and investment flows (Dingel, 2017; Fajgelbaum et al., 2015). Correspondingly, on the one hand, Kazakhstan alone accounted for an estimated 70 % of the gross FDI inflows to the region during the last two decades (Kubaeva, 2021). On the other hand, despite the stable average 5 to 8 % economic growth, the efforts of Central Asian economies to attract foreign investment has been rather futile with downward trend over the last couple of years. To illustrate, in 2020, Uzbekistan’s total FDI inflows decreased down to 1.73 billion USD from 2.13 billion USD in 2019. Likewise, Kazakhstan also experienced a drastic decline, where FDI inflows have declined from 17.22 billion USD in 2016 to 7.41 billion USD in 2020 (World Bank, 2020). Though attracting foreign investors is an intricate process, it is crucial for economic transition and growth for the Central Asian economies. Therefore, it is imperative to understand the determining factors of FDI and its impact of economic growth in the region.

Prior empirical studies on the FDI and economic growth nexus suggest that the benefits of foreign direct investment differ across countries, and its impact on economic growth mostly depends on the country specific characteristics of the host economy (Iamsiraroj, 2016; Osei & Kim, 2020). Provided that despite the theoretical explanations on the contribution of foreign direct investment to economic growth, empirical studies have not provided clear evidence of the growth effect of FDI for Central Asia (Makiela & Ouattara, 2018; Alvarado et al., 2017; Demir & Lee, 2022). Hence, given the large investment needs of countries in Central Asia, this research scrutinizes the determinants of FDI, highlights the challenges facing the countries in the region to increase FDI inflows, and examines the impact of these flows on...
economic growth. The contribution of the study refers to the fact that there is limited number of studies focusing on Central Asia despite the significance of foreign direct investment in capital formation, uneven distribution of foreign capital, and different levels of economic development in the region compared to the rest of the developing economies. The findings of this research help to overcome the potential challenges facing the Central Asian economies to attract FDI and develop investment-enticing policies and reforms to increase FDI inflows.

This research explores the impact of numerous factors, such as market size, trade openness, natural resources, infrastructure, and population on foreign direct investment and examines the impact of the determining factors on economic growth along with foreign direct investment. We find that market size, trade openness, and natural resource abundance are significant factors influencing the investment location decisions of foreign investors in the region. Further regression results indicate that higher foreign investment inflows are associated with higher rates of economic growth, where 1% increase leads to 0.16% economic growth in Central Asia.

The remainder of the paper is organized as follows. Section II presents a short literature review, and Section III provides the methodology, data, and variable description. Empirical findings are discussed in Section IV, and Section V concludes the study with policy implications.

II. LITERATURE REVIEW

A. Determinants of Foreign Direct Investment

The Ownership-Location-Internalization (OLI) paradigm was first introduced 37 years ago explaining the origin, level, pattern, and growth of multinational enterprises’ offshore activities. Today, the OLI has perhaps become the dominant paradigm in international business studies. This framework distinguishes international activities of business enterprises: export, licensing, and FDI, based on three advantages: ownership advantages, location advantages, and internationalization advantages (Dunning, 2001). Dunning (2015) stated that FDI is the most capital-intensive activity of multinational enterprises, with the locational advantage being the predominant determinant.

Building on the OLI paradigm, earlier empirical studies, such as Noorbakhsh et al. (2001), examined the non-traditional determinants of FDI in developing countries. Their estimates indicated that human capital had increasing importance through time for foreign investment. Through the analysis of FDI determinants in 25 developing countries during 1990-1998, Campos and Kinoshita (2002) examined the influencing factors of geographical FDI distribution. They classified their empirical findings into three categories. The first category contains comparative advantage sources, such as market size, level of economic development, infrastructure, abundant natural resources, and macroeconomic stability. Host countries’ institutional quality, proxied by the rule of law, level of bureaucracy, and executive restrictions was the second classification. The third group of FDI determinants were the host country’s efforts to attract foreign capital, denoting structural reforms as the crucial part of those efforts. The structural reforms included financial reforms, trade and privatization reforms, and other attractive policies developed by host countries to acquire foreign investment (Campos & Kinoshita, 2002). Similarly, Johnson (2006) found that the main motive of FDI distribution into developing economies is seeking resources. However, in an earlier study, Onyeiwu and Shrestha (2004) argued that the availability of resources is not the only driving force of FDI inflows as some of the countries in the Middle East do not receive enough FDI inflows regardless of resource abundance. Morisset (2000) and Chakrabarti (2001) found a positive association between trade openness and FDI, but highlighted the sensitivity of their findings to changes in the data set. Chakrabarti (2001) suggested that FDI inflow is sensitive to factors such as wage, tax, exchange rate, and trade balance. He used wages to measure the cost of labor and found that cheap labor cost to have a significant impact on attracting foreign investments from multinational enterprises. Likewise, Demirhan and Mascia (2008) identified the significance of FDI determinants in 31 developing countries using data for the 2000-2004 period. Their findings indicated that trade openness and labor cost encourage FDI while inflation rate, risk, and tax rates discourage it.

