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Unravelling the Role of FDI and Financial Institutions in Developing Countries

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Abstract

This study investigates the impact of Foreign Direct Investment (FDI) on the economic growth of developing countries utilising panel data encompassing 150 countries from 2000 to 2021. The empirical analysis reveals a positive yet modest influence of FDI on economic growth within these countries. In the subsequent section, the study explores the potential contribution of a well-developed financial market to this relationship and finds the effect to be inconclusive. These findings hold under different metrics of financial development and withstand a sample selection test, indicating their robustness.

Abstract

1. Introduction

In today's globalised world, the relationship between foreign direct investment (FDI) and economic growth has gained enormous significance. Many Southeast Asian developing nations, amongst others, are aiming to gain economic progress using FDI as a catalyst (Markusen & Venables, 1999). The attraction of fresh capital, technology transfers, and entrance to global markets has inspired governments globally to advocate for FDI through diverse policies. Some examples are the liberalization of their investment regulation, the privatization of state-owned enterprises and the offer of incentives to foreign investors. Yet, the focus on policies that effectively channel and allocate these investments remains insufficient (Cleeve, 2008). This could partly be due to the existing academic literature's lack of consensus on FDI's impact, determinants, and its overall effect on economic growth. Consequently, this research aims to contribute to the current body of knowledge on this subject, emphasising specifically on the developing nations.

The focus on developing nations is crucial, given the anticipated variation in the impact of FDI between developed and developing economies, especially regarding the host economies' economic growth. As developing countries are the primary recipients of FDI, its effect is expected to be more profound in these settings (De Mello, 1999). Moreover, it is crucial to emphasize the limited research focused exclusively on a large number of developing countries. Most existing literature examines approximately 20 countries, often combining both developing and developed nations. Even when studies do consider developing countries separately, they tend to concentrate on specific regions rather than encompassing the entirety of these nations as a cohesive group. This lack of comprehensive research dedicated solely to developing countries is surprising, particularly considering that they comprise over 60% of the global population (Asiedu, 2002). Therefore, this paper's primary objective is to delve into how FDI influences the economic growth of developing countries. To facilitate a thorough understanding, we dissect the research question into two hypotheses:

- H1: Foreign direct investment (FDI) has a small[1] positive impact on the economic growth of developing countries.

[1] This hypothesis uses the term “small” to refer to an effect smaller than 1% increase in economic growth given a 1 percentage point increase in FDI.

- H2: The impact of foreign direct investment (FDI) on the economic growth of developing countries is influenced by the development of their financial institutions.

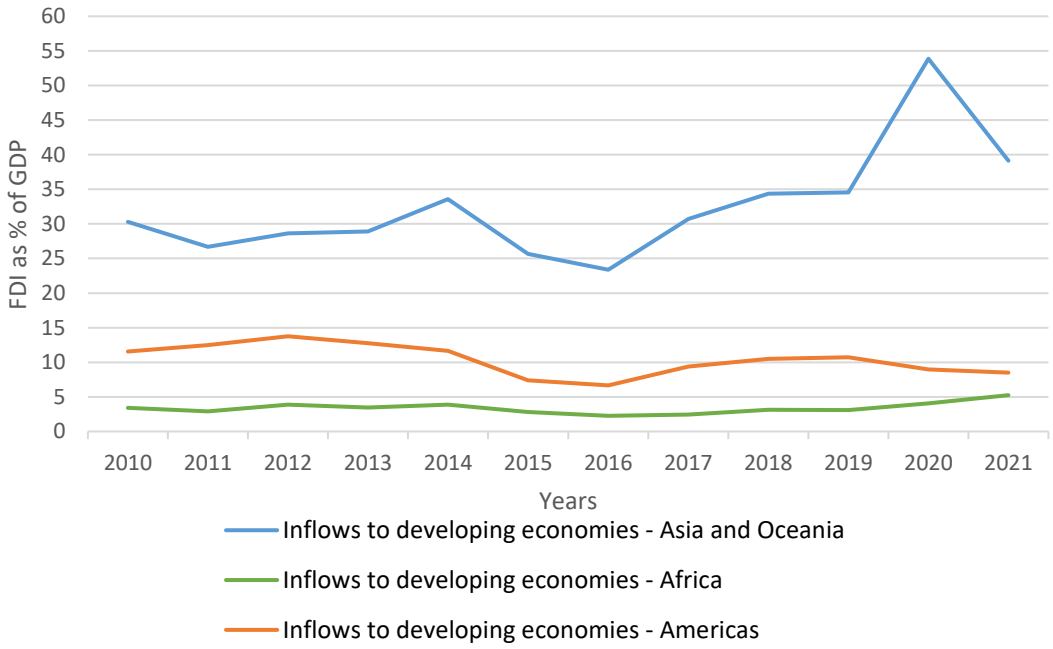
The first hypothesis is designed to evaluate FDI's general impact on economic growth, aligning with the part of prior literature that finds that FDI contributes positively, albeit modestly, to the economic growth of developing nations. The second hypothesis analyses if a country with well-developed financial institutions makes the effect of FDI on economic growth bigger.

This research holds substantial social and academic relevance. From a social lens, comprehending the FDI-economic growth nexus is crucial for policymakers to strategize and manage foreign investments effectively. From an academic viewpoint, studying this topic enhances the economic field's knowledge. H1's findings can feed into future theoretical frameworks, deepening our understanding of the factors boosting economic growth in developing countries. Conversely, H2's results may advocate a shift in policies towards enhancing financial development and factors that comprise it, rather than solely attracting FDI.

This research provides several novel contributions to the existing literature. Primarily, it offers a current perspective on the subject. The literature review comprises over 20 relevant papers, with the latest dataset only extending to 2014. Since then, considerable global shifts have occurred, including a global pandemic. Therefore, this research utilises a more recent dataset, covering up to 2021, to better understand the topic in the present context, especially given the surge of FDI in the past decade (refer Figure 1).

Figure 1

Analysis of FDI inflows into developing countries



Note: Data obtained from UNCTAD.

Further, this study enhances previous research by focusing on a commonly used variable while adopting a new way of measuring it. Specifically, the variable "Regulatory quality" is utilised to measure financial development, offering a unique perspective, and possibly contradicting existing assumptions and findings. More specifically, RQ measures the perceived capacity of a government to establish and enforce prudent policies and regulations, which stimulate private sector growth. This variable was selected due to its comprehensive and intricate nature, as it captures multiple dimensions of financial development within a single measure. This comprehensive approach enables a thorough assessment of financial development. By combining updated data with this innovative way of measuring financial development, the study aims to expand the current understanding of the subject matter and make a valuable contribution to the academic literature in this field.

The remainder of this research is structured as follows: Section 2 examines the relevant literature on FDI and economic growth, analyzing FDI's determinants and prior methodologies employed. Section 3 describes the utilised dataset in detail. Sections 4 and 5 explain and

examine the methodology and present the results, respectively. Lastly, Section 6 summarises the findings and delivers concluding remarks.

2. Related literature

a. Effect of FDI on economic growth

The theoretical implications of foreign direct investment (FDI) on the economic development of emerging economies are quite evident. Various economic models, including neo-classical growth theory, technology transfer theory, and spill-over effect theory, support the idea that FDI can stimulate growth by increasing access to physical capital, introducing technological advancements, and enhancing productivity. However, translating these theories into empirical evidence has sparked extensive debate, leading to a multitude of studies with contrasting findings.

Numerous studies suggest a positive relationship between FDI and economic growth. Alfaro et al. (2009), for example, conclude that FDI predominantly affects economic growth through productivity enhancements rather than capital accumulation. Agrawal (2015) found a strong, positive, bidirectional relationship between FDI and economic growth in BRICS countries. Bengoa and Sanchez-Robles (2003) also found a positive correlation between the two, contingent on adequate human capital, economic stability, and liberalised markets.

Certain studies, such as those by Aitken and Harrison (1999) and Blalock and Gertler (2008), indicate a positive but minimal correlation, pointing out that FDI's benefits are not uniformly distributed. For instance, Aitken and Harrison's research showed a positive impact on smaller Venezuelan plants, while larger plants experienced negative spill-over effects. On the other hand, Nair-Reichert & Weinhold (2001) highlighted that the relationship between FDI and economic growth is more robust in economies that are more open to trade.

In contrast, some research fails to establish a direct correlation between FDI and economic growth. Durham (2004), in a study incorporating data from OECD and IFS, concluded that FDI and equity foreign portfolio investment (EFPI) do not directly and positively impact growth. De Mello (1999) echoed these findings, indicating that developing economies encounter difficulties in capital accumulation and the assimilation of new technologies through FDI.

There are also studies yielding mixed results. For instance, Tsai (1994) found no impact of FDI on economic growth in least developed countries (LDCs) during the 1970s but reported a positive and significant impact in the 1980s. Similarly, Loris Gui-Diby (2011) revealed a negative relationship during the 1980s, which then turned positive from 1994 to 2009 due to improved business environments. Furthermore, Görg & Greenaway (2004) concluded that while there's no aggregate evidence supporting FDI's positive spill-overs leading to economic growth, at a disaggregate level, firms with high absorptive capacity or proximity to multinational enterprises (MNEs) do exhibit higher productivity levels thanks to FDI spill-overs.

In summary, the interplay between FDI and economic growth is not uniform and varies across studies. While some underscore a positive correlation influenced by factors such as trade openness, others point out limited positive effects, stressing the importance of absorptive capacity, sector-specific dynamics, and technological complementarity. Therefore, additional research is necessary to fully comprehend the intricate dynamics between FDI and economic growth.

b. Determinants of FDI: Role of Financial Institutions

The influence of foreign direct investment (FDI) on the economic growth in developing nations is complex, leading to diverse outcomes across different countries. Factors like absorptive capacity (the capacity of a host country to effectively attract and utilisese FDI) and trade openness can significantly sway the economic impact of FDI. Nonetheless, this paper primarily revolves around the development of financial institutions as a crucial determinant of FDI.

Hermes and Lensink (2003) conducted an empirical examination of how mature financial institutions could enhance the positive effects of FDI on economic growth. Their research suggests that robust financial institutions facilitate technological spill-overs linked with FDI. Alfaro et al. (2004) echo this sentiment, asserting that a well-structured financial system is a prerequisite for a nation to reap the economic benefits of FDI. In a subsequent study, Alfaro et al. (2009) delved into how financial markets mediate the influence of FDI on economic growth, either through factor accumulation, total factor productivity (TFP) improvements, or both. They concluded that the effect on economic growth primarily arises from TFP improvements.

Adding to this narrative, Arestis & Demetriades (1997) provided an in-depth evaluation of existing literature on the impact of financial development on economic growth, indicating an overall positive correlation. However, they emphasize the need for more research to gain a better understanding of the causal relationship's direction. They also highlight that the effect may vary depending on a country's initial level of financial development. Bengoa and Sanchez-Robles (2003) support this viewpoint, finding that FDI and economic growth are positively correlated, given adequate human capital, economic stability, and well-developed financial institutions.

Wachtel (2003), in his research, underscored the importance of a robust financial sector for economic growth. He detailed four keyways a developed financial sector contributes to growth: by refining the screening and monitoring of funding seekers, mobilizing savings, leveraging economies of scale in financial institutions, and facilitating risk management and liquidity provision. King and Levine (1993) also found this for keyways in his results and in turned all of his results mostly agreed with those of Wachtel (2003).

The literature exploring the impact of a well-developed financial market on foreign direct investment (FDI) can be broadly categorized into two groups based on the proxies used to measure financial development. These groups include financial development measured using variables related to the stock market and financial development measured using variables related to the credit market. Initially, credit market proxies were more prevalent in the literature, but as one delves into more recent papers, a shift towards the use of stock market proxies becomes apparent. Among the various variables used to proxy for financial development, a few stand out due to their frequent usage and repetition.

One commonly employed variable, and the one utilized in this study for replication purposes, is liquid liabilities as a percentage of GDP. This variable belongs to the credit market group and serves as a broad measure of the overall size of the economy. Its usefulness lies in its ability to account for all three types of financial institutions, namely the central bank, deposit money banks, and other financial institutions.

Another frequently used variable is credit to the private sector as a percentage of GDP, which also falls within the credit market group. On the other hand, when it comes to proxying financial development in terms of the stock market, the most common variables are the value

of stock trading relative to the size of the economy and the average value of listed domestic shares on domestic exchanges in a given year as a proportion of the economy's size.

In addition to studies on financial development, other noteworthy research study other important determinants worth mentioning. Tsai (1994) explored the positive influence of market size on FDI, while also finding that trade balance and labour costs can negatively affect FDI inflows. Asiedu (2002) built on this, analyzing factors such as return on investment, trade openness, infrastructure, and natural resource endowment as positive drivers of FDI, while identifying corruption, political instability, and inflation as detriments. Chowdhury & Mavrotas (2006) then expanded this further by highlighting the impact of education quality on FDI, asserting that a higher-quality labour force attracts more FDI inflows.

Reviewing the literature, it becomes clear that FDI's impact on economic growth is contingent upon numerous crucial determinants. These insights are particularly relevant for policymakers as they may need to shift their focus from solely attracting FDI to enhancing policies related to a country's inherent characteristics. This would enable a country to absorb FDI more effectively and convert it into meaningful economic growth. In this context, the development level of financial institutions emerges as a paramount determinant that warrants further research. It is hoped that the findings of this paper will contribute to the existing body of knowledge and guide policy formulation aimed at leveraging FDI for higher economic growth in developing countries.

c. Review of methodological approaches

The selection of an appropriate empirical method for studying this subject remains a topic of debate within the extensive body of literature. There are essentially two divergent perspectives with regard to the type of data used. One group predominantly uses aggregate-level data, analysing numerous countries to explore the transnational effects of foreign direct investment (FDI) on economic growth. In contrast, the other group focuses on micro-level data, such as plant-level or sector-level data, seeking to understand the intra-country correlation between FDI and productivity.

