

Capital Flows and Corruption on Southeast and East Asia's Economic Growth: A Panel Data Analysis

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Abstract

This paper investigates the role of capital flows both from internal and external sources on economic growth, as well as the main social obstacle factor to growth, corruption. The paper attains this by conducting panel data analysis for Southeast and East Asian countries from 2005-2022. Sources of capital flows are divided into external sources, i.e. foreign direct investment (FDI) and personal remittance, and internal sources, i.e. domestic bank credit and stock market capitalization. The results show that corruption hinders economic growth and only some sources of capital have a positive impact on the economy while the effect of other sources such as FDI are not statistically significant.

JEL Classification: C33, O16, K40

Keywords: Economic growth, capital, corruption, financial markets

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1.0 INTRODUCTION

This research aims to dive further and enhance our understanding of the relationship between capital flows, corruption, and economic growth. From a policy perspective, this analysis is important because it looks into factors that impede or boost economic growth and provides policymakers with the evidence needed to take steps to tackle any issues standing as obstacles to the growth of the overall economy and the standard of living. The relevance of this study is that it encompasses corruption and capital flows at the same time and drills even further into many components of capital, potentially aiding policymakers in choosing which source or component to focus on and shifting more resources toward it. Simultaneously, the research will also look at why some capital, which is supposed to have a positive impact on economic growth, is rendered not significantly impactful.

Corruption and capital flows have been big contributors to economic growth all around the world, but they take the role of more significant players in emerging regions where higher perceived levels of corruption and gradually developing financial systems persist. Corruption itself has been debated between two theories regarding its impact on economic growth. The first theory, known as the “grease the wheel” theory, suggests that corruption allows for the circumvention of any inefficiency in the economy caused by players such as the government, hence leading to a more efficient economy. On the other hand, the “sand the wheels” theory states that corruption leads to inequality in terms of wealth and resource distribution, impeding growth, innovation, and efficiency.

Corruption in East Asia can be thought of as having a chain of reasons behind it. The multiple changes in regimes over quick succession and emanation from war led to a weak institutional framework, political patronage, and poverty which led players in the economy to exploit corruption for their personal growth while there was no procedure in place to tackle corruption. These go on to create a vicious cycle and become embedded as part of cultural factors in which everyone believes that corruption is the key to growth, at least individually. Although there are improvements in perceived corruption levels in some East Asian countries such as China, other countries especially in the southeast region still face a very high perceived level of corruption.

Capital flows, on the other side, have always been theorized to have a positive impact on economic growth although it does not guarantee wealth and income equality. The conclusion that many researchers aim to accomplish is the magnitude of the impact and the causality relationship. Growth in financial development contributes as a compounding factor to the effect. Multiple studies have shown that more efficient, more accessible, and more in-depth financial institutions and markets have smoothly allocated capital resources from those with excess funds but no opportunities available to those lacking funds but with opportunities in need of those funds. It is also important to note that the smoothness of capital flows can also be impacted by corruption as that capital may not be allocated efficiently and there is not enough credibility in the rule of laws to protect investors and their funds.

In East Asia, besides China, Japan and the four tiger economies, financial development as seen through the expansion of private credit or the stock market exchange are varied among the rest and still considered as developing. For instance, the five tiger cub economies have seen more financial developments than countries such as Cambodia, Myanmar, and Laos which just established the exchange after the 2010s and the market capitalization of listed domestic companies as a percentage of GDP does not even make up to 10 basis points properly.

This paper was guided by two research objectives that differ from other studies: First, it looks into the impact of corruption and capital flows on economic growth, specifically in East Asia using panel data; lastly, it investigates which source of capital is more relevant than the others by further incorporating the variable of personal remittance. There is very little empirical work in the literature concentrating on East Asia as a group using panel data model.

The rest of the paper is organized as follows: Section 2 provides some evidence showcasing the relationship between corruption, capital flows, and economic growth. Section 3 gives a brief literature review of previous studies conducted on the role of corruption and capital flows on economic growth. Section 4 outlines the empirical model. Data and estimation methodology are discussed in section 5. Finally, section 6 presents the discussion on the empirical results, which is subsequently followed by a conclusion in section 7.

2.0 TREND of Corruption and Capital to Economic Growth

Figure 1 illustrates the trend between economic growth as proxied by the natural log of real GDP and the reversed corruption perception index (CPI). From the figure, it self-explains that corruption has a negative relationship to economic growth, supporting the “sand the wheels” theory. With recent movements and progress in combating corruption among emerging countries through various ways and if anti-corruption movement produces fruition, those emerging countries at the second half of the trend may position themselves for the boost in growth later, if not sooner.