In recent studies, Doytch and Eren (2012) analyzed foreign capital distribution for various sectors in 21 Eastern European and Central Asian countries from 1994 to 2008. She concluded that educated labor is the driving force of FDI inflow in the services sector. In contrast, cheap labor attracts the most FDI in labor-intensive industries, such as export-oriented enterprises and manufacturing subsidiaries. Using panel data multiple regression, Jadhav and Katti (2012) explored the association between foreign direct investment and economic, institutional, and political factors in BRICS economies during 2000-2009. He found economic factors, such as market size, to have greater significance than institutional and political factors for FDI in BRICS economies. Alam and Shah (2013) used Granger causality, cointegration, and VCEM approaches to estimate the determining factors of FDI in OECD member-states during 1985-2009. Their estimations indicated that market size, labor cost, and infrastructure are significant and positively associated with FDI. They also found a bidirectional short-run relationship between market size and labor cost and short-run unidirectional causalities between market size, infrastructure, and labor costs. Aziz and Mishra (2016) examined the economic and policy determinants of FDI in Arab countries from 1984 to 2012, where better financial institutions and an educated labor force were found to encourage FDI. Besides, their findings further suggested that economic policy measures and institutional policies should be integrated starting with privatization and trade liberalization. Studying the incentives for FDI during different time periods and regions, Phung (2016) claimed that the market size and availability of skilled labor force are significant factors making developing nations more attractive for FDI in the short run. For a longer period of time, their results highlighted that natural resources and labor force were more predominant factors for FDI.
B. Foreign Direct Investment and Economic Growth

In theory, foreign direct investment is associated with economic growth through capital accumulation and transfers of technologies and skills (Borensztein et al., 1998). Neoclassical and endogenous growth are common empirical models used to test those theoretical views, yet the results vary based on the type of methodology, estimation technique, time period, and country or group of countries under consideration. Prior literature demonstrates that host countries' policies and environments decide the relative impact of FDI on economic growth. These include the market size, the level of human capital, the degree of trade openness and the economic development (Bengoa & Sanchez-Robles, 2003; Durham, 2004; Li & Liu, 2005; Kurtishi-Kastrati, 2013; Popescu, 2014). However, there is no consensus on the impact of foreign direct investment on economic growth, as some studies find a positive effect of (Borensztein et al., 1998; Bengoa & Sanchez-Robles, 2003; Lensink & Morrissey, 2006; Herzer & Klasen, 2008), whereas others reveal no significant impact (Durham, 2004; Carkovic & Levine, 2005), and other studies found a negative impact of FDI on economic growth (Li & Liu, 2005; Herzer, 2012).

Borensztein et al. (1998) studied the impact of FDI on economic growth in developing countries and revealed that the FDI has a significant contribution to a country's economic development compared to domestic investment. However, the amount of growth is highly dependent on the level of human capital. On the contrary, Carkovic and Levine (2005) studied the impact of FDI on economic growth in developing countries but found no empirical evidence that FDI stimulates economic growth. However, they concluded that the advantages of FDI to boost the economy are contingent on the local conditions, including the financial markets and the educational level in the host country. At the same time, Hermes and Lensink (2003) showed clear evidence that developed nations with dynamic financial markets realize significant gains from foreign direct investments, leading to substantial growth. Bengoa and Sanchez-Robles (2003) show that FDI is positively correlated with economic growth, but host countries require human capital, economic stability, and liberalized markets in order to gain long-term benefits from FDI. Kentor and Boswell (2003) used foreign investment concentration, measured as the percentage of total foreign direct investment stocks, as a proxy for FDI and found a long-term negative effect on economic growth. Likewise, using data on 80 countries during 1979–1998, Durham (2004) failed to identify a significant and positive relationship between FDI and economic growth and suggested that the effects of FDI depend on the “absorptive capability” of host countries.