The aggregate data faction primarily employs the ordinary least squares (OLS) regression method using cross-country data. This approach is prominent in several influential studies, including Asiedu (2002), Alfaro et al. (2004), and Benson Durham (2004). The advantage of

this method is that it captures variations between FDI and economic growth, enabling the identification of patterns and associations between these two variables. Additionally, this methodology allows for a comparative analysis of how the impact of FDI on economic growth differs among countries with varying characteristics. However, it assumes exogeneity, which may not be applicable in this context due to the potential for reverse causality. Furthermore, the results are context-specific and may not be applicable to other settings due to the inherent heterogeneity of the initial data.

In contrast, some researchers prefer alternative methodologies, as demonstrated by Loris Gui-Diby (2011). This author utilizes the Generalized Method of Moments (GMM), which effectively mitigates simultaneity bias that may occur due to endogenous explanatory variables. Nevertheless, GMM has challenges related to relevance and validity, particularly when valid instruments are unavailable. Alternatively, De Mello (1999) uses time series analysis and panel data fixed effects estimation. These methods help control for unobserved country-specific factors that might influence both FDI and economic growth. Still, endogeneity could be a concern as panel data fixed effects estimation does not account for reverse causality or omitted variable bias.

In the micro-level data faction, two methodologies are predominantly used. The first is fixed effects regression, a method employed by notable studies such as Blalock and J. Gertler (2008). Similar to panel data fixed effects, this methodology controls for unobserved heterogeneity and time-varying effects. However, this approach significantly limits the generalizability of the results and assumes that all time-varying factors are captured, leaving potential room for omitted variable bias. The second method is linear or log-linear regression, as used by J. Aitken and E. Harrison (1999) in their plant-level data analysis. Despite its simplicity and usefulness in hypothesis testing and determining the statistical significance of coefficients, this method comes with assumptions (like linearity and error independence) that might not hold true. Moreover, the assumption of heterogeneity is often criticized within the literature.

In conclusion, a myriad of methodologies exists for studying the impact of FDI on economic growth in developing countries. Yet, the academic community does not seem to have reached a consensus on which method provides the most accurate or superior results. The appropriateness of one methodology over another often depends on the availability of data and the specific research question under investigation.

3. Data

The dataset that forms the basis of this study consists of observations from 150 distinct developing nations, spanning from the year 2000 to 2021. Please refer to Table A.1 for a comprehensive list of these countries. A large sample size was deliberately selected to minimize the standard error interval for each variable, thereby enhancing the precision of the analysis. Within the scope of this study, a "developing" nation is classified as one with a Human Development Index (HDI) score below 0.800. This cut-off aligns with the United Nations' benchmark, which classifies nations with an HDI below 0.800 as having medium HDI. The inclusion of specific countries, years, and control variables in the analysis was determined by data availability. However, it's important to note that due to missing data for some countries, the dataset employed in addressing our research question isn't perfectly balanced. Descriptive statistics for all variables used in the analysis can be found in Table 1.

Table 1

Summary of descriptive statistics

Variable	Obs.	Mean	Std. dev.	Minimum	Maximum
Dependent variable:					
GDP growth	2,989	3.560833	6.203523	-54.2359	86.82675
Independent variables:					
FDI inflow	2,819	7.16747	49.92118	-37.17265	1709.766
Govt expenditure	2,454	16.56816	11.28248	.9517466	147.7189
Inflation	2,600	7.644624	23.89165	-10.06749	557.2018
Trade openness	2,618	81.84934	48.78744	.7568755	863.1951
Regulatory quality	2,359	41.18277	28.47621	0	99.03846
Physical infrastructure	2,882	24.12597	25.16933	0	98.37
Liquid liabilities	2,545	49.66676	39.75212	0.9749299	449.954

Notes: Table 1 shows the descriptive statistics of all variables used in the model. See section 2 of the paper for more detailed information on each variable.

Upon analysis, the mean value of economic growth appears to be positive, suggesting a trend of positive economic growth across the observed nations over time. Additionally, there's

a considerable standard deviation in FDI inflows, trade openness, and liquid liabilities, meaning the variables have significant variations across different countries. Notably, the accessibility of infrastructure shows big differences as well, with some nations, like Timor-Leste, reporting zero percent internet access at certain years, whereas others, like Bermuda, showcasing almost universal access. Furthermore, FDI inflows and liquid liabilities show considerable fluctuations; some countries, such as the Cayman Islands, emerged as substantial FDI recipients in specific years, while others like Mongolia were more commonly donors. Similarly, Libya exhibits a high ratio of liquid liabilities, while Zimbabwe has minimal liquid liabilities as a percentage of GDP. This underlines the dynamic nature of foreign investments and financial development in developing countries.

As in the existing literature, the dependent variable for this study is economic growth, measured as the annual percentage growth rate of GDP. The independent and control variables have been widely used in prior studies, which utilised diverse methodologies to measure their impacts and establish their relationship with economic growth (Levine and Renelt, 1992; Barro, 1991). The primary independent variable is FDI inflows, quantified as net inflows of FDI as a percentage of GDP. To control for omitted variable bias, six control variables are included in the regression models. The following subsections will explain in great detail all the descriptions of these control variables.

a. Physical infrastructure

This variable accounts for the extent of internet accessibility, represented as the percentage of the population that used the internet from any location in the last three months. It acts as a marker for the availability of physical infrastructure. The significance of this variable becomes apparent when considering foreign businesses, as internet access enhances connectivity, facilitates global trade, and enables participation in international value chains (Banga, 2003). It's also instrumental in business growth, market accessibility, and competition with other players in the market. From the viewpoint of the host nation, this variable holds importance as it influences the quality and the effect of technological spill-overs, subsequently impacting the transfer of knowledge and development of human capital within the local economy. It's important to note, however, that this control variable's measurement is primarily focused on availability and does not take into account the aspect of reliability (Asiedu, 2002).

b. Public expenditure

This variable denotes the final government spending as a percentage of GDP. Its inclusion helps to isolate the impact of FDI on economic growth from the effect of government spending. Additionally, it highlights a nation's absorptive capacity, which gauges its ability to effectively convert FDI into growth. It also takes into account possible government policies, such as tax cuts or subsidies, aimed at attracting FDI. This variable has been widely used in the literature in papers such as Goodspeed et al. (2006).

c. Macroeconomic stability

Macroeconomic stability in this context is quantified as the annual percentage of inflation. This control variable is included to correct for the potential distortion caused by inflation when measuring economic growth and overall economic activity. Inflation can also impact various macroeconomic factors that subsequently influence economic growth. Moreover, it can sway the decision-making process of foreign firms regarding investment locations, as it directly affects production costs and purchasing power. Agudze & Ibhagui (2021), amongst other papers, point out the adverse effect this variable can have on FDI and consequently on economic growth.

d. Financial development

The variable selected to quantify financial development in this study is Regulatory Quality (RQ). According to the World Bank's definition, RQ measures the perceived capacity of a government to establish and enforce prudent policies and regulations, which stimulate private sector growth. This variable is measured using a percentile rank, demonstrating a country's position with respect to all nations included in the indicator. In this case the highest and best possible rank a country can have would be 100. The formation of this variable relies on a diverse range of measurements and various variables (for a comprehensive list of these variables, please refer to Table A.2). An example of some of the most important variables used to construct RQ are, the ease of setting up a subsidiary for a foreign firm, efficiency of competition regulation and a measurement of how problematic labour regulations for the growth of your business are. As it can be seen all these factors are crucial for foreign firms to establish the feasibility and growth potential in host countries. RQ was specifically chosen over alternative metrics (such as the number of commercial branches per 100,000 adults, the proportion of bank assets to GDP, the ratio of nonperforming bank loans to total gross loans, etc.) primarily because it accurately represents the choices businesses must make between exporting and making foreign direct investments (FDI). Additionally, this variable accurately

reflects institutional effectiveness, key for foreign firms who want to set up in host countries, as an effective government encourages investor confidence because of well-implemented regulations. It also serves as a measure of risk, countries with poor regulatory quality are sensed as riskier by foreign countries. In essence, this variable is a good way of combining the measurement of different aspects, key when investing in FDI, in a way that other variables individually cannot do.

The incorporation of this variable is vital for several reasons, as highlighted in existing literature. First, it helps when managing the potential endogeneity between FDI and financial development, since failing to account for financial development could lead to omitted variable bias and heightened endogeneity. Moreover, financial development serves a crucial intermediary role in effectively directing and allocating FDI, which in turn contributes to economic growth. As such, incorporating this variable helps untangle the unique contributions of each variable towards economic growth. It is worth noting that this study does not include a variable specifically addressing corruption. While it is typically included in much of the relevant literature, data unavailability prevented its addition to the regression. Nonetheless, it's crucial to recognize that regulatory quality does, to an extent, account for corruption, given that corruption is factored into the construction of the RQ variable itself.

In addition, and as it will be seen in further sections of the paper, another variable will be used to measure financial development. This variable will be used for replication purposes. The variable is called Liquid Liabilities or LLY and it provides a measure for the overall size of the financial sector without distinguishing between different financial institutions. The variable is measured as the ratio of liquid liabilities to GDP[2]. This variable is expected to have a negative coefficient when regressing it as a control against GDP growth, as the higher the ratio of liquid liabilities to GDP the less financially developed an economy is considered. Note it is important to not get confused between RQ and LLQ, as RQ is expected to have a positive coefficient given that the higher the RQ the more financially developed an economy is considered.

e. Trade openness

[2] Liquid liabilities being the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travellers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.

This variable is the sum of exports and imports of goods and services, presented as a percentage of GDP. Controlling for trade openness allows for the investigation of FDI's impact on economic growth independent of a country's existing level of international trade. It also aids in isolating FDI's influence on growth while factoring in the country's trade-related circumstances. Furthermore, trade openness is vital as it serves as a significant prerequisite for FDI, determining market access and competition levels.

Lastly, it's important to clarify that none of the variables have undergone logarithmic transformations. This choice is informed by the fact that all variables are already presented as percentages of GDP. This methodology simplifies interpretation, as the results can be understood as the percentage change in GDP growth resulting from a 1 percentage point increase in FDI inflows. This factor is particularly relevant when evaluating effects across nations, given that GDP and FDI inflows vary among countries. Consequently, the impact of a similar FDI increase may vary based on a country's GDP. Considering the significant variation in GDP across countries, as demonstrated in Table 1 and Appendix B, this decision appears suitable and precise.

After detailing all the variables, it's crucial to assess their correlations, as it directly impacts the robustness and stability of the results. Table 2 showcases the correlation between the independent variables used in this model. The results display no signs of multicollinearity. The highest correlation appears to be between liquid liabilities (a variable used for replication purposes) and physical infrastructure, yet it remains below the threshold of 0.5. Furthermore, there are no redundant variables, indicating the appropriate selection of control variables, as no two variables encapsulate similar information or exert similar effects on the dependent variable. Additionally, it can be seen that almost all of the correlations appear to be significant at the 1% significance level. This indicates a strong and statistically significance linear relationship between the variables in the observed data. It is to be noted that Regulatory quality (or RQ), the variable of choice to measure financial development only has two out of five significant correlations with other independent variables. This should be analysed cautiously as non-significant correlation does not necessary mean there is absence of any relationship, as the relationship could be linear or non-monotonic. The non-significance of these correlation simply suggests that the observed data does not provide strong evidence for a linear relationship between the variables under investigation. This can be crucial when regressing the variables in future sections of this paper.

Table 2

Correlation between independent variables

	FDI	Govt exp	Physical infra.	Inflation	Trade openness	Regulatory quality	Liquid liabs.
FDI	1.0000						
Govt exp	-0.0133 (0.5211)	1.0000					
Physical infra.	0.1051 (0.0000)***	0.0860 (0.0000)***	1.0000				
Inflation	- 0.0164 (0.4086)	-0.0629 (0.0035)***	-0.0688 (0.0006)***	1.0000			
Trade openness	0.3123 (0.0000)***	0.2508 (0.0000)***	0.1496 (0.0000)***	-0.0650 (0.0021)***	1.0000		
Regulatory quality	-0.0272 (0.2162)	0.1279 (0.0000)***	-0.0004 (0.9839)	0.0051 (0.8229)	-0.0609 (0.0069)***	1.0000	
Liquid liabs.	0.0878 (0.0000)***	0.1679 (0.0000)***	0.4302 (0.0000)***	-0.1181 (0.0000)***	0.2151 (0.0000)***	0.0694 (0.0030)***	1.0000

Notes: Table 2 shows the correlation between the independent variables of the model. See section 2 of the paper for more detailed information on each variable. Below the coefficients, between parenthesis, are the p-values. The significance levels of each p-value are indicated as following: *** Significance at 1 percent level: $p<0.01$; ** Significance at 5 percent level: $p<0.05$; *Significance at 10 percent level: $p<0.10$.