Figure 1: Correlation between Economic Growth and Corruption Perceived Index

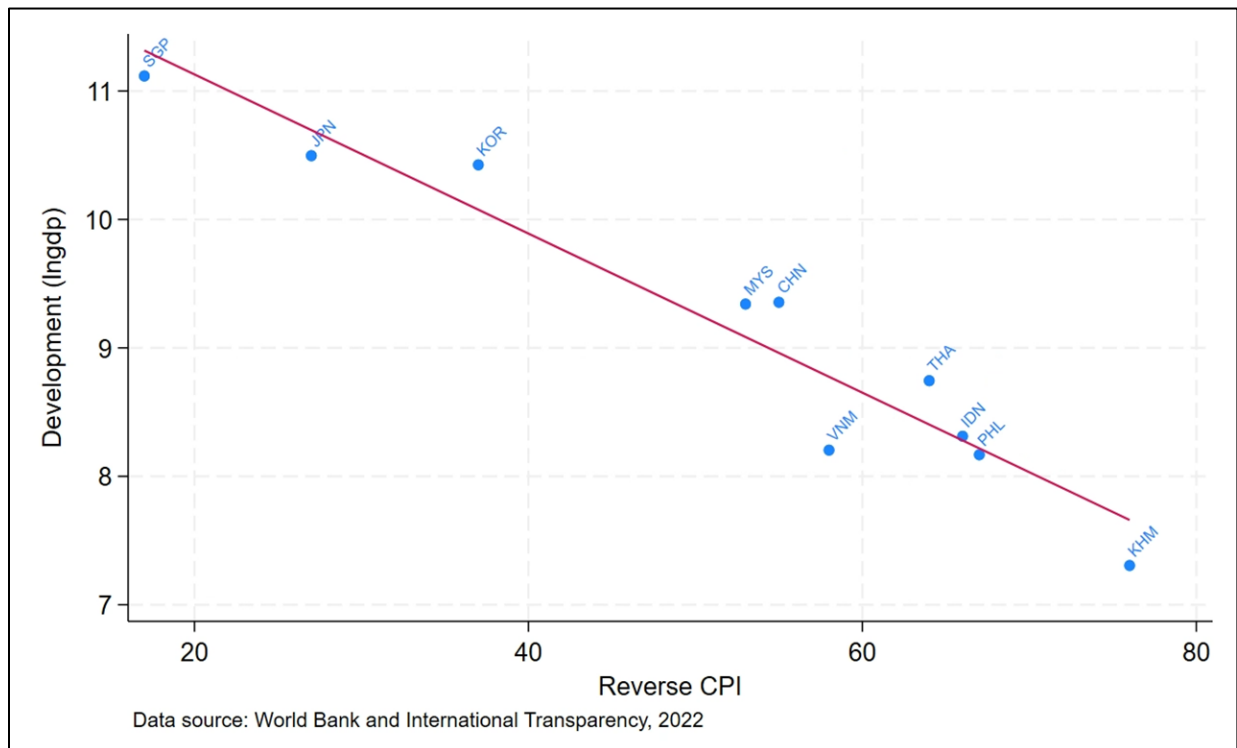
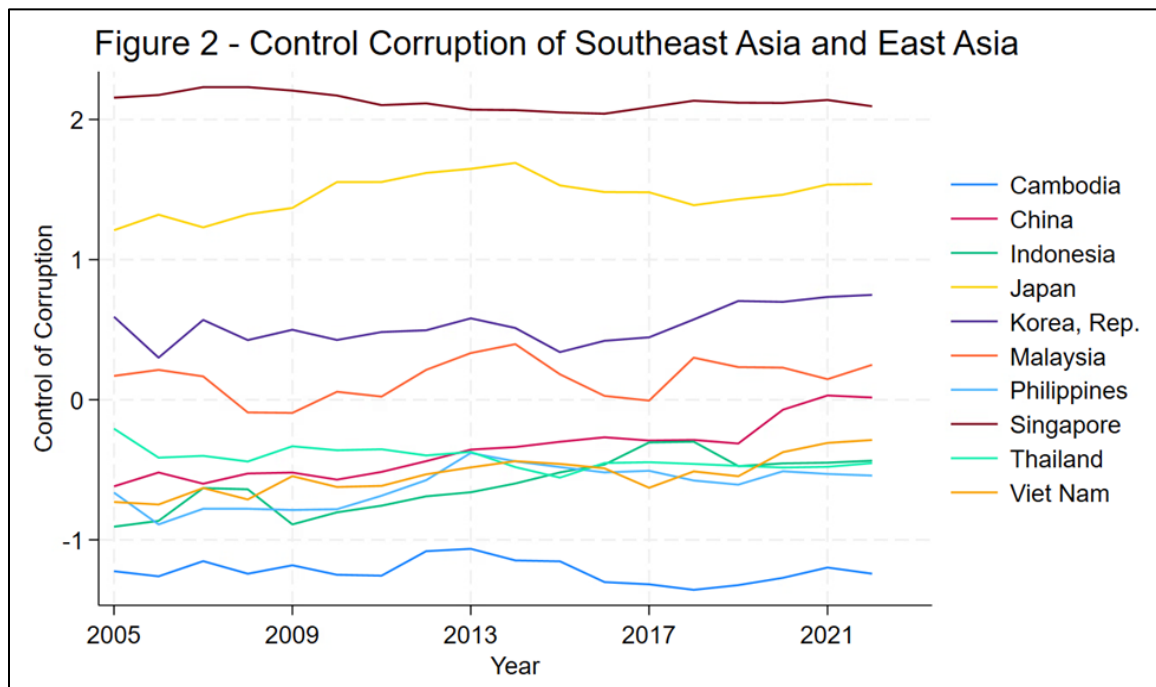


Figure 2 shows the trend of another proxy of corruption, which is control of corruption from 2005 to 2022. Control of corruption measures the perception that public power is exercised for private gains. Singapore is leading the group while China has shown an increase in its control of corruption and Cambodia is at the bottom, exhibiting a decreasing trend in its control of corruption.