Pegkas (2015) examined the foreign direct investments and economic growth nexus using Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) in the Eurozone countries from 2002 to 2012. The results indicated the existence of a positive long-run cointegrating relationship between FDI and economic growth. Earlier Omri and Kahlouli (2014) also found a similar association for 13 MENA countries using a simultaneous-equation models estimated through generalized method of moments (GMM) during 1990–2010. Sakyi and Egyir (2017) used the GMM estimation method to study the impact of foreign direct investment on economic growth via exports in 45 African countries during the period 1990-2014. Their findings supported hypothesis that promoting more credible export-promotion strategies and channeling of FDI into export-oriented sectors help to realize long-term growth in African countries. Dinh et al. (2019) found that positive association between FDI and economic growth in the long-run and a negative impact in the short-run for lower-middle-income developing countries. Besides, Raza et al. (2019) also analyzed the impact of FDI on economic growth considering the quality of the governance system in the Organization for Economic Co-operation and Development (OECD) countries during 1996–2013. Using the Fixed Effects and the GMM estimators, the study unveiled that FDI has a significant positive association with economic growth. Furthermore, estimates for the impact of the interaction terms showed a positive effect on economic growth, and the Granger causality test results indicated that the bidirectional causal relationship exists between the FDI and regulatory quality on economic growth.

III. Methodology

Following the prior studies, such as Le et al. (2016), Shakib (2016), Ikpesu et al. (2019), and Lu et al. (2020), this study employs the Panels Corrected Standard Errors (PCSEs) linear regression method developed by Beck and Katz (1995). Both econometric models are specified for first-order autocorrelation AR (1) with panel-specific AR (1) coefficient. This produces panel-corrected standard error estimates for both linear models where the parameters are estimated by Prais-Winsten regression. PCSEs method accounts for heteroskedasticity and contemporaneous correlation across panels when computing the variance-covariance estimates and standard errors. This estimation method best fits the long panel datasets, where the number of years is larger than the number of panels (T>N), as in this research work.

A. Data sources

This paper focuses on the determinants of FDI and the relationship between FDI and economic growth in Central Asian countries, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. This study uses annual data covering the period from 2000 to 2020, based on data availability. Data are obtained from the World Development Indicators, and all data except for trade openness and natural resources are used in logarithm form to increase the efficiency of results. Equation (1) shows the econometric model.

\[ Y_{it} = \beta X_{it} + e_{it} \quad (1) \]

where \( i = 1, \ldots, m \) is the number of panels, \( t = 1, \ldots, T \) is the number of periods in panel \( i \) and \( e_{it} \) is the error term which could be correlated along \( t \) or contemporaneously correlated across \( i \).

Building on this model, we derive at (2) and (3).

\[ FDI_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 TO_{it} + \beta_3 NR_{it} + \beta_4 INF_{it} + \beta_5 HC_{it} + \epsilon_i \quad (2) \]

where \( \epsilon_i \) is the error term.
\[ E_{G,t} = \beta_0 + \beta_1 FDI_{t} + \beta_2 T O_{t} + \beta_3 N R_{t} + \beta_4 I N F_{t} + \beta_5 H C_{t} + \epsilon_t \] (3)

B. Variable Description

FDI is the logarithm of total foreign direct investment inflows and EG signifies the economic growth proxied by the logarithm of GDP per capita. GDP is used as a measure of the market size (MS), trade openness (Trade/GDP) indicates the economic openness of the country for foreign trade (TO), and natural resources (total natural resource rents/GDP) signify the importance of resources rents in the economy (NR). The infrastructure is measured as the number of mobile phone subscriptions per 100 people (INF), and human capital is proxied by the total population (HC). The two regression models above help estimate the determinants of FDI (1) and the impact of FDI on EG (2).