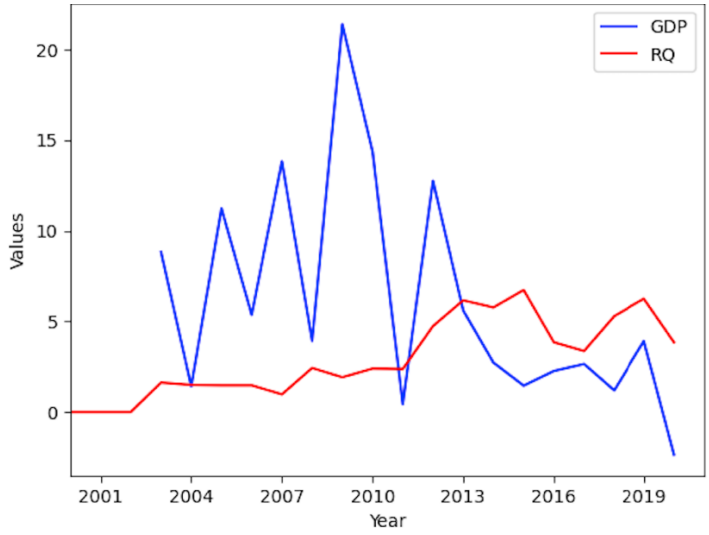
Furthermore, it is crucial to explore the relationship between the financial development variable and economic growth. To visually represent this relationship, a scatterplot (Figure A.1) was created to illustrate the association between GDP growth and the regulatory quality (RQ) variable. The scatterplot indicates a relatively consistent relationship between the two variables, with limited variation. However, it is important to note that this observation does not imply uniformity in variation across countries over time.

To delve deeper into this variation, individual graphs, like the one shown in Figure 2, were generated for each country, displaying the changes in GDP and RQ over time. However, considering the large sample size, it was deemed more appropriate to group countries by region in order to demonstrate the variation of GDP and RQ. Thus, two graphs plotting RQ and GDP

over time were created for each region of countries and can be found in Appendix B. The graphs were done using python coding given the complexity and the large number of countries used. These country-specific graphs reveal substantial variation between GDP and RQ across different time periods for almost all countries. When combined with the descriptive statistics and correlations between independent variables shown above, these findings suggest a potential correlation between these variables that warrants further investigation.

Figure 2

Variation in GDP and RQ over time in Afghanistan



Note: This figure depictures the variation in Regulatory Quality (RQ) and GDP over time in Afghanistan. In this case both variables are measured as described in the data. GDP is measured as annual percentage growth rate of GDP and RQ is measured as a percentage rank.

4. Methodology

This study's empirical methodology aims to examine the effect of FDI on the economic growth of developing countries while also analysing the role of financial development in this relationship. Given the nature of the research questions and the data required, a panel data analysis was identified as the most suitable method. Although many well-established studies opt for a cross-country approach, multiple meta-analyses have suggested that this method may overstate spill-over effects, given its inability to account for time-invariant specific effects (Görg & Strobl, 2001; Wooster & Diebel, 2010). Panel data analysis, on the other hand, was chosen for various reasons, including the greater statistical power resulting from a larger sample size, the ability to control for time-invariant heterogeneity, and the capacity to address omitted variable concerns to some extent by incorporating time and country fixed effects.

Additionally, not including country fixed effects when dealing with dynamic panels in a large time dimension produces correlated disturbances and hence inconsistent results (Pesaran & Smith, 1995).

The methodology employed in this paper is a modified version of prior works by Alfaro et al. (2004) and Hermes and Lensink (2003), which, in turn, expanded on models proposed by Mankiw et al. (1992) and Barro (1991). The model was adapted to accommodate panel data, given that the aforementioned papers used a cross-country data approach. The panel data regression equations utilized in this study are specified as follows:

$$EconomicGrowth_{i,t} = \alpha + \beta_1 FDI\_inflow_{i,t} + \beta_2 Controls_{i,t} + \gamma_t + \delta_i + \varepsilon_{i,t} \quad (1)$$

Equation (1) embodies the simplified form used to test the first hypothesis. Here, α represents the intercept, while β_1 and β_2 denote the vector coefficients of FDI inflows as a percentage of GDP and the five control variables, respectively. The control variables are incorporated to account for other time-invariant confounders that may influence the relationship. γ_t and δ_i correspond to the time and country fixed effects, whereas $\varepsilon_{i,t}$ stands for the error term. The subscripts i and t symbolize the country and year fixed effects, with i spanning from 2000 to 2021.

$$EconomicGrowth_{i,t} = \theta + \beta'_1 FDI\_inflow_{i,t} + \beta'_2 Financial\_development_{i,t} + \beta'_3 Controls_{i,t} + \beta'_4 (FDI\_inflow_{i,t} * Financial\_development_{i,t}) + \gamma'_t + \delta'_i + v_{i,t} \quad (2)$$

Equation (2) follows the same pattern as equation (1) and is employed to address the second hypothesis. In this equation, θ signifies the intercept, β'_1 and β'_2 are the vector coefficients of FDI and the five control variables, respectively, while β'_4 is the coefficient of the additional interaction term. Once again, γ'_t and δ'_i represent the time and country fixed effects, $v_{i,t}$ is the new error term, and the subscripts indicate the country and year. The inclusion of an interaction term allows for the examination of the combined effect of FDI and financial development on economic growth. To ensure that the interaction term does not act as a proxy for either variable individually, both variables are separately included in the regression.

5. Empirical results

a. H1: FDI on economic growth

Table 3 shows the results corresponding to Hypothesis 1, which posits, "Foreign direct investment (FDI) has a small positive impact on the economic growth of developing countries." To analyse this supposition, three individual regression analyses were performed, incorporating varying combinations of variables (see Table 3).

Table 3

Economic growth and FDI. Dependent variable- annual growth rate.

	(1)	(2)	(3)
Constant	3.524189	3.27835	3.903358
	(0.030)**	(0.020)**	(0.012)**
FDI inflow	.1571593	.1050949	.1487241
	(0.014)**	(0.003)**	(0.008)**
Government expenditure	- .1983963	- .1673611	-.1939262
	(0.055)*	(0.080)*	(0.021)**
Inflation	- .0282938	- .0328265	-.024188
	(0.000)***	(0.006)**	(0.000)***
Physical infrastructure	- .0393993	-.0371747	-.0330779
	(0.031)**	(0.038)**	(0.092)*
Trade openness	.0445139	.0437462	.0636457
	(0.003)**	(0.006)**	(0.000)***
Regulatory quality	-	-.0016855	-
		(0.858)	
Liquid liabilities	-	-	-.050982
			(0.029)**
R^2	0.2362	0.2150	0.2733
Nº of observations	2073	1873	1977
Nº of groups	113	110	109

Notes: Table 3 shows the panel data regression results of FDI inflows on economic growth in developing countries. Panel 1 represents a regression with no variable to control for financial development. Panel 2 represents a regression where RQ is added to control for financial development. Panel 3 uses LLY instead of RQ to control for financial development. See section 2 of the paper for more detailed information on each variable. All of the regressions are obtained by using panel data regression analysis. Below the coefficients, between parenthesis, are

the p-values. The significance levels of each p-value are indicated as following: *** Significance at 1 percent level: p<0.01; ** Significance at 5 percent level: p<0.05; *Significance at 10 percent level: p<0.10.

The first regression included all control variables except for one to control for financial development (FD). The outcomes suggest FDI possesses a small, positive, and significant influence on economic expansion within the identified developing countries. Translated, a unit increase (1%) in FDI inflow into a developing nation contributes, on average, to a 0.16 percentage points increase in economic growth. Additionally, all control variables are significant in explaining the variation of economic growth due to FDI. The significance levels for the control variables range from 1% to 5%. Therefore, based on the results of the first regression, we cannot reject the first hypothesis at the 5% significance level.

The second regression iterates upon the first by integrating the study's primary financial development variable, namely RQ. Despite the inclusion of RQ, FDI still has a positive and modest coefficient. This time, the change in economic growth caused by a one unit increase in FDI inflow, has decreased by 0.10 percentage points. The control variables continue to hold significance at the 5% bracket, excluding government expenditure, which holds significance at the 10% threshold. Notably, RQ fails to exert a significant impact on economic growth, challenging portions of the literature underscoring its influence (Benson Durham, 2004; Bengoa and Sanchez-Robles, 2003; King and Levine, 1993). Regardless, Hypothesis 1 still cannot be rejected, given the outcomes of this regression.

To replicate past literature and tackle the RQ contradiction, a third regression was undertaken. This regression introduced an alternative financial development variable, liquid liabilities (LLY), widely utilized in relevant literature. Predictably, all variables, encompassing FDI, demonstrate significance. With the integration of LLY, economic growth decreases by 0.15 percentage points coinciding with a 1% increase in FDI inflow. The new financial development variable, LLY, appears negative and significant, aligning with preceding studies. Notice that in this case LLY has a negative sign due to the fact that an increase in liquid liabilities may indicate a higher level of financial risk or financial instability (contrary to RQ, where the higher the ranking, the more financial developed the country is considered). As such, Hypothesis 1 withstands based on the results of this regression.

Across all three regressions, multiple findings remain consistent. Firstly, the constants in all regressions appear positive and significant, signalling a positive rate of economic growth in

developing nations. This can also be seen in the descriptive statistics explored in Table 1. Moreover, the R-squared values across all regressions approximate 25%, going up to 27.33% with the addition of LLY. These values suggest the incorporated variables account for approximately one-third of the effect on economic growth, which is not overly robust. For future investigations, it is recommended to incorporate more substantial control variables to enhance the models' explanatory prowess. In addition, it is important to highlight that year fixed effects were included in the regression analysis, although they are not displayed in the table. The inclusion of year fixed effects is crucial to control for any common shocks that may impact all observations in a particular year. By incorporating year fixed effects, the analysis effectively removes any shared variation in economic growth across countries within a given year, allowing for a more precise estimation of the coefficient for FDI. However, the year fixed effects were not included in the table as their interpretation is not particularly informative or relevant within the scope of this paper.

Furthermore, the signs of all control variables agree with the discoveries of antecedent literature. For instance, Goodspeed et al. (2006) posit that government expenditure negatively influences FDI, while Agudze & Ibhagui (2021) underscore the adverse impact of inflation on FDI in developing nations. King and Levine (1993) propose that financial development is key for spill-over effects to occur, and Balasubramanyam et al. (1996) demonstrate that the effect of FDI on growth is contingent on trade. The unexpected negative relationship observed for physical infrastructure, despite its acknowledged significance, calls for closer examination. One possible explanation is that the specific variable employed in the analysis may not adequately capture the quality of infrastructure, focusing solely on quantity instead. This distinction between quality and quantity is crucial, as an abundance of infrastructure with subpar quality may not efficiently contribute to economic growth, potentially resulting in wasteful expenditures.

Another plausible reason for the negative coefficient could be the presence of overlapping effects between physical infrastructure and FDI. Physical infrastructure plays a direct role in fostering growth by enhancing connectivity, productivity, and reducing transaction costs. However, if these benefits are already accounted for by the positive impact of FDI, the coefficient for physical infrastructure may turn negative. This suggests that FDI captures some of the advantages traditionally attributed to physical infrastructure, rendering their independent contribution less significant.

To better understand this unexpected sign, further investigation is warranted. Exploring potential factors such as reverse causality or crowding-out effects can shed light on the complex relationship between physical infrastructure, FDI, and economic growth. In conclusion, according to the results of the three regressions, Hypothesis 1, which posits that FDI has a modest positive impact on the economic expansion of developing nations, cannot be rejected.

b. H2: The role of financial institutions

Table 4 displays the outcomes for our second hypothesis, which states that: "The impact of foreign direct investment (FDI) on the economic growth of developing countries is influenced by the development of their financial institutions." To analyse this proposition, we performed two regression analyses, investigating the joint impact of FDI and financial development on economic growth.

Table 4

Economic growth and FDI: the role of financial markets. Dependent variable- annual growth rate.

	(1) RQ	(2) LLY
Constant	3.21677	3.974944
	(0.022)**	(0.007)**
FDI inflow	.1314082	-.0183645
	(0.008)**	(0.772)
Government expenditure	- .1691769	-.1809871
	(0.078)*	(0.026)**
Inflation	-. 032962	-.0241778
	(0.007)**	(0.000)***
Physical infrastructure	-.0374688	-.035189
	(0.038)**	(0.102)
Trade openness	.0432629	.0636535
	(0.007)**	(0.000)***
Financial development	.0020266	-.0549977
	(0.816)	(0.000)***
FDI x Financial develop.	-.0009441	.0028708

	(0.396)	(0.000)***
R^2	0.2150	0.2959
Nº of observations	1873	1977
Nº of groups	110	109

Notes: Table 4 shows the panel data regression results of FDI jointly with development of financial institutions on economic growth in developing countries. Panel 1 regresses RQ as a financial development control variable and is interacted with FDI. Panel 2 regresses LLY as a financial development control variable and is interacted with FDI. See section 2 of the paper for more detailed information on each variable. All of the regressions are obtained by using panel data regression analysis. Below the coefficients, between parenthesis, are the p-values. The significance levels of each p-value are indicated as following: *** Significance at 1 percent level: p<0.01; ** Significance at 5 percent level: p<0.05; *Significance at 10 percent level: p<0.10.

The initial regression model incorporated the regulatory quality (RQ) variable as a proxy for financial development, along with an interaction term between RQ and FDI. However, neither RQ nor its interaction with FDI showed statistical significance, consistent with the findings of the first hypothesis.