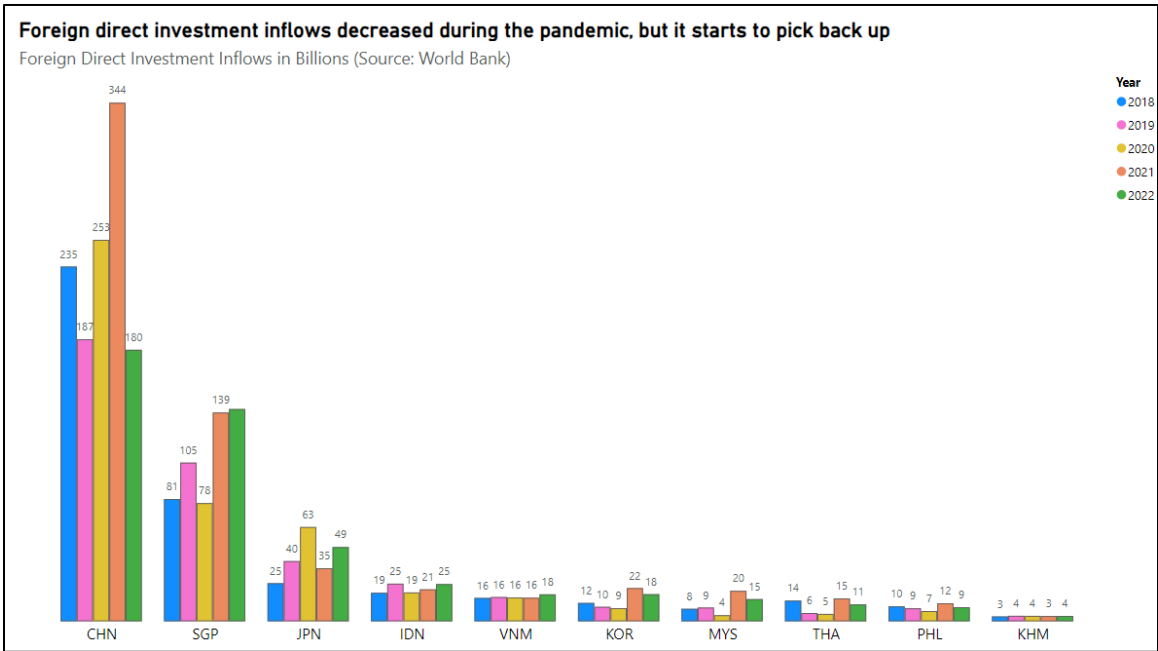


Data Source: World Bank

Figure 3 illustrates that there are fluctuations of foreign direct investment net inflows (FDI) in dollars amount from year to year (2018 to 2022) with 2021 as the year with the most FDI since it is the year when the economy around the world started to recover from the pandemic. The number and trend also vary by country. For instance, China saw a big decline in FDI between 2021 and 2022 while Singapore saw a constant number and Japan saw an increase. With the Chinese economy as well as the world's major countries such as the U.S. and those in European countries experiencing a tightening policy to cool

down their economy, it can be forecasted that FDI will decrease especially among emerging countries in Southeast Asia.

Figure 3: Foreign Direct Investment Net Inflows by Year and Country



Data Source: World Bank

Figure 4 reveals the correlation between the development of financial market proxied by market capitalization of listed domestic countries as a percentage of GDP to economic growth. Market cap exhibits a positive relationship, showcasing that high growth economy tends to have a robust and much more activities in the financial market.