IV. RESULTS

Table I presents the descriptive statistics for dependent and independent variables, including the mean, standard deviation, minimum, and maximum values. Due to missing data, some variables lack observations. For instance, FDI, EG, MS, TO, and NR has fewer observations than INF and HC.

Table II provides the pairwise correlation matrix between the variables. The results indicate a positive and significant correlation between foreign direct investment, market size (0.835), natural resources (0.257), infrastructure (0.605), and human capital (0.308), whereas trade openness has a negative and significant association (-0.245). Likewise, the correlation between economic growth and foreign direct investment (0.874), market size (0.891), natural resources (0.552), infrastructure (0.640), and human capital (0.229) is positive and significant, while the relationship with trade openness is negative and significant (-0.396). The correlations between the variables are also supported by the theoretical framework.

Prais-Winsten regression results for foreign direct investment determinants are provided in Table III. The estimates show that market size has a positive and significant (\( \beta = 1.24; p=0.00 \)) impact on foreign investment in Central Asian countries. The coefficient for market size signifies that a 1% change in market size leads to a 1.2% change in foreign direct investment. Trade openness (\( \beta = 0.015; p=0.00 \)) and natural resource rents (\( \beta = 0.014; p=0.00 \)) also have a positive and significant association with foreign direct investment, suggesting a 1% increase in trade openness and natural resources increases foreign direct investment by 1.5 and 1.4%, respectively. The regression results for infrastructure (\( \beta = 0.154; p=0.015 \) and human capital (\( \beta = 0.516; p=0.00 \)) also indicate a positive and significant relationship with foreign direct investment. These results suggest that foreign investment inflows to Central Asian countries are driven by the market size, trade openness, natural resource endowments, modern infrastructure, and human capital.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign direct investment</td>
<td>102</td>
<td>20.23</td>
<td>1.8</td>
<td>15.35</td>
<td>23.57</td>
</tr>
<tr>
<td>Economic growth</td>
<td>104</td>
<td>7.35</td>
<td>1.14</td>
<td>4.93</td>
<td>9.54</td>
</tr>
<tr>
<td>Market size</td>
<td>104</td>
<td>23.48</td>
<td>1.45</td>
<td>20.57</td>
<td>26.19</td>
</tr>
<tr>
<td>Trade openness</td>
<td>101</td>
<td>84.70</td>
<td>31.03</td>
<td>29.19</td>
<td>175.35</td>
</tr>
<tr>
<td>Natural resources</td>
<td>99</td>
<td>18.37</td>
<td>18.38</td>
<td>0.553</td>
<td>87.46</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>105</td>
<td>3.16</td>
<td>2.29</td>
<td>-3.98</td>
<td>5.19</td>
</tr>
<tr>
<td>Human capital</td>
<td>105</td>
<td>16.12</td>
<td>0.677</td>
<td>15.32</td>
<td>17.35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>FDI</th>
<th>EG</th>
<th>MS</th>
<th>TO</th>
<th>NR</th>
<th>INF</th>
<th>HC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EG</td>
<td>0.87***</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MS</td>
<td>0.83***</td>
<td>0.89***</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TO</td>
<td>-0.24**</td>
<td>-0.39**</td>
<td>-0.55**</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NR</td>
<td>0.25**</td>
<td>0.55**</td>
<td>0.22**</td>
<td>-0.28**</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>INF</td>
<td>0.60***</td>
<td>0.64***</td>
<td>0.58</td>
<td>-0.19*</td>
<td>-0.27**</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>HC</td>
<td>0.31***</td>
<td>0.23**</td>
<td>0.64***</td>
<td>-0.53**</td>
<td>-0.03</td>
<td>0.17*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coef.</th>
<th>St. Err.</th>
<th>t-value</th>
<th>p-value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market size</td>
<td>1.214</td>
<td>0.155</td>
<td>7.83</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.015</td>
<td>0.003</td>
<td>4.83</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Natural resources</td>
<td>0.014</td>
<td>0.006</td>
<td>2.67</td>
<td>0.008</td>
<td>***</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.154</td>
<td>0.064</td>
<td>2.20</td>
<td>0.028</td>
<td>**</td>
</tr>
<tr>
<td>Human capital</td>
<td>0.516</td>
<td>0.154</td>
<td>3.36</td>
<td>0.001</td>
<td>***</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.046</td>
<td>2.775</td>
<td>-0.74</td>
<td>0.461</td>
<td>-</td>
</tr>
</tbody>
</table>