Regression 1 also echoes characteristics found in the regressions presented in Table 3. The constant term remains positive and significant, and the R-squared value suggests that the included variables explain around 22% of the variation in economic growth. Additionally, FDI continues to exhibit a positive and significant impact at the 5% interval. The coefficient indicates that a one percent increase in FDI leads to a 0.13 percentage points rise in economic growth. However, given the insignificant coefficient of the interaction term and RQ itself, we can reject the second hypothesis for this regression.

The subsequent regression was performed for replication purposes, utilizing liquid liabilities (LLY) as a proxy for financial development. This variable is frequently used in the literature, as evidenced by studies conducted by King and Levine (1993) and Alfaro et al. (2004). This replication aims to validate and verify previous findings, given the unsuccessful attempt to do so with the initially chosen variable (RQ).

The most noteworthy finding from regression 2 is that the interaction term between LLY and FDI is positive and significant at the 1% significance level. This implies that the positive effect of FDI on economic growth is strengthened when a country has a more developed financial system. More precisely, a well-developed financial system strengthens the positive

effect of FDI on economic growth by 0.003 percentage points when FDI increases by one percent. However, it's important to recognize that the effect size of the interaction term is incredibly small. This could stem from omitted variable bias, as the chosen variables explain only about 30% of the variation in economic growth. It's also plausible that endogeneity issues surface in this regression, as the direction of the relationship between FDI and financial development remains inconclusive in the literature (Chowdhury & Mavrotas, 2006). Despite the small effect size, the second hypothesis cannot be reject based on the outcomes of regression 2.

Another significant observation in regression 2 is that both the financial development variable (LLY) and the FDI variable, when considered individually, are insignificant and have negative signs. This could be due to the interaction term capturing a significant part of the effect. Also, the control variable for physical infrastructure is now insignificant, which could be due to its moderate to high correlation with LLY, as shown in Table 2. The other control variables maintain their significance at the 5% or 1% significance level.

Upon careful examination of both regressions, we revisit the initial concern that prompted the replication analysis, which is the significance of regulatory quality (RQ) and its interaction with foreign direct investment (FDI). The findings indicate that RQ and its interaction with FDI are not statistically significant, leading to the rejection of hypothesis H2. However, it is worth noting that the same hypothesis cannot be rejected when using liquid liabilities (LLY), as demonstrated in the previous analysis. The lack of significance observed with RQ can be attributed to several underlying factors that require further consideration.

Firstly, the RQ variable may not adequately capture the diverse aspects of financial development in developing countries. The specific indicators used to measure regulatory quality might not fully reflect the unique challenges and characteristics of financial systems in these nations. Limited data availability, particularly concerning aspects such as unfair competitive practices or price controls (components of RQ), which are less regulated in developing countries, could contribute to this limitation. Furthermore, differences in regulatory frameworks and policies between developed and developing countries may diminish the impact of RQ as a measure of financial development. Other institutional factors like corruption or political instability (also components of RQ) could overshadow the influence of regulatory quality on FDI and economic growth. For instance, high levels of corruption in developing

countries might discourage foreign investment due to increased risk (Habib & Zurawicki, 2002).

To further examine these explanatory theories regarding the inadequacy of RQ as a measure of financial development in this specific case, several additional regressions were conducted (refer to Table 5). The first set of regressions examined the relationship between GDP and RQ without any control variables, allowing for an analysis of the independent effect of RQ on economic growth. The insignificance of the coefficient indicates that RQ alone might not adequately capture the impact of financial development on economic growth in developing countries. To address potential omitted variable bias, the second set of regressions included the usual control variables, including FDI, as independent variables. The coefficient for RQ remained insignificant, suggesting that RQ does not exert a significant independent effect on GDP growth, even when accounting for other relevant factors. Panel 3 and 4 followed a similar approach but using liquid liabilities (LLY) instead of RQ. As observed, both regressions demonstrated a negative and significant coefficient for LLY. Comparing the first two panels with the latter two clearly highlights the limited suitability of RQ as a measure of financial development in this particular case.

Table 5

Economic growth and financial development: RQ vs LLY. Dependent variable: annual growth

	(1)RQ	(2) RQ	(3) LLY	(4) LLY
Constant	3.512619	5.054296	5.521515	3.903358
	(0.000)**	(0.030)**	(0.000)**	(0.012)**
Financial	.002536	.0302083	-.0322061	-.050982
development	(0.701)	(0.179)	(0.000)**	(0.029)**
Government	-	-.3894354	-	-.1939262
expenditure		(0.009)**		(0.021)**
Inflation	-	-.0393619	-	-.024188
		(0.008)**		(0.000)***
Physical	-	-.0455634	-	-.0330779
infrastructure		(0.056)*		(0.092)*
Trade openness	-	.0439967	-	.0636457
		(0.011)**		(0.000)***

FDI	-	.1643978	-	..1487241
		(0.014)**		(0.008)**
R^2	0.0001	0.2515	0.0466	0.2733
Nº observations	2199	1589	2465	1977
Nº of groups	113	92	121	109

Note: Table 5 presents the results GDP growth regressed against financial development variables, examining different specifications. Panel 1 only regresses GDP against RQ. In Panel 2, we introduce the control variables to regression 1. Moving to Panel 3, we replace RQ with liquid liabilities (LLY) as a measure of financial development. In Panels 4, include control variables to the regression performed in panel 3. See section 2 of the paper for more detailed information on each variable. All of the regressions are obtained by using panel data regression analysis. Below the coefficients, between parenthesis, are the p-values. The significance levels of each p-value are indicated as following: *** Significance at 1 percent level: p<0.01; ** Significance at 5 percent level: p<0.05; *Significance at 10 percent level: p<0.10.

In a nutshell, the regression results and the comparison with regressions involving liquid liabilities (LLY) provide compelling evidence that RQ is not an effective measure of financial development in the context of this study. The factors discussed earlier, including the inadequate reflection of unique hurdles and traits in developing financial systems, data limitations, differences in regulatory frameworks, and the presence of other influential institutional factors, collectively contribute to the limited relevance of RQ in capturing financial development in developing countries.

To conclude this section, a fitting quote from Alfaro et al. (2004) encapsulates the issues in the literature: "This nicely summarizes the problem that exists in the literature: whereas on theoretical grounds there is a strong basis for expecting FDI to have a positive role in growth, the empirical evidence is fragile, to say the least." The change in sign and significance of FDI when adding an interaction term, and the specificness with which the financial development variable needs to be measured exemplify this quote very well.

c. Robustness check

To assess the robustness of the results, a sample selection robustness test was conducted to ensure the empirical findings maintain their validity under different sample selection criteria (see Table 6). In this case, the sample size was significantly reduced by excluding from the regression countries with more than 10 missing observations for any given variable in a given year. This was done using a command in Stata that first sorts out the data by “Country Code”,

a variable created to let Stata know which observations belong to the same country. Next, a new variable "Complete" is created. This variable will contain a count of how many of the specified[3] variables have non-missing values for each country. Then, the drop command is used to delete all observations which have a "Complete" value lower than 10. Meaning, this command creates a variable that counts the number of non-missing values for all variables within each country and then drops countries from the dataset that have fewer than 10 non-missing values among those variables. This reduction resulted in a decrease in observations from 1955 to 1740 and a decrease in the number of groups (countries) from 110 to 87. Meaning, roughly 80% of the countries were kept in the regression and the rest were excluded. Note this is only one possible way of checking the robustness of the regressions performed. There are, however, many other possible ways and criteria that could be used to reduce the sample.

Table 6

GDP and FDI: robustness check. Dependent variable- annual growth rate.

	(1)	(2) RQ	(3) LLY	(4) RQ	(5) LLY
Constant	3.429921	3.25174	3.842243	3.158407	3.853066
	(0.039)**	(0.019)**	(0.015)**	(0.024)**	(0.009)**
FDI inflow	.190314	.1304092	.1797949	.1629911	.0131169
	(0.005)**	(0.000)***	(0.002)**	(0.002)**	(0.848)
Government	-.1767867	-.1523597	-.1684507	-.1550367	-.1563664
expenditure	(0.103)	(0.126)	(0.037)**	(0.121)	(0.046)**
Inflation	-.0736586	-.0873489	-.0659022	-.0891447	-.0567156
	(0.003)**	(0.000)***	(0.005)**	(0.000)***	(0.021)**
Physical	-.0418502	-.0389141	-.0352259	-.0390674	-.0379175
infrastructure	(0.029)**	(0.036)**	(0.086)*	(0.037)**	(0.093)*
Trade openness	.0449105	.0464979	.06642	.0462551	.0665033
	(0.008)**	(0.008)**	(0.000)***	(0.008)**	(0.000)***
Financial	-	-.0035285	-.0555818	.0012398	-.0586868
development		(0.695)	(0.031)**	(0.887)	(0.001)**

[3] In this case all variables, including the dependent and the independent variable, where included in the regression. Meaning, the command accounts for 6 variables in total.

FDI*Financial development	-	-	-	-.0012668 (0.200)	.0027107 (0.002)**
R^2	0.2318	0.2140	0.2759	0.2115	0.2974
Nº observations	1811	1701	1748	1701	1748
Nº of groups	88	88	87	88	87

Note: Table 6 presents the results of the robustness tests, examining different specifications. Panel 1 represents the baseline model without controlling for financial development. In Panel 2, we introduce the regulatory quality (RQ) variable to account for financial development. Moving to Panel 3, we replace RQ with liquid liabilities (LLY) as a measure of financial development. In Panels 4 and 5, we include interaction terms between FDI and RQ, and FDI and LLY, respectively, to explore their combined effects. See section 2 of the paper for more detailed information on each variable. All of the regressions are obtained by using panel data regression analysis. Below the coefficients, between parenthesis, are the p-values. The significance levels of each p-value are indicated as following: *** Significance at 1 percent level: p<0.01; ** Significance at 5 percent level: p<0.05; *Significance at 10 percent level: p<0.10.

After the deletion of observations, the five main regressions presented in this paper were rerun to examine their consistency. The results of the robustness check demonstrate that FDI continues to exhibit a positive and significant relationship across all regressions, except for regression 5, where the beta coefficient becomes statistically insignificant. These findings align with the results obtained in the empirical analysis.

Furthermore, it is worth noting that the coefficients for FDI remain relatively stable, hovering around 3, indicating minimal variation between the original data sample and the reduced one. Similarly, the control variables exhibit coefficients that are highly similar to those obtained in the results section. The significance, sign, and coefficients of the financial development variables also exhibit consistent patterns without significant variation.

Additionally, the dummies used and the R^2 values do not show substantial fluctuations between the original and reduced samples. Based on these observations, it can be concluded that the results obtained in all five regressions remain robust.

6. Discussion and limitations

The comprehensive analysis above yields several noteworthy discussions and conclusions, offering insightful policy recommendations. In the first series of regressions, it's clear that

economic growth in developing countries experiences a positive impact from an increase in FDI. These findings suggest several important factors for policy makers to consider. Foremost, the attraction of foreign direct investment (FDI) should remain a main goal for governments. Secondly, inflation should be controlled for, although not a top priority, is also key to a healthy economy. Moreover, encouraging economic growth can be achieved by promoting trade openness through liberalization and minimizing trade barriers. Lastly, further research is essential for future policy advice concerning the enhancement of physical infrastructure and institutional regulatory quality. In essence, policymakers should continue to prioritize attracting FDI, controlling inflation, and advocating trade openness.

Turning to the second series of regressions and the evaluation of hypothesis H2, it emerges that only certain financial development variables significantly influence economic growth. As previously discussed, this discovery may be connected to the characteristics of the regulatory quality variable (RQ) and their relevance to developing countries. Regarding policy advice, it is proposed that as well as with efforts to attract FDI, policies that enhance financial markets should also be introduced. Even though the effect may not be substantial, it is significant and could potentially be underestimated in the regression due to issues such as omitted variable bias, measurement inaccuracies, or endogeneity. Consequently, it is strongly advised to prioritize the establishment of a robust financial market to augment the positive influence of FDI on economic growth.

Nonetheless, these recommendations should be treated carefully. In spite of the significance of the results and their conformity with existing literature, it is crucial to recognize the model's limitations. Primarily, panel data regression controls for exogeneity of the independent variables, yet as Agrawal (2015) suggests, potential reverse causality could exist. Moreover, the selected model specification might neglect relevant variables that could influence the results, leading to omitted variable bias. Lastly, the roughly 20-year timeframe used in the model is relatively narrow, considering that economic conditions and factors affecting FDI frequently fluctuate over more extended periods. Additionally, the dataset employed also presents limitations that may need careful contemplation when interpreting the results and subsequent policy advice. Notably, the dataset lacks balance, implying that certain observations for specific variables and countries might be absent. This lack of data availability could introduce biases and affect the sample's representativeness. Despite the fact that a robustness check is done to prevent the introduction of these biases, the check could be flawed, therefore

this is mentioned as a small but present limitation that should be analysed in the future. Furthermore, this study was conducted on a national level, potentially masking variations that may be critical at a sectorial, firm or even plant level. By focusing on the broader picture, there is a risk of overlooking smaller variations that occur at more specific levels such as sectors, firms, or individual plants. These variations could be influenced by factors specific to certain sectors, unique characteristics of individual firms, or localized conditions that may not be fully considered or captured in a national-level analysis. This can be seen in previous literature, that shows how the effect differs at different levels (Blalock and J. Gertler, 2008; J. Aitken and E. Harrison, 1999; Nair-Reichert & Weinhold, 2001). Lastly, according to Fölster and Henrekson (2001) there are some limitations in the use of panel data. In this particular case, employing annual data could present challenges when interpreting the results, by making it difficult to disentangle the long-term effects from the fluctuations associated with changes in the business cycle. In conclusion, despite the robustness of the findings, it is crucial to critically consider these limitations before making definitive statements or generalizations.