Figure 4: Correlation between Market Capitalization and Economic Growth

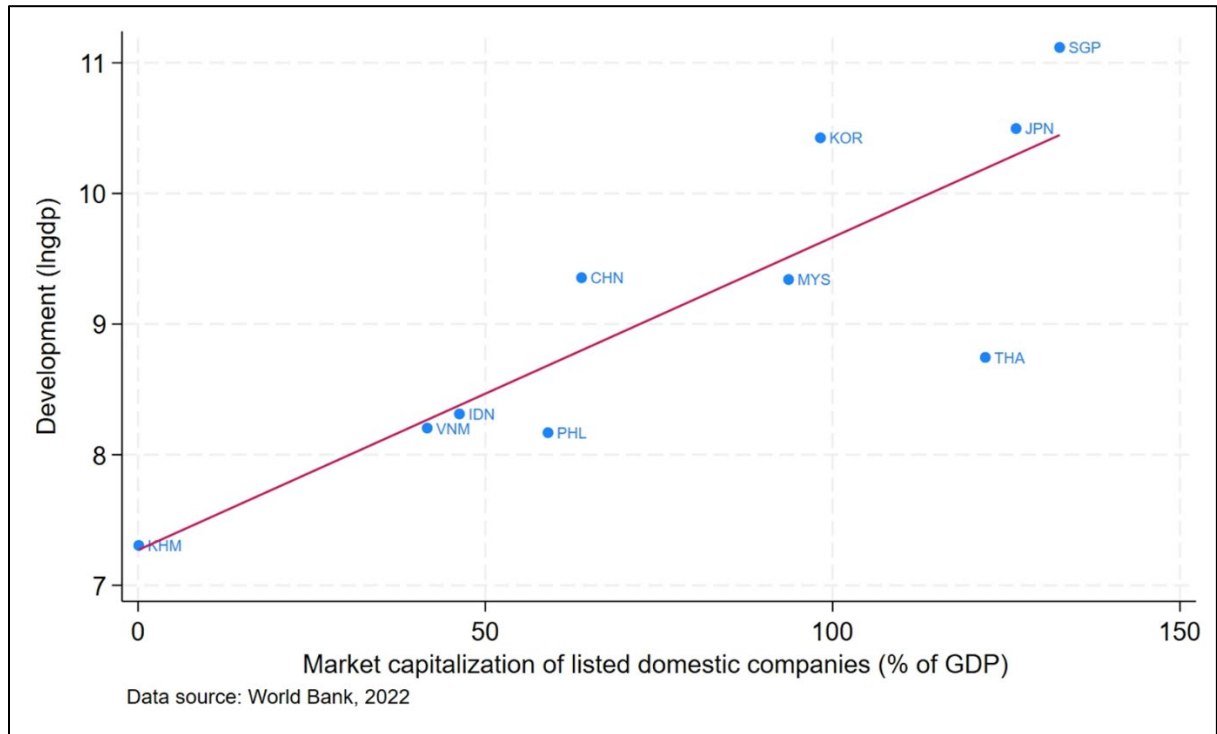
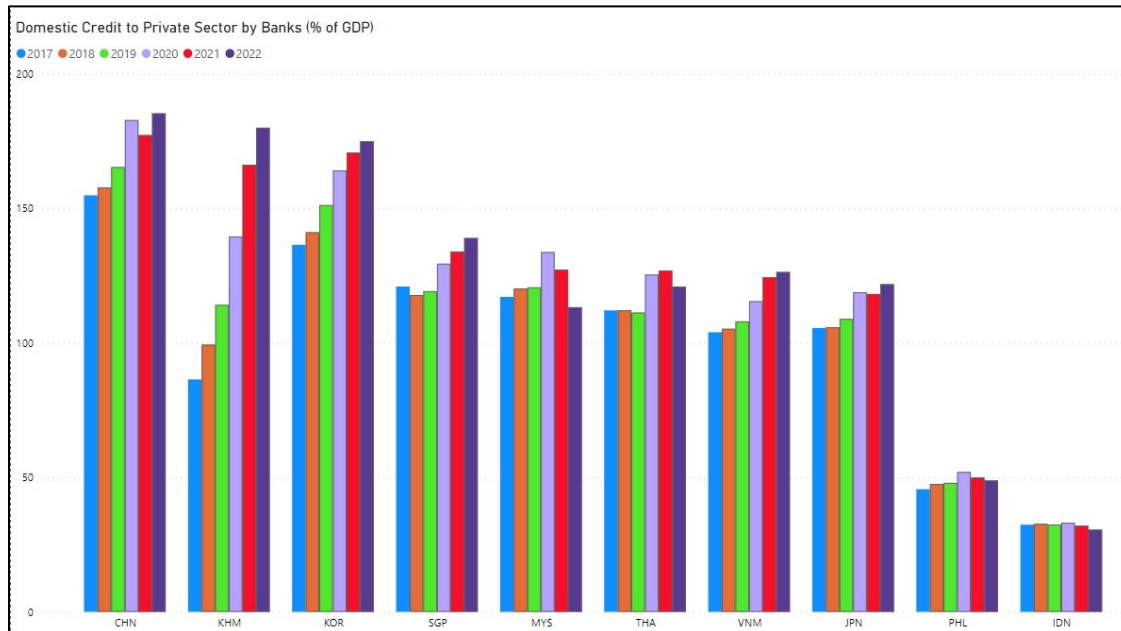


Figure 5 conveys the trend of the development of financial institutions proxied by the domestic credit to the private sector by banks as a percentage of GDP. Overall, there has been an increasing trend overall among countries in the last six years. Among the emerging countries, Cambodia has seen the largest increase, but Cambodian's economic growth (natural log of real GDP per capita) is not growing as fast as it would be implied, which is interesting to question and look further. Additionally, as mentioned above, if the world's largest economies experience negative growth in the upcoming one to two years, we may see an impact on this trend in terms of decreasing or increasing at a decreasing rate.

Figure 5: Domestic Credit to Private Sector by Banks as a percentage of GDP



Data Source: World Bank

3.0 LITERATURE REVIEW

Numerous studies have been done to convey the relationship between capital flows as well as corruption on economic growth. Capital flows from entities with funds available to others with investment opportunities theoretically enhance everyone's welfare and make everyone better off, leading to the growth in the economy. On the other hand, corruption impedes economic growth as it is considered a major obstacle to the smoothness of the flow in capital. According to Paulo et al (2022), corruption is worse, especially in emerging economies, where the rule of law and governance effectiveness is low and still evolving. However, there is a counterargument theory that corruption is not bad for the economy. Leff (1964) argues that corruption can promote economic growth, facilitating beneficial exchanges and allowing individuals and businesses to circumvent strict government regulations and correct preexisting government failures to generate vibrant economic activity. This theory is known as "grease the wheels".