Mean dependent variable: 20.210 SD dependent var: 1.827
R-squared: 0.780 Number of observations: 95
Chi-square: 260.408 Prob > chi2: 0.000

*** p<0.01, ** p<0.05, * p<0.1
Table IV presents the regression results for the impact of foreign direct investment on economic growth in Central Asia. The coefficient for foreign direct investment is positive and significant ($\beta = 0.16; p=0.00$), indicating that a 1% change in foreign investment inflows can lead to a 0.16% change in economic growth. This result is not surprising that Central Asian countries are transitioning economies with significant investment needs and limited financial resources. Hence, the impact of foreign capital flows is substantial and positive. Surprisingly, trade openness is negative and significant, implying that trade liberalization does not have a straightforward positive relationship with growth, especially in developing countries (Yanikkaya, 2003; Hye & Lau, 2015). Silajdzic and Mehic (2018) also reported that differences in technology and endowments between trade partners might create an adverse effect of trade liberalization on developing countries. Natural resources, infrastructure, and human capital are positive and significant factors affecting economic growth in the region. The coefficients of these variables suggest that a 1% increase leads to a 1.5%, 0.19%, and 0.32% surge in economic growth in Central Asia, holding other factors constant.

A. Endogeneity Issue
To overcome the endogeneity problem, this research employs the Two-Stage Least Squares (2SLS) estimation method developed by Lewbel (2012). This estimation method identifies the structural parameters in regressions using endogenous or mismeasured regressors that are not correlated with heteroskedastic errors in the absence of external instruments. Given the prior literature, trade openness is assumed to be endogenous, and one year lag ($t-1$) of trade openness is used as an instrument. Table V presents the 2SLS regression estimates for the determinants of foreign direct investment in Central Asia.

The regression results resemble Table III, where market size, trade openness, natural resources, infrastructure, and human capital have positive and significant impacts on foreign direct investment inflows. However, the coefficients of trade openness, natural resources, and human capital have considerably increased, demonstrating their importance for inward FDI. The Sargan test statistic for the overidentification of instruments is 3.353 and not significant, indicating that the null hypothesis cannot be rejected as the overidentifying restrictions are valid.

Table VI shows regression results for the association between foreign direct investment and economic growth in Central Asia. The estimates indicate similar results to Table IV. However, the coefficients for natural resources, infrastructure, and human capital have decreased. In contrast, the coefficient for foreign direct investment has increased, highlighting the role of foreign direct investment in economic growth.

### Table IV: Economic Growth - Prais-Winsten Regression (PCSEs)

<table>
<thead>
<tr>
<th>Economic growth</th>
<th>Coef.</th>
<th>St. Err.</th>
<th>t-value</th>
<th>p-value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign direct investment</td>
<td>0.160</td>
<td>0.039</td>
<td>4.13</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Trade openness</td>
<td>-0.005</td>
<td>0.002</td>
<td>-3.45</td>
<td>0.001</td>
<td>***</td>
</tr>
<tr>
<td>Natural resources</td>
<td>0.015</td>
<td>0.004</td>
<td>3.94</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.193</td>
<td>0.027</td>
<td>7.20</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Human capital</td>
<td>0.317</td>
<td>0.113</td>
<td>2.79</td>
<td>0.005</td>
<td>***</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.404</td>
<td>1.619</td>
<td>-0.87</td>
<td>0.386</td>
<td>-</td>
</tr>
</tbody>
</table>

Mean dependent variable 7.362 SD dependent var 1.149 R-squared 0.953 Number of observations 95 Chi-square 277.330 Prob > chi2 0.000