In terms of future research, several suggestions are made during the analysis. First and foremost, while panel data analysis partially addresses endogeneity concerns, future studies should contemplate employing instrumental variable techniques or alternative methodologies to tackle this issue further. Additionally, integrating more control variables might lead to a more precise and robust model. If data availability allows, extending the analysis timeframe would capture long-term effects and variations in the data. From a data perspective, delving into regional or provincial data could yield valuable insights for crafting country-specific policy. Another captivating suggestion for future research would be to explore the influence of trade agreements on FDI inflows and economic growth. Lastly, the incorporation of a variable accounting for corruption could also be enlightening.

7. Concluding remarks

The scholarly literature discussing the impact of foreign direct investment (FDI) on economic growth, particularly in the context of developing nations, is lacking up to date data and a clear and concise solution. Furthermore, there is scarcity of research in these regions regarding this specific field. Therefore, this paper aspires to enrich the existing literature by offering a more definitive insight into FDI's influence on economic growth within developing nations. To achieve this, we utilize panel data regression analysis, effectively mitigating partial issues related to omitted variable bias through the inclusion of year and country fixed effects.

The dataset deployed in this research encompasses 150 developing nations, spanning from 2000 to 2021.

The outcome of this research confirms that FDI indeed yields a positive impact on economic growth. Nevertheless, it is noteworthy that while this impact is statistically significant and robust to changes in the dataset, it is somewhat modest in size.

Moreover, this paper investigates the collective effect of the financial system's development and FDI on economic growth within developing nations. In order to bring an innovative perspective to the existing body of knowledge, we introduce a novel methodology for measuring financial development. This approach assesses the government's perception and implementation of sound policies and regulatory measures aimed at fostering a robust private financial system. Ideally, this measure would offer insights into the level of development within the financial system. However, our findings suggest that this variable fails to significantly contribute to economic growth when paired with FDI. A plausible explanation for this outcome is that the components comprising the variable may not carry significant weight within the context of our dataset. Given the prevalent consensus in current literature that a robust financial system is a vital catalyst for economic growth in conjunction with FDI, we replicate previous studies for comparison. The regression results from these replicated studies do substantiate that a well-developed financial system, alongside FDI, propels economic growth. Nevertheless, some anomalies appear in the regression analysis. Most strikingly, both FDI and the financial development variable, when considered independently, lose their significance and even their positive aspect. One plausible interpretation for this observation is that the interaction between these elements captures the share of the effect on economic growth.

Overall, this paper makes a unique contribution to the existing literature and sheds light on areas that require improvement for future research endeavours. It emphasises the need for further exploration and understanding of the intricate relationship between FDI, financial system development, and economic growth in developing countries. By addressing these gaps, future studies can enhance our comprehension and provide valuable insights for policymakers and researchers seeking to optimise the benefits of FDI for sustainable development.

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9. Appendix A

Table A.1

List of countries

Afghanistan
Albania
Algeria
American Samoa
Angola
Antigua and Barbuda
Armenia
Aruba
Azerbaijan
Bangladesh
Barbados
Belize
Benin
Bermuda
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
British Virgin Islands
Bulgaria
Burkina Faso
Burundi
Cabo Verde
Cambodia
Cameroon
Cayman Islands
Central African Republic
Chad
Channel Islands
China, People's Republic of
Colombia
Comoros
Congo, Republic of
Cote d'Ivoire
Cuba
Curacao
Djibouti
Dominica
Dominican Republic
Ecuador
Egypt
El Salvador
Equatorial Guinea
Eritrea
Eswatini
Ethiopia
Faroe Islands
Fiji
Gabon
Gambia, The
Ghana
Gibraltar
Greenland
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hong Kong SAR
India
Indonesia
Iran
Iraq
Jamaica
Jersey, Channel Islands
Jordan
Kenya
Kiribati
Korea, Republic of
Kosovo
Kyrgyz Republic
Lao PDR
Lebanon
Lesotho
Liberia
Libya
Macao SAR, China
Madagascar
Malawi
Maldives
Mali
Marshall Islands
Mauritania
Mexico
Micronesia, Fed. Sts.
Moldova
Monaco
Mongolia
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
New Caledonia

Nicaragua	Seychelles	Tajikistan
Niger	Sierra Leone	Tanzania
Nigeria	Sint Maarten (Dutch part)	Timor-Leste
Niue	Solomon Islands	Togo
North Macedonia	Somalia	Tonga
Northern Mariana Islands	South Africa	Tunisia
Pakistan	South Sudan, Republic of	Turkey
Palau	Sri Lanka	Turkmenistan
Papua New Guinea	St. Kitts and Nevis	Tuvalu
Paraguay	St. Lucia	Uganda
Peru	St. Martin (French part)	Ukraine
Philippines	St. Vincent and the Grenadines	Uzbekistan
Puerto Rico	Sudan	Vanuatu
Rwanda	Suriname	Venezuela
Samoa	Syrian Arab Republic	Vietnam
São Tomé and Principe	Taiwan, China	Yemen, Rep.
Senegal		

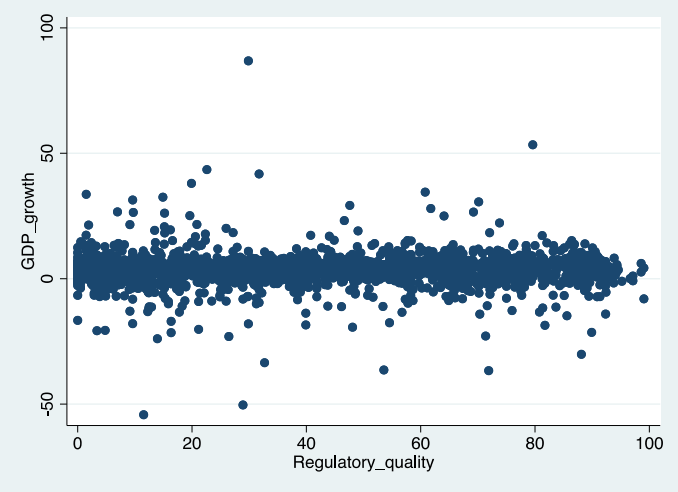
Table A.2

List of components of RQ (financial development proxy)

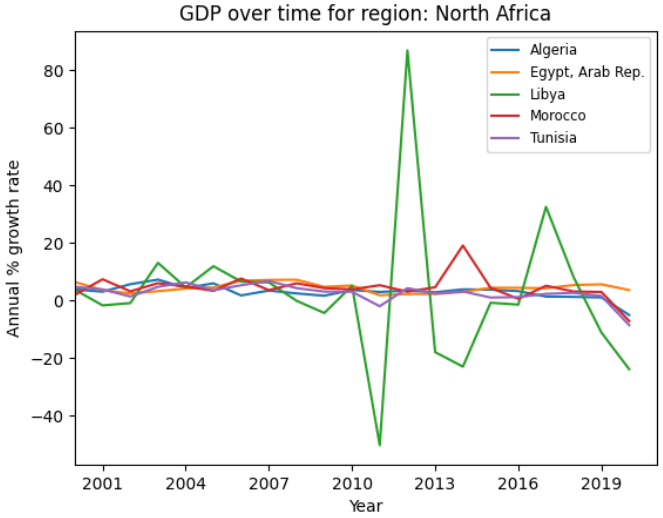
Unfair competitive practices	Regulatory burden. The risk that normal business operations become more costly due to the regulatory environment. This includes regulatory compliance and bureaucratic inefficiency and/or opacity. Regulatory burdens vary across sectors so scoring should give greater weight to sectors contributing the most to the economy.
Price controls	
Discriminatory tariffs	
Excessive protections	
Discriminatory taxes	
Burden of government regulations	
Prevalence of non-tariff barriers	
Investment freedom	
Financial freedom	
Ease of starting a business governed by local law?	Tax inconsistency. Tax inconsistency also captures the risk that fines and penalties will be levied for non-compliance with a tax code that appears disproportionate or manipulated for political ends.
Ease of setting up a subsidiary for a foreign firm?	
Share of administered prices	
Does the State subsidize commodity prices (i.e. food and other essential goods, excluding oil)?	
Does the State subsidize the price of petrol at the pumps?	
Efficiency of competition regulation in the market sector (excluding financial sector)	
Investment profile	
Regional integration	
Trade policy	
Business regulatory environment Trade policy	
Business regulatory environment	
How problematic are labor regulations for the growth of your business?	
How problematic are tax regulations for the	

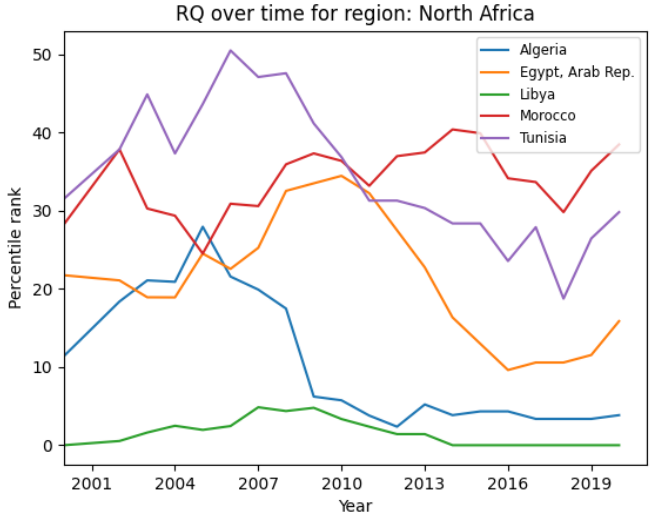
growth of your business?
How problematic are customs and trade regulations for the growth of your business?
Market organization
Enabling conditions for rural financial services development
Investment climate for rural businesses
Access to agricultural input and product markets Trade policy
Business regulatory environment
Trade policy
Protectionism does not impair the conduct of your business
Competition legislation is efficient in preventing unfair competition
Capital markets (foreign and domestic) are easily accessible
The legal and regulatory framework encourages the competitiveness of enterprises
Foreign investors are free to acquire control in domestic companies
Public sector contracts are sufficiently open to foreign bidders
Real personal taxes do not discourage people from working or seeking advancement
Labor regulations (hiring/firing practices, minimum wages, etc.) do not hinder business activities
Subsidies do not distort fair competition and economic development
Regulatory enforcement

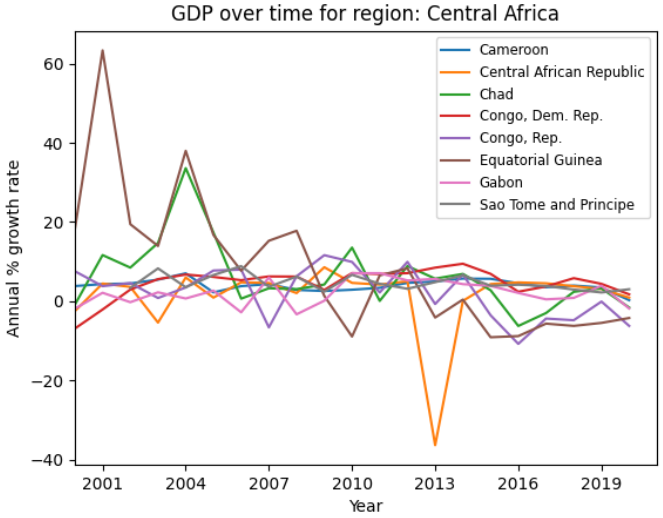
Figure A.1
GDP growth against RQ

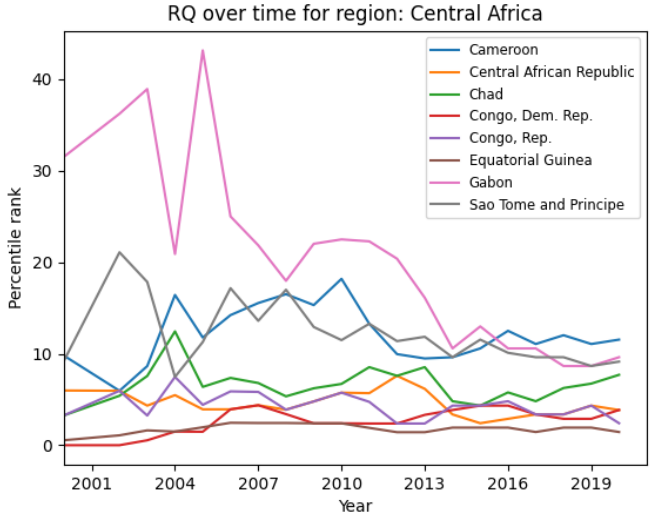


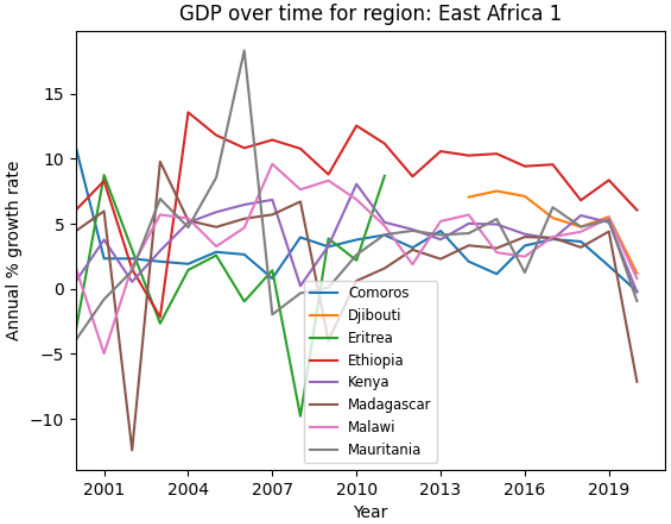
10. Appendix B: Variation of GDP and RQ over time per geographical region