Corruption in terms of bribery, nepotism, lobbying, invades all societies, however, that is much more detrimental in countries or regions with low rule of law and complicated bureaucracy. Countries with solid institutions designed to prevent control from elites are seen to be wealthier than countries with fragile institutions dominated by elites' desires in power, implying that corruption is worse in emerging economies, where the rule of law and governance effectiveness is low and still evolving (Paulo et al., 2022). Grundler and Potrafke (2019) denoted that corruption is negatively associated with economic growth and real GDP per capita decreased by around 17% in the long run. Going along the line, the study by Paulo et al (2022) on the Latin American and Caribbean countries from 2000 to 2018 found that one standard deviation increase in corruption, measured by Transparency International's reversed corruption perception index (CPI), is associated with a decrease of 12.2% in GDP per capita and 3.05% in economic growth, further supporting the "sand the wheels" theory. In the same study, Paulo et al. (2022) also denoted that corruption leads to lower investment in physical capital and foreign investment flow and that there is a bidirectional causality between lower economic development and higher corruption. There is no consensus whether corruption is an issue to economic growth. Some economists claim that corruption is an obstacle to economic growth "sands the wheels" and some argue that corruption functions as "grease in the wells" for economic growth, however, empirical evidence and study tends to show that corruption has a negative impact on economic growth.

The rule of law can protect against the diversion of resources, but in societies with corruption, that rule of law is often the primary driver and the consequences are hindrances on economic development through increased transaction costs, rent-seeking, uncertainties, inefficient investment, discouragement of innovation, misallocation of economic resources, and distortion of market regulations (Paulo et al., 2022; Grundler and Potrafke, 2019; Jin-Wei, 2000).

The impact of corruption affects the economy directly and indirectly. Study by Jin-Wei (2000) examine the indirect effects of corruption on economic growth as high levels of corruption tend to steer the mix of capital inflows towards hot money, hence making host countries more vulnerable to currency crises. Additionally, by discouraging foreign direct investment inflows and misallocating those resources for private gains,

corruption reduces the scope for beneficial financial development, since FDI flows have been shown to carry the most solid growth externalities. On the other hand, Abotsi (2017) denotes that 68% of the countries in Asia scored less than the tolerable level of corruption for investment as corruption has been observed to be significant in virtually all Asian countries, but, despite this, the region remains the number one global investment destination. Furthermore, countries with low control of corruption has negative impact on foreign direct investment (FDI), and countries with high control of corruption has positive impact on FDI (Abotsi, 2017).

Studies conducted by Bassanini & Scarpetta (2001) show that financial openness to international transactions such as FDI, trade, borrowing funds, aids, have exhibited positive relationship to economic growth. This relationship is then compounded in the economy whose financial market is operational and informational efficient as shown by Hondroyiannis (2004). Osani (2020) found that each government indicator and financial development indicator has a different level of magnitude from one another on the capital flows, hence economic growth. For instance, financial institutions prevail over financial markets in the dissemination of capital flows, hence have more impact on economic development (Osani, 2020). An empirical study by Shan (2020) found that swift change and reform in the financial sector and opening up the domestic financial market has brought significant growth in the economy. The study also found that there is a bidirectional causality between financial opening and economic growth (Shan, 2020).

Financial development has impact on the economy through many channels and mechanisms. A well-functioning and efficient financial market and financial intermediaries provide liquidity, reduce cost, reduce risk, enhance the integrity of the market, act as a channel for transferring funds efficiently from those without investment opportunity to those with investment opportunity but without fund as well as reducing the asymmetric information. One of the channels is through the stock market. Regulated and efficient stock market provides liquidity and more investment opportunities as investors now have more trust and options rather than investing in long-duration projects (Hondroyiannis et al., 2004). Hondroyiannis et al. (2004) did the study on Greece and found that upward shock in the stock market (rise in market capitalization) is associated with the increase in total output and increases in private bank credit boosts real economic

activity. Countries should strive to develop sound financial markets, including the trading activities of capital markets and countries should make every effort to prevent a banking crisis or currency crisis from occurring in order to eliminate, or at least mitigate, the influence they would have on capital flows' effect on economic growth (Shen et al., 2010).

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses annual data to conduct panel data analysis from 2005 to 2022 on ten countries in Southeast and East Asia. All the data except for the CPI index and World Governance Indicators (WGI) were obtained from the World Development Indicators in the World Bank website. Those data are each country's yearly real GDP per capita, foreign direct investment net inflows, market capitalization of listed domestic companies, domestic credit to private sectors by banks, personal remittance, labor force participation rate, percentage of government expenditure on education, mortality rate under five, and fixed capital investment. All of the variables from World Bank are transformed into log-normal. The CPI data is calculated annually and published by Transparency International, using thirteen different data sources from twelve institutions. The data collection and methodology behind this index is based on the perceptions among business executives and country experts on the public sectors' corruptive activities such as bribery, nepotism, etc. The CPI data from Transparency International ranges from 0 to 100, in which 0 is perceived as the most corrupted and 100 is perceived as the least corrupted. The study takes the same stance of the literature to potentially show the negative impact of corruption by modifying the data into reversed CPI in which the higher the CPI, the more corrupted the country is perceived to be. Summary statistics for the data are provided in Table 1.