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

### Table V: Foreign Direct Investment - Lewbel (2012) 2SLS

<table>
<thead>
<tr>
<th>Foreign direct investment</th>
<th>Coef.</th>
<th>St. Err.</th>
<th>z-value</th>
<th>p-value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market size</td>
<td>1.208</td>
<td>0.130</td>
<td>9.260</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.018</td>
<td>0.004</td>
<td>4.540</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Natural resources</td>
<td>0.018</td>
<td>0.007</td>
<td>2.790</td>
<td>0.005</td>
<td>***</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.145</td>
<td>0.068</td>
<td>2.120</td>
<td>0.034</td>
<td>**</td>
</tr>
<tr>
<td>Human capital</td>
<td>0.480</td>
<td>0.198</td>
<td>2.420</td>
<td>0.015</td>
<td>**</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.721</td>
<td>2.719</td>
<td>-1.000</td>
<td>0.317</td>
<td>-</td>
</tr>
</tbody>
</table>

Number of observations 90 R-squared 0.821 Under identification test 72.558 Prob > chi2 0.000 Weak identification test 66.559 Sargan statistic 3.353 (0.506)

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

### Table VI: Economic Growth - Lewbel (2012) 2SLS

<table>
<thead>
<tr>
<th>Economic growth</th>
<th>Coef.</th>
<th>St. Err.</th>
<th>z-value</th>
<th>p-value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign direct investment</td>
<td>0.403</td>
<td>0.044</td>
<td>9.11</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Trade openness</td>
<td>-0.008</td>
<td>0.002</td>
<td>-3.70</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Natural resources</td>
<td>0.009</td>
<td>0.004</td>
<td>2.39</td>
<td>0.017</td>
<td>**</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.157</td>
<td>0.037</td>
<td>4.17</td>
<td>0.000</td>
<td>***</td>
</tr>
<tr>
<td>Human capital</td>
<td>0.246</td>
<td>0.093</td>
<td>2.65</td>
<td>0.008</td>
<td>***</td>
</tr>
<tr>
<td>Constant</td>
<td>3.232</td>
<td>1.530</td>
<td>2.11</td>
<td>0.035</td>
<td>**</td>
</tr>
</tbody>
</table>

Number of observations 90 R-squared 0.846 Under identification test 62.763 Prob > chi2 0.000 Weak identification test 12.563 Sargan statistic 1.898 (0.754)

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The Sargan test statistic is 1.898 and is insignificant, suggesting that the null hypothesis cannot be rejected and the overidentifying restrictions are valid. The estimates in both Table V and Table VI signify that the findings of this research are consistent even after controlling for endogeneity issues.

V. CONCLUSION AND POLICY IMPLICATIONS
This study examined the determinants of FDI and estimated the impact of foreign investment on economic
growth in Central Asia using panel data covering the 2000-2020 period. The regression results revealed the positive and significant impact of market size, trade openness, natural resources, infrastructure, and human capital on inward foreign direct investment. These results are no surprise because Central Asian countries are transitioning economies with sizeable markets, active participation in global trade, significant natural resource reserves, such as oil, gold, and natural gas, inexpensive, capable, and educated human capital, and new and integrated infrastructure offering higher returns on investment. As per the impact of FDI on economic growth in the region, the estimates highlighted the importance of foreign direct investment, natural resources, infrastructure, and human capital.

The findings of this research have two main policy implications. First, countries in Central Asia must create an investment-friendly business environment characterized by larger gross domestic product, greater integration into global trade, efficient use of natural resource endowments, enhanced infrastructure, and skilled labor. However, the association between the use of natural resources and environmental sustainability should be maintained to reduce the impact of increased economic activities. Therefore, the relationship must be forged to ensure human well-being, increase efficient economic activity, and mitigate natural resource depletion. Second, the economic growth in the region can be ignited by similar factors, such as higher FDI inflows, efficient use of natural resources, improved infrastructure, and the availability of skilled labor force. Therefore, Central Asian nations should prioritize these factors to ensure the continuous flow of FDI inflows and instigate economic growth.

A. Limitations of the Study

Limitations of this research may arise due to variable selection. Though these variables are chosen based on prior studies and data availability, other significant factors are omitted due to insufficient data. Factors such as locational advantage, corporate taxes, and institutions are not included, although they could be the determinants of FDI in the region. Hence, our empirical analysis may be subject to omitted variable bias as the influence of the home country and sectoral dimensions of FDI have not been considered. Therefore, future research should incorporate the origin and sectoral characteristics of FDI data to explore its determinants and investigate its association with economic growth.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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http://www.infra.kth.se/cegis/research/publications/working papers.