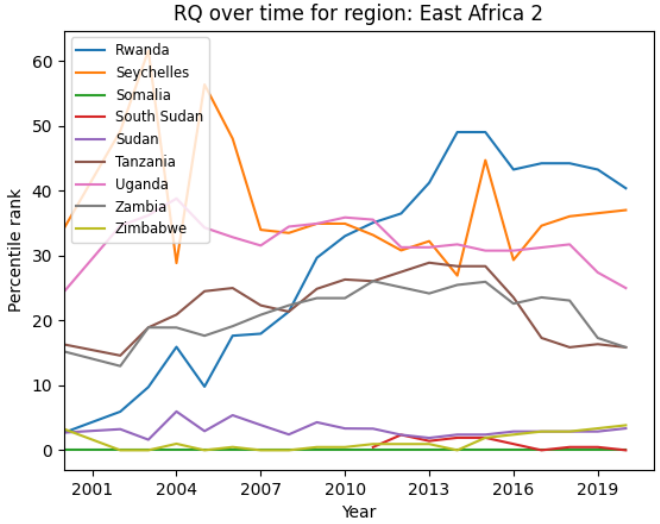


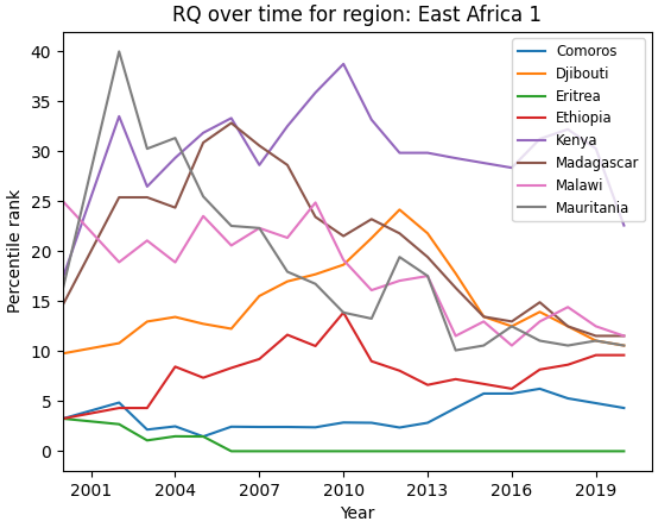


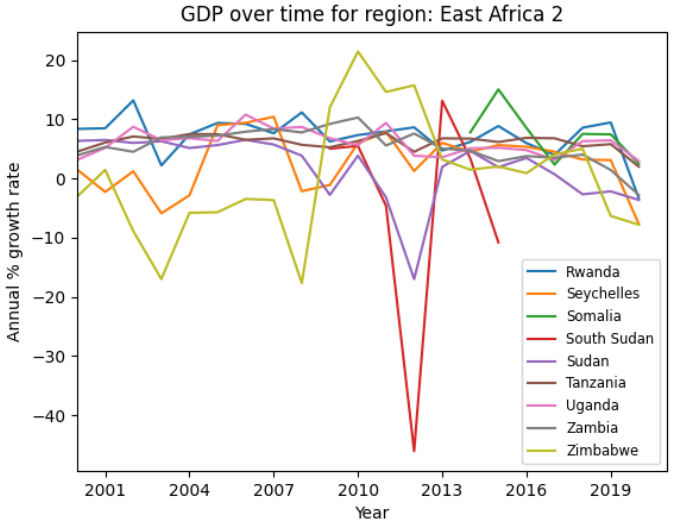


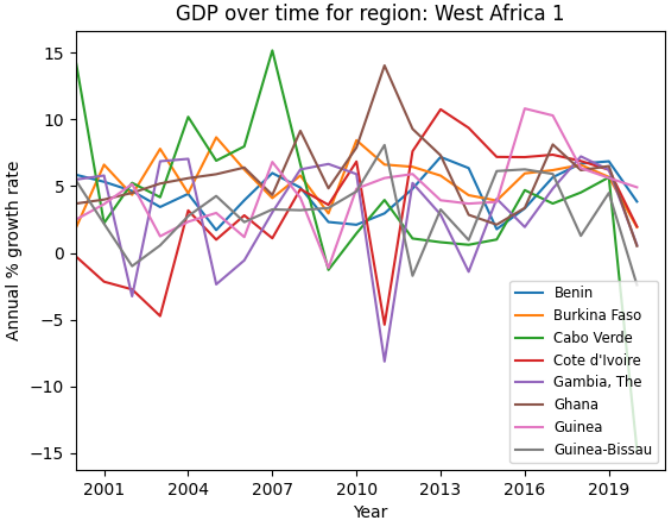


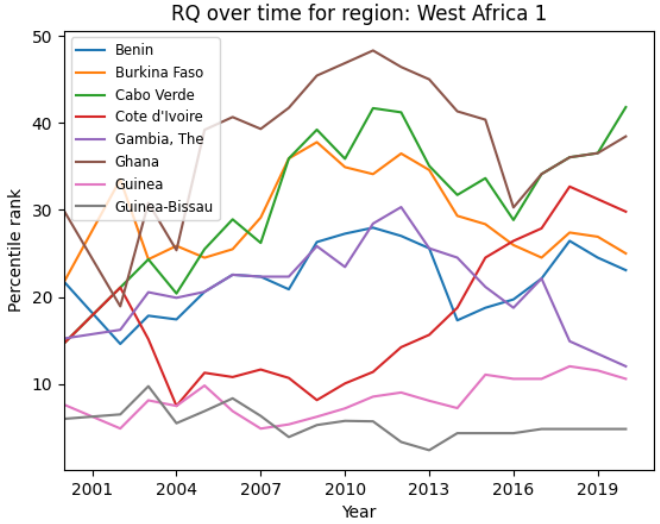

GDP over time for region: East Africa 1
Annual % growth rate
Year
Comoros
Djibouti
Eritrea
Ethiopia
Kenya
Madagascar
Malawi
Mauritania

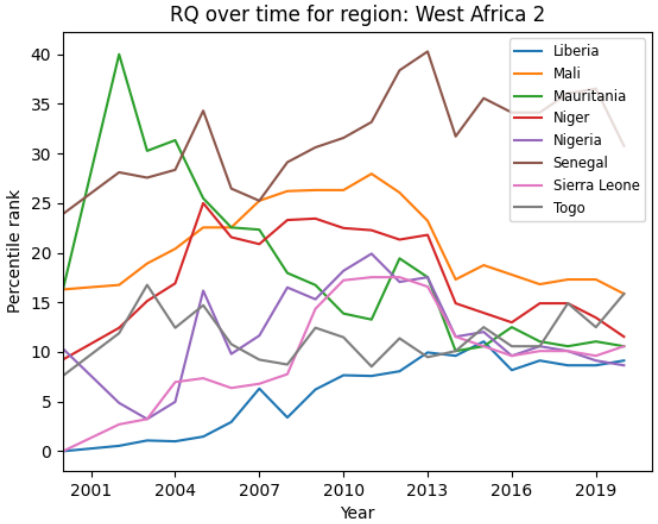

RQ over time for region: East Africa 2
Percentile rank
Year
Rwanda
Seychelles
Somalia
South Sudan
Sudan
Tanzania
Uganda
Zambia
Zimbabwe

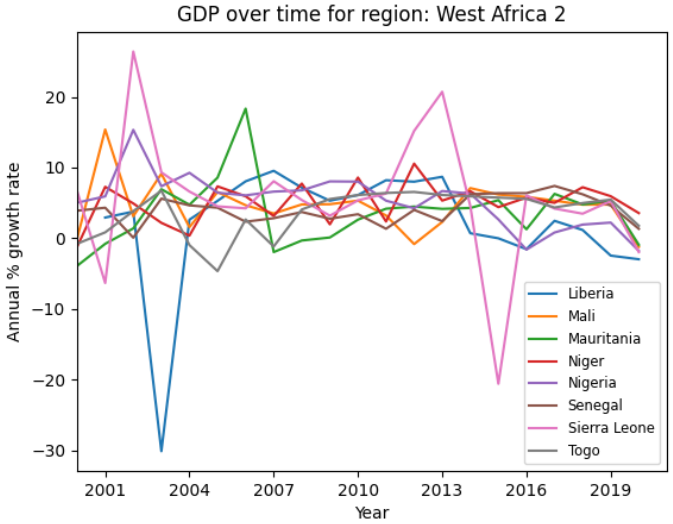

RQ over time for region: East Africa 1
Percentile rank
Year
Comoros
Djibouti
Eritrea
Ethiopia
Kenya
Madagascar
Malawi
Mauritania

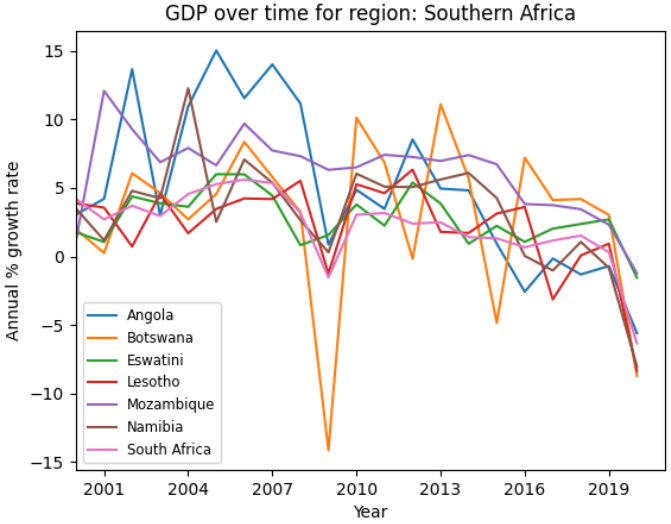

GDP over time for region: East Africa 2
Annual % growth rate
Year
Rwanda
Seychelles
Somalia
South Sudan
Sudan
Tanzania
Uganda
Zambia
Zimbabwe

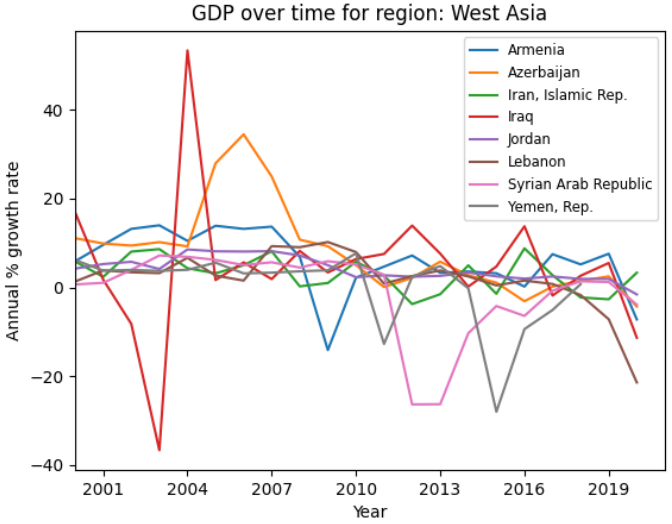

GDP over time for region: West Africa 1
Annual % growth rate
Year
Benin
Burkina Faso
Cabo Verde
Cote d'Ivoire
Gambia, The
Ghana
Guinea
Guinea-Bissau

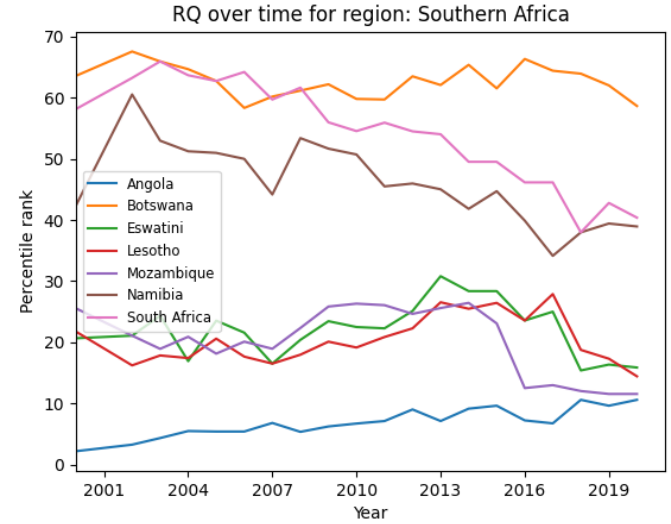

RQ over time for region: West Africa 1
Percentile rank
Year
Benin
Burkina Faso
Cabo Verde
Cote d'Ivoire
Gambia, The
Ghana
Guinea
Guinea-Bissau