Table 1: Descriptive Statistics

Variable	Obs	Mean	St. Dev	Min	Max
Real GDP Per Capita	180	14740.93	17198.89	697.75	67359.79
GDP Per Capita Lag	180	14374.18	16827.40	627.01	67175.87
Control Of Corruption	180	0.05	1.00	-1.36	2.23
Market Cap & Bank Credit	180	238817.70	538196.20	56.10	3341186.00
Foreign Direct Investment (In Flows)	180	36.43	65.46	0.12	344.08
Remittance	180	7.94	8.96	0.00	38.05
Labor Force Participation Rate	180	72.51	5.88	56.91	81.87
Mortality Under 5years (per 1,000 birth)	180	16.35	13.31	2.00	64.80
Government Expenditure on Education	180	14.93	3.75	7.20	21.96
Fixed Capital	180	27.30	6.47	15.97	44.52

Source: World Bank and Author's Calculation

4.2 Empirical Model

Following Paulo et al. (2020) and Hondroyannis et al. (2004), this study adapted and combined the ideas behind the two papers together on corruption and capital flows with the addition of personal remittance.

The model could be written as follows:

$$Growth_{it} = \beta_0 + \beta_1 RGDP_{it-1} + \beta_2 Corruption_{it} + \beta_3 LMCAPTBC_{it} + \beta_4 LFDI_{it} + \beta_5 LREM_{it} + \theta x_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

$Growth_{it}$ represents the economic growth of country i at year t . Natural log of real GDP per capita is a proxy for $Growth_{it}$, which data is obtained from the World Bank. It can also be considered as a representative for the improvement in standard of living a person.

Independent variables consist of four main variables. Appendix A and B provide data sources, acronyms, descriptions, expected signs, and justifications for using the variables. First, $Corruption_{it}$ represents the proxy for corruption through seven proxies from Transparency International and WGI. Second, $LMCAPTBC_{it}$ is the proxy for development of financial markets and institutions for country i at year t . It is the log-normal of the

transformation of domestic bank credit and stock market capitalization of listed domestic countries through addition. Third, $LFDI_{it}$ is log-normal of foreign direct investment net inflows in country i at year t . Then, $LREM_{it}$ is the log normal of the personal remittance received which attempts to capture the capital inflows from national workers overseas. Lastly, x_{it} is a vector capturing other determinants of economic growth such as mortality rate, human capital, physical capital, workforce, etc. μ_i is the country-fixed effect that absorbs the heterogeneity factors between countries while δ_t is the time effect that accounts period-specific shocks common to all countries.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Figure 6 and 7. The same empirical model is run seven times, each time with a different proxy of corruption. In each of the sub-model, it is run three times with fixed effect, random effect, and OLS. Exhibit 1 in the Appendix shows the tests and diagnostics before running the model. Using the Hausman test, fixed effect is chosen to mainly describe the result. The empirical estimation shows a negative relationship between economic growth and corruption. Capital through financial markets and institutions and personal remittance have a positive relationship with economic growth while the impact of FDI is unambiguous.

Figure 6: Regression Results Part 1

Explanatory Variables	Outcome Variable: Growth			Outcome Variable: Growth			Outcome Variable: Growth			Outcome Variable: Growth		
	(1)			(2)			(3)			(4)		
	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect	OLS
CPI	-0.008***	-0.008***	-0.009***									
Control of Corruption				0.209***	0.185***	0.212***						
Government Effectiveness							0.125***	0.154***	0.196***			
Political Stability										-0.139***	-0.076***	-0.092***
Regulation Quality												
Rule of Law												
Voice & Accountability												
RGDP _{t-1}	0.00002***	0.00002***	0.00002***	0.00002***	0.00002***	0.00002***	0.00001***	0.00002***	0.00002***	0.00002***	0.00002***	0.00002***
LMCAPTBC	0.168***	0.145***	0.146***	0.176***	0.147***	0.145***	0.162***	0.152***	0.151**	0.169***	0.159***	0.157***
LDI	0.006	0.008	-0.008	0.006	0.003	-0.009	0.005	-0.002	-0.021*	0.007	-0.008	-0.024**
IREM	0.057***	0.006	-0.009	0.067***	0.002	0.014	0.081***	-0.003	0.017*	0.107***	-0.015	0.032***
LLFPR	0.0211***	0.0325***	0.109***	0.024***	-0.041***	0.092***	0.011***	-0.310***	0.761***	0.023***	-0.031***	0.863***
LMORT	-0.198***	-0.551***	-0.549***	-0.190***	-0.562***	-0.560***	-0.171***	-0.533***	-0.517***	-0.298***	-0.643***	-0.658***
LEDU	0.064	0.301***	0.228***	0.091**	0.277***	0.215***	0.085**	0.254***	0.177***	0.089**	0.293***	0.222***
LFC	-0.130	-0.136	-0.007	-0.120	-0.094	0.017	-0.090	-0.094	0.041	0.004	-0.070	0.064
Constant	10.639***	14.349***	14.950***	10.736***	14.238***	14.672***	11.268***	13.426***	13.647***	11.922***	14.015***	14.484***
F (26, 144)	89.4			89.04			79.98			93.64		
Prob > F	0.0000			0.0000			0.0000			0.0000		
Wald Chi ² (26)		22792.07			22933.88			20874.57			20827.21	
Prob > Chi ²		0.0000			0.0000			0.0000			0.0000	
F (9, 170)			2349.60			2436.20			2224.42			2175.71
Prob > F			0.0000			0.0000			0.0000			0.0000
R ²	0.888	0.972	0.991	0.848	0.979	0.991	0.859	0.981	0.991	0.873	0.974	0.991
Hausman Test:												
Chi ²	117.22			116.86			116.6			121.68		
Prob > Chi ²	0.0000			0.0000			0.0000			0.0000		
No. of Observations	180	180	180	180	180	180	180	180	180	180	180	180