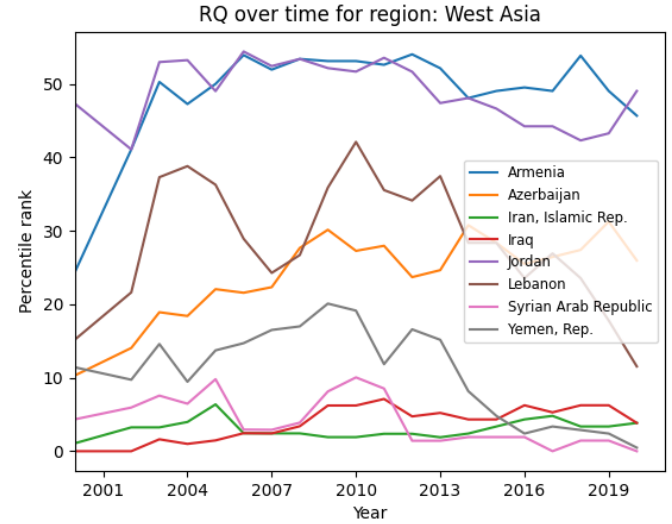

RQ over time for region: West Africa 2
Percentile rank
Year
Liberia
Mali
Mauritania
Niger
Nigeria
Senegal
Sierra Leone
Togo

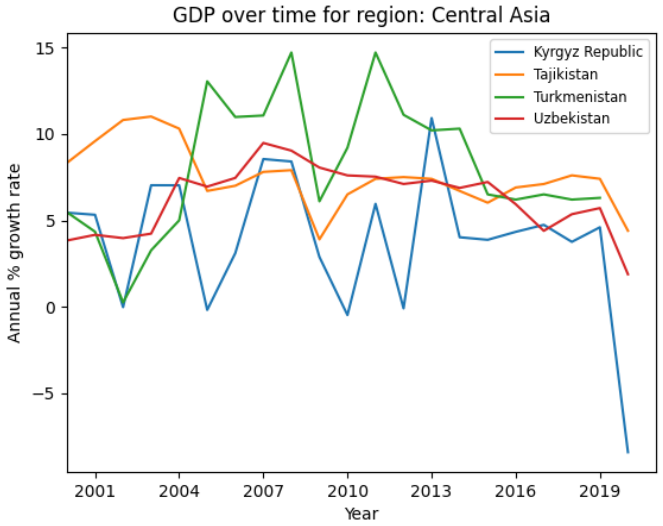

GDP over time for region: West Africa 2
Annual % growth rate
Year
Liberia
Mali
Mauritania
Niger
Nigeria
Senegal
Sierra Leone
Togo

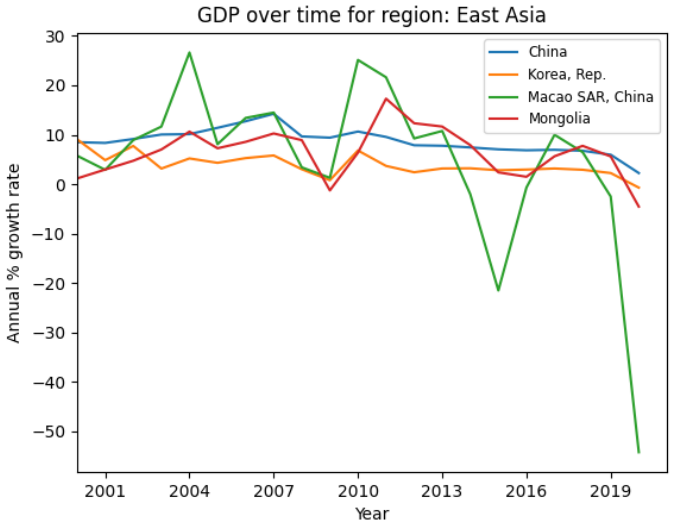

GDP over time for region: Southern Africa
Annual % growth rate
Year
Angola
Botswana
Eswatini
Lesotho
Mozambique
Namibia
South Africa

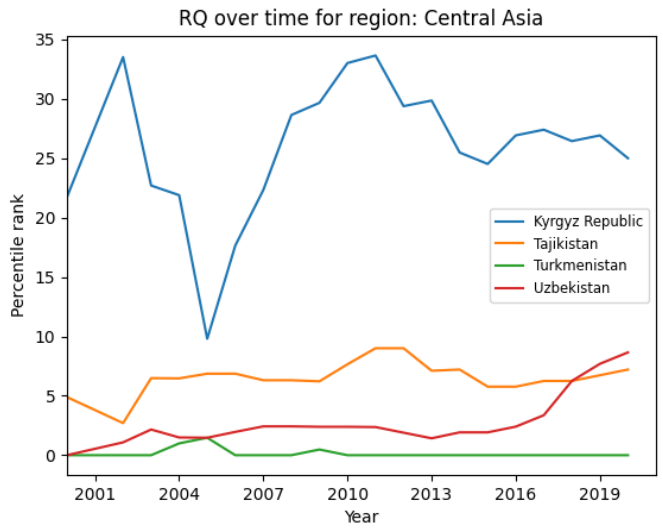

GDP over time for region: West Asia
Annual % growth rate
Year
Armenia
Azerbaijan
Iran, Islamic Rep.
Iraq
Jordan
Lebanon
Syrian Arab Republic
Yemen, Rep.

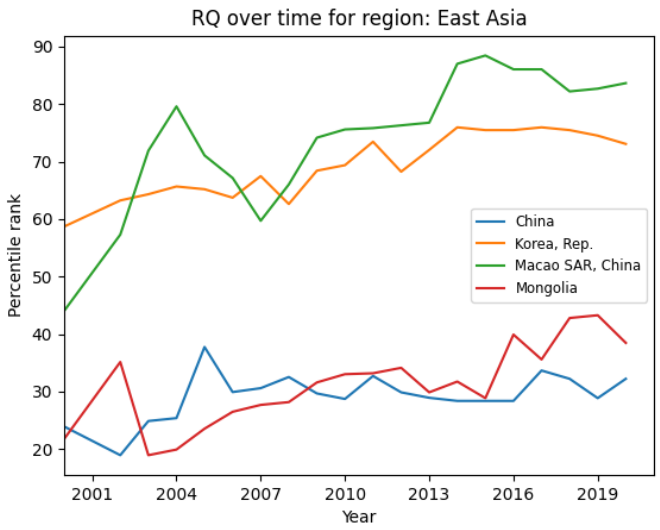

RQ over time for region: Southern Africa
Percentile rank
Year
Angola
Botswana
Eswatini
Lesotho
Mozambique
Namibia
South Africa

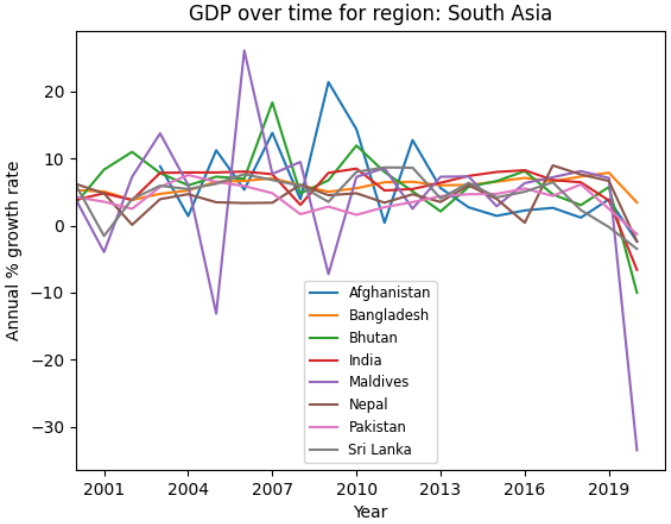

RQ over time for region: West Asia
Percentile rank
Year
Armenia
Azerbaijan
Iran, Islamic Rep.
Iraq
Jordan
Lebanon
Syrian Arab Republic
Yemen, Rep.

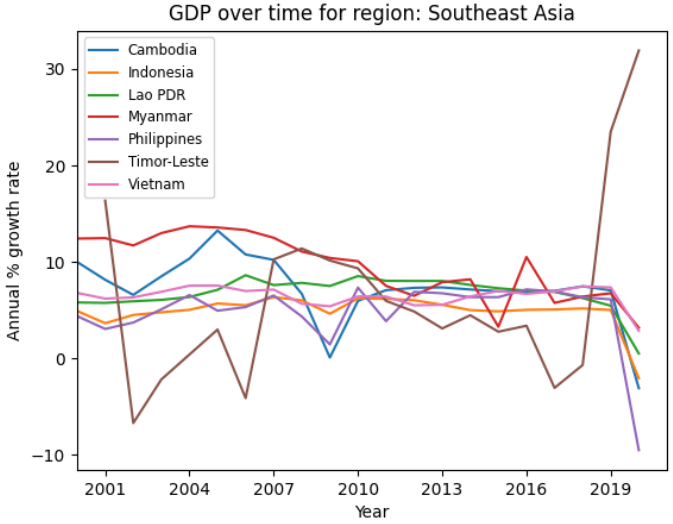

GDP over time for region: Central Asia
Annual % growth rate
Year
Kyrgyz Republic
Tajikistan
Turkmenistan
Uzbekistan

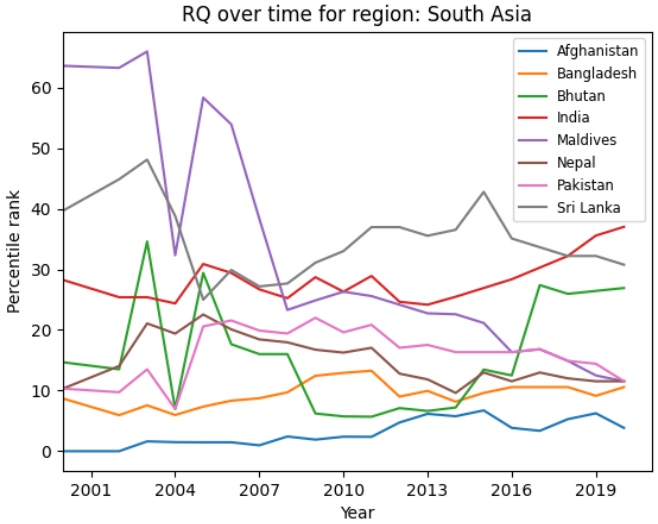

GDP over time for region: East Asia
Annual % growth rate
Year
China
Korea, Rep.
Macao SAR, China
Mongolia

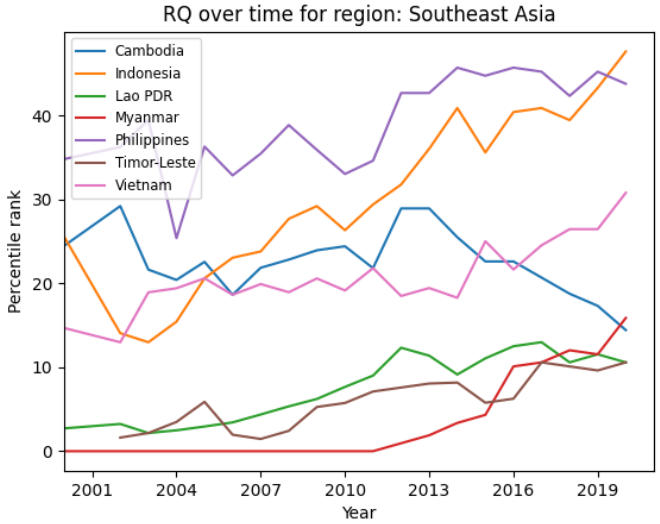

RQ over time for region: Central Asia
Percentile rank
Year
Kyrgyz Republic
Tajikistan
Turkmenistan
Uzbekistan

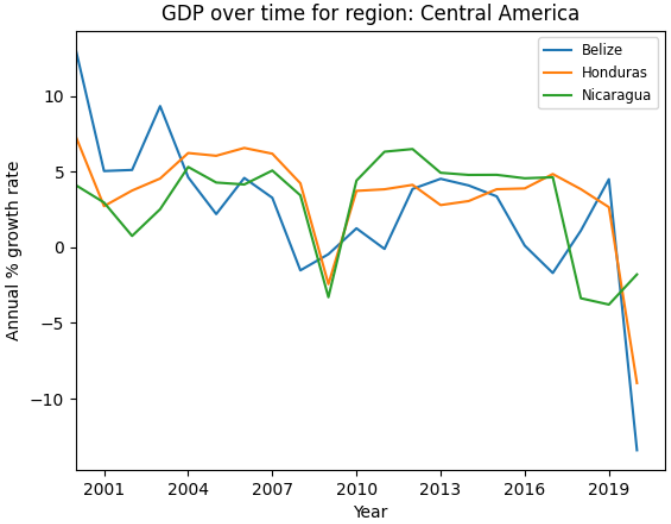

RQ over time for region: East Asia
Percentile rank
Year
China
Korea, Rep.
Macao SAR, China
Mongolia

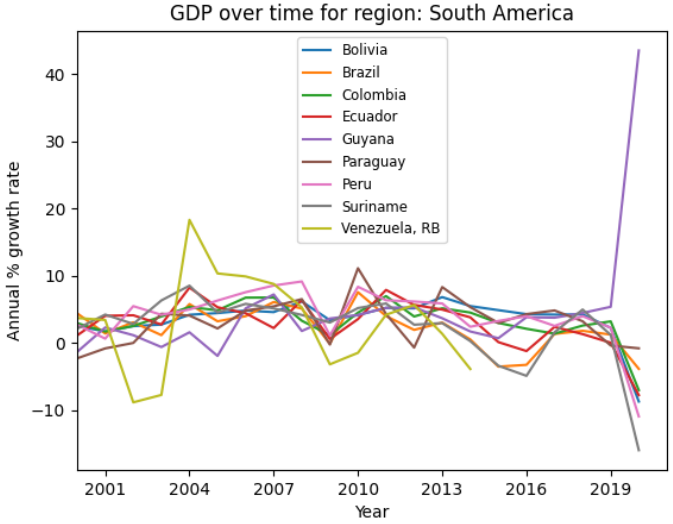

GDP over time for region: South Asia
Annual % growth rate
Year
Afghanistan
Bangladesh
Bhutan
India
Maldives
Nepal
Pakistan
Sri Lanka