Figure 6: Regression Results Part 2

Explanatory Variables	Outcome Variable: Growth			Outcome Variable: Growth			Outcome Variable: Growth		
	(5)			(6)			(7)		
	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect	OLS	Fixed Effect	Random Effect	OLS
CPI									
Control of Corruption									
Government Effectiveness									
Political Stability									
Regulation Quality	0.012***	0.403***	0.417***						
Rule of Law				0.191***	0.403***	0.404***			
Voice & Accountability							0.205***	0.180***	0.191***
RGDP _{t-1}	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00002***	0.00001***
LMCAPTBC	0.175***	0.161***	0.165***	0.164***	0.161***	0.170***	0.178***	0.175***	0.177***
LDI	0.005	-0.009	-0.025	0.005	-0.009	-0.001	0.004	0.026	0.013
IREM	0.093***	0.004	0.021***	0.072***	0.004	0.039***	0.063***	0.054***	0.071***
LLFPR	0.0112***	-0.0167***	0.691***	0.0068**	-0.0242***	0.772***	0.0111***	-0.0143***	0.642***
LMORT	-0.251***	-0.0490***	-0.488***	-0.162***	-0.490***	-0.375***	-0.264***	-0.605***	-0.608***
LEDU	0.072	0.215***	0.143***	0.106***	0.215***	0.147***	0.071**	0.305***	0.247***
LFC	-0.081	0.046	0.160**	-0.054	0.046	0.006	-0.094	-0.081	0.026
Constant	11.119***	11.259***	11.766***	11.363***	11.259***	14.087***	11.675***	11.954***	12.287***
F (26, 144)	73.79			81.8			91.83		
Prob > F	0.0000			0.0000			0.0000		
Wald Chi ² (26)		31165.05			31165.05			32966.4	
Prob > Chi ²		0.0000			0.0000			0.0000	
F (9, 170)			3084.38			3245.14			3349.25
Prob > F			0.0000			0.0000			0.0000
R ²	0.869	0.987	0.993	0.880	0.979	0.994	0.861	0.971	0.994
Hausman Test:									
Chi ²	94.55			82.41			102.64		
Prob > Chi ²	0.0000			0.0000			0.0000		
No. of Observations	180	180	180	180	180	180	180	180	180

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively.

The CPI variable estimate in Model 1 was significant at the 1% level. The parameter estimate of CPI is consistent with the result of Paulo et al. (2022). The estimate indicated that CPI was negatively associated with economic growth in the Southeast and East Asia. Each proxy of corruption across all seven models is statistically significant at 1% as they consistently show that corruption impedes and is negatively associated with economic growth. This result is identical only differ in magnitude when looking at the random effect and OLS. In Model 2, as the control of corruption increases by 1%, economic growth will increase by 0.2%, holding everything else constant. Meanwhile, in Model 4, as political stability and absence of violence/terrorism, which measures the likelihood of political instability and politically-motivated violence, increases by 1%, economic growth 0.14%, holding everything else constant. Development of financial markets and institutions through its capital allocation proxied by the market capitalization of listed domestic companies and total domestic bank credit is statistically significant across all models and it indicates consistently that financial markets and institutions are positively associated with economic growth. This is also consistent with the random effect and OLS as well as with the findings of Hondroyiannis et al. (2004). Looking at the fixed effect alone, FDI is not statistically significant across all models even though it shows a positive sign. In other models of random effect and OLS, FDI is either not statistically significant or statistically significant with a negative sign. It is not consistent with the findings of Hondroyiannis et al. (2004) since this model incorporates corruption. This is expected as we hypothesize that capital with high interference from the government, especially in a highly corrupted country, is not allocated efficiently and may be exercised for private gains. On the other hand, personal remittances received by households from members working abroad is statistically significant across all models and the result shows that it consistently has a positive impact on economic growth. FDI usually needs approval from the government and it often is given to the government for distributing and investing that capital while capital through financial markets and personal remittances usually reaches corporate, businesses, households, and individuals directly or with less participation from the government. The degree of interference with those capitals from the government may make the impact of capital vary by forms, encouraging further study.

6.0 POLICY IMPLICATIONS

Policy implications subsequently follow after the findings. It is hard and almost impossible to do policy implications when the policymaker who has the power to do it is corrupted, and assuming it is not the case is a very big assumption. Corruption is like cockroaches: it is resilient, persistent and it spreads rapidly and it multiplies in the dark which cannot be easily observed. The more you deal with it, the more you realize there is more to come. We can try to combat with corruption like how we deal with those cockroaches. Identify the infestations: what are the sources, who are the players in it, and what are considered corruption? It then comes to sanitation, pesticide, and hygiene: remove and mitigate the sources that contribute to corruption. Then, close off entry points for corruption and implement education for corruption control and train groups of chosen people who still have the willingness to fight corruption. Combating corruption requires a collaborative effort, it is not just what the government can do, it is also what each individual can do. If corruption is reduced as it is impossible to eliminate them just like how you cannot completely eradicate cockroaches, FDI will potentially be allocated efficiently and may show positive impact on economic growth. Regarding the financial markets and institutions, it needs to be as much efficient as possible to have a higher impact on growth. Some approaches such as reducing corruption, education on the roles of capital, establishing an effective regulations to oversee the market, building trust and reducing information asymmetry will attract more participants into the market even foreign investors in terms of foreign portfolio inflows to make the market more liquid and more efficient. Tax incentives, transaction costs, and subsidies could also be considered to attract more funds. On the other hand, remittances should have a matching program to certain limits for incentivizing.

7.0 LIMITATIONS

There is no perfect model in this world nor there is a model without any limitations. It is important to distinguish between good data and great data, especially in our case. Great data are usually behind the pay-wall. Although we got our data from sources like World Bank and they adjust it, the World Bank initially gets those data reported and prepared by

government agencies and if that country is corrupted, the credibility of those data also decreases. There are also problems with inputs such as the use of proxy and specification and there are also other biases that is very hard to account for such as omitted variable bias. The fixed effect model does not account for time-invariant causes. More observations are helpful and useful in this and future study. With more observations, it also comes with more flexibility, enhanced precision, as well as reducing bias and increasing statistical power. More observations allow us to study each country separately across multiple periods of time and conduct a comparison as each country has different level of corruption and different development in financial markets. Grouping countries by sub-regions or by similar level of corruption is also encouraged for future study. Difference in difference could be studied on a specific country which exhibits an increasing trend in its governance and control of corruption to see how impact of each capital changes.

8.0 CONCLUSION

In summary, corruption is a very big obstacle to economic growth, eroding trust and confidence, distorting the allocation of resources, hindering investment, increasing inequality, degrading the environment, discouraging people, chipping away productivity fueling grievances and conflict, as well as the capital flows through the economy, in which the flow may be disrupted and cannot be allocated efficiently. The results in this paper imply that corruption hinders economic growth across all seven models. With the presence of corruption, only certain forms of capital are shown to have a positive impact on economic growth as those particular forms have less to no interference from the government. FDI, with the high interference from the government, has an ambiguous effect. Corruption needs to be reduced for the economy to grow more efficiently and the impact may need to study from time to time to see the difference.

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Appendix A: Variable Description and Data Source

Acronym	Description	Data source
Growth	Growth in real GDP per capita proxied by natural logarithm of real GDP per capita	World Bank
CPI	Corruption perceived index	Transparency International
FDI	Foreign Direct Investment net inflows in current dollars	World Bank
MCAPTBC	Development of financial systems proxied by the transformation through addition between market capitalization of listed domestic companies and domestic credit to private sectors by banks in current dollars	World Bank
REM	Personal remittance received in current dollars	World Bank
LFPR	Total Labor Force Participation Rate (% of total population ages 15-64)	World Bank
EDU	Education Expenditure in current US \$	World Bank
MORT	Mortality rate under 5 (per 1000 live births)	World Bank
WGI	Six Governance Indicators	World Governance Index
FC	Fixed capital formation as % of GDP	World Bank

Appendix B- Variables and Expected Signs

Acronym	Variable Description	What it captures	Expected sign
CPI	Reversed Corruption perceived index	Perceived corruption in public institutions	-
FDI	Foreign Direct Investment net inflows in current dollars	Investment inflows from abroad	+/-
MCAPTBC	Transformation through addition between market capitalization of listed domestic companies and domestic credit to private sectors by banks in current dollars	Development of financial system	+
REM	Personal remittance received in current dollars	Proxy for fund from household members working abroad	+
LFPR	Total Labor Force Participation Rate (% of total population ages 15-64)	Human capital and labor markets	+
EDU	Education Expenditure in current US \$	Human Capital	+
MORT	Mortality rate under 5 (per 1000 live births)	Human Capital/Health Stock	-

WGI	Six Governance Indicators	Proxy for governance and corruption	+/-
FC	Fixed capital formation as % of GDP	Physical Capital	+

Appendix C- Tests and Diagnostics

Tests	Null Hypothesis	Test Statistics	Conclusion
Joint-F Test	H0: Years are jointly equal to zero (time fixed effects are not needed)	F stat= 4.19; Prob> F= 0.0000 <0.05	Reject H0; Time fixed effects are needed
BP LM Test	H0: Variances across entities is equal to zero (No significant difference across units or no panel effect => Simple OLS)	Chibar ² = 24037.53; Prob > Chibar ² =0.0000 <0.05	Reject H0; Random effects are needed
BP/LM Test	H0: Residuals across entities are not correlated (no cross sectional dependence)	Chi ² = 138.262; Pr = 0.0000 < 0.05	Reject H0; Panel are correlated (cross-sectional dependence)
Modified Wald Test	H0: Homoskedasticity (constant variance)	Chi ² = 960.41; Prob > Chi ² =0.0000 <0.05	Reject H0; Conclude Heteroskedasticity
Wooldrige Test	H0: No first order serial/autocorrelation	F stat= 24.387; Prob > F 0.0008 < 0.05	Reject H0; Conclude Serial Correlation

Appendix D- Heat Map of Corruption by Transparency International