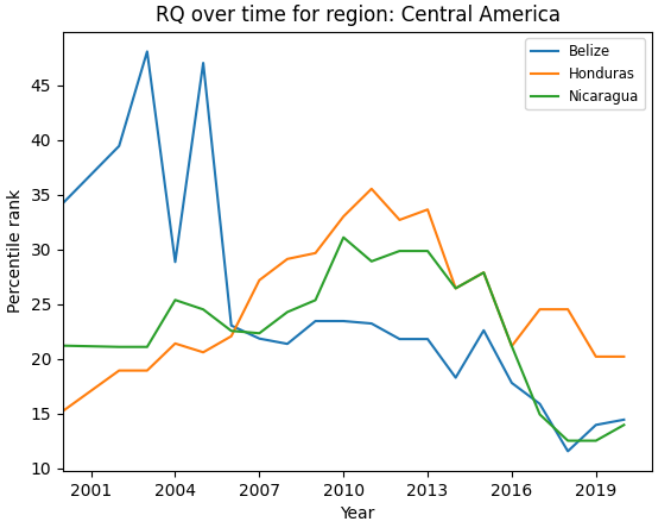

GDP over time for region: Southeast Asia
Annual % growth rate
Year
Cambodia
Indonesia
Lao PDR
Myanmar
Philippines
Timor-Leste
Vietnam

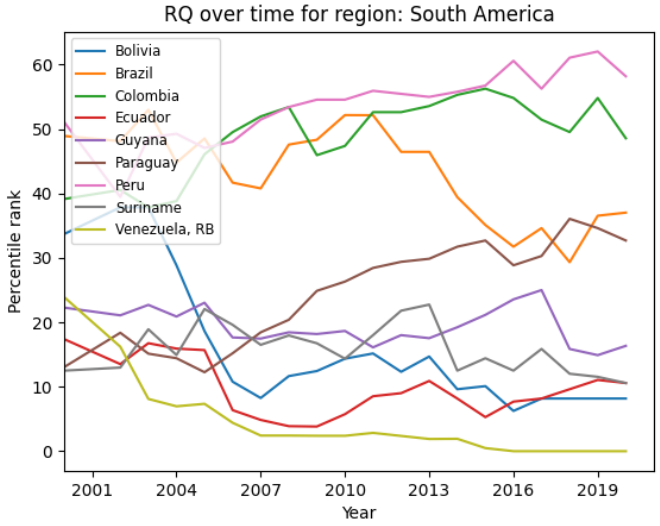

RQ over time for region: South Asia
Percentile rank
Year
Afghanistan
Bangladesh
Bhutan
India
Maldives
Nepal
Pakistan
Sri Lanka

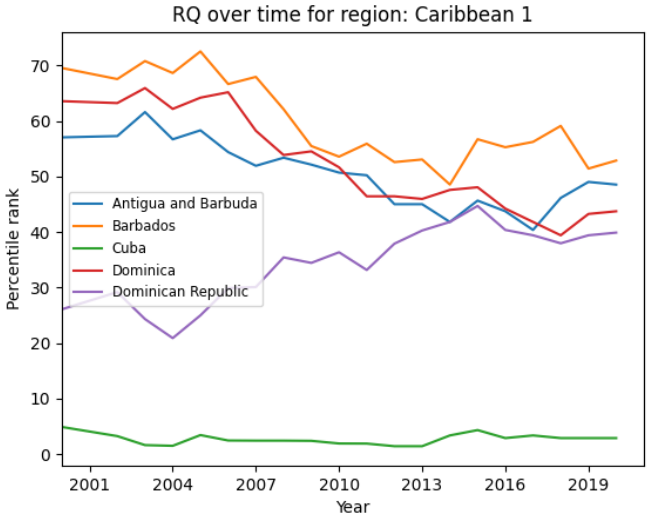

RQ over time for region: Southeast Asia
Percentile rank
Year
Cambodia
Indonesia
Lao PDR
Myanmar
Philippines
Timor-Leste
Vietnam

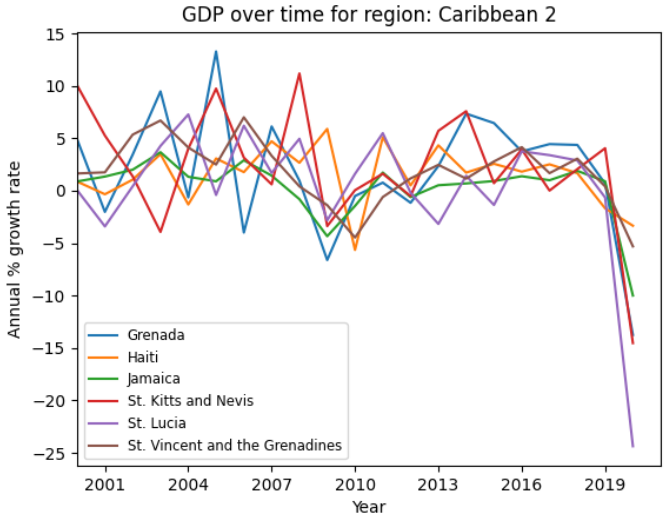

GDP over time for region: Central America
Belize
Honduras
Nicaragua
Annual % growth rate
Year

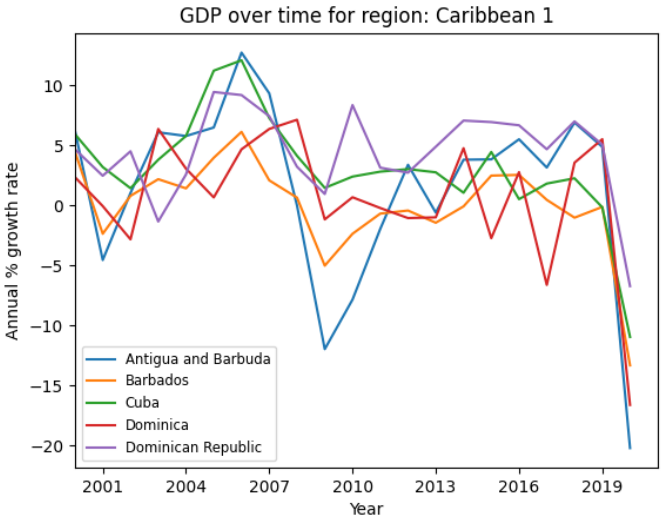

GDP over time for region: South America
Bolivia
Brazil
Colombia
Ecuador
Guyana
Paraguay
Peru
Suriname
Venezuela, RB
Annual % growth rate
Year

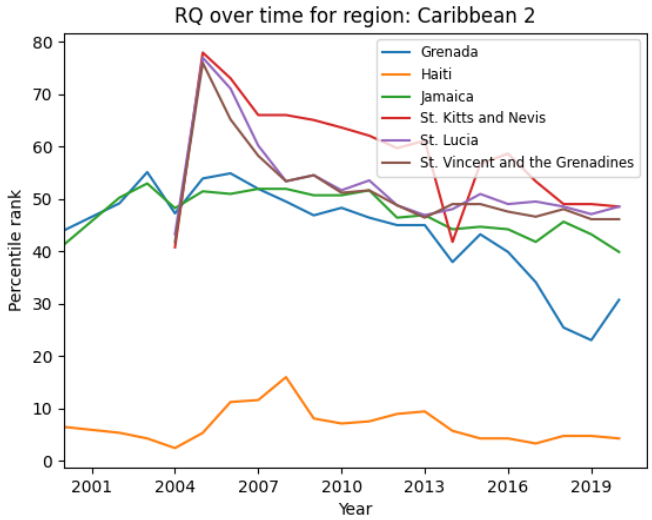

RQ over time for region: Central America
Belize
Honduras
Nicaragua
Percentile rank
Year

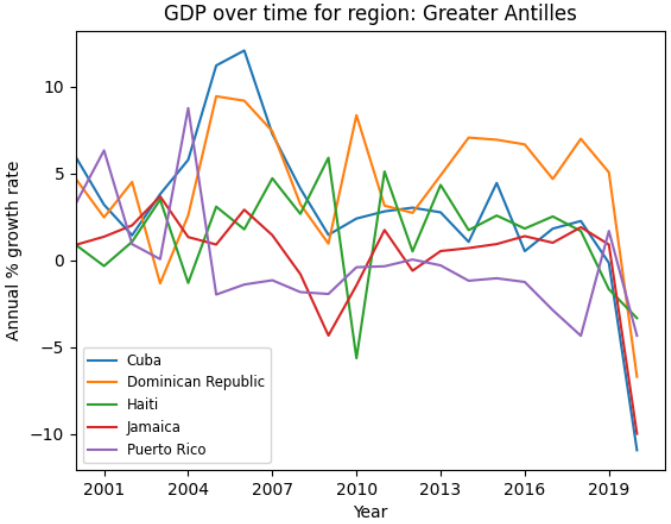

RQ over time for region: South America
Bolivia
Brazil
Colombia
Ecuador
Guyana
Paraguay
Peru
Suriname
Venezuela, RB
Percentile rank
Year

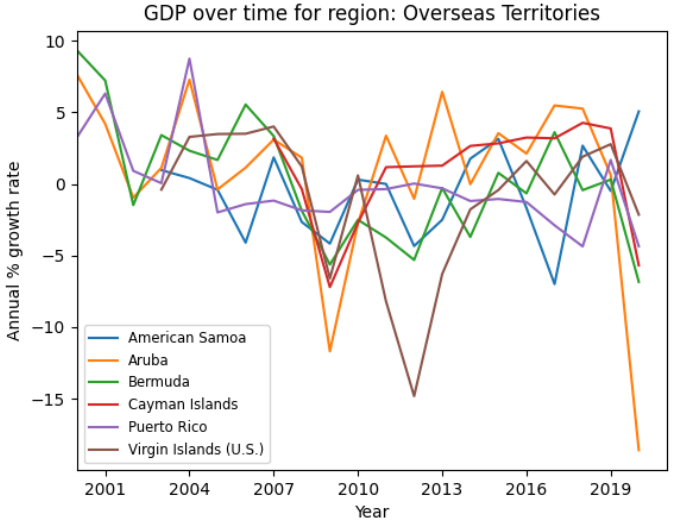

RQ over time for region: Caribbean 1
Percentile rank
Year
Antigua and Barbuda
Barbados
Cuba
Dominica
Dominican Republic

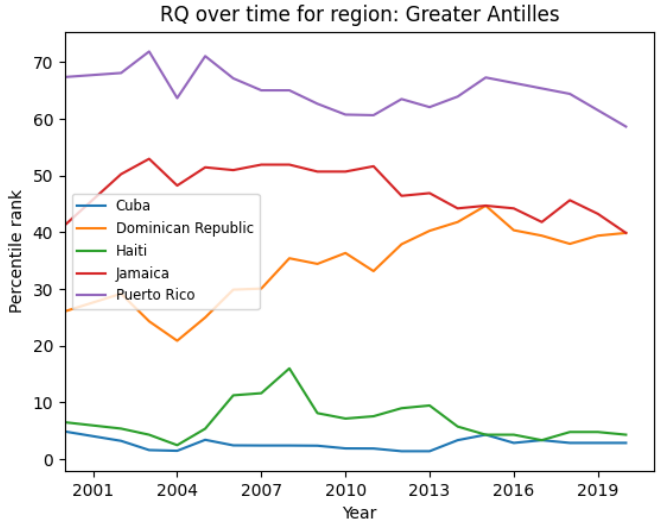

GDP over time for region: Caribbean 2
Annual % growth rate
Year
Grenada
Haiti
Jamaica
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines

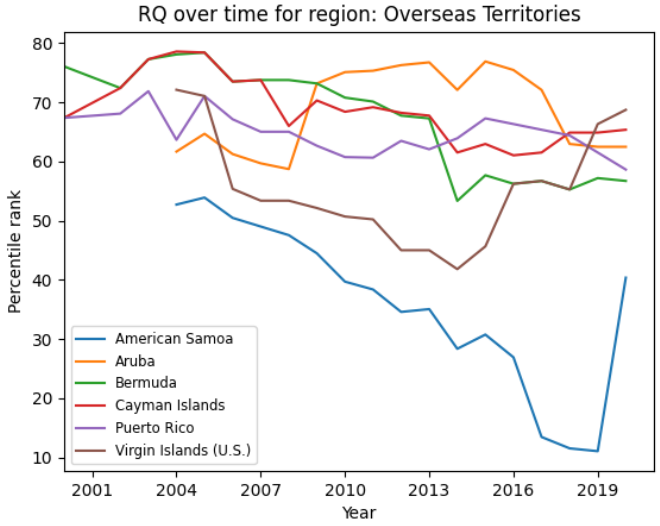

GDP over time for region: Caribbean 1
Annual % growth rate
Year
Antigua and Barbuda
Barbados
Cuba
Dominica
Dominican Republic

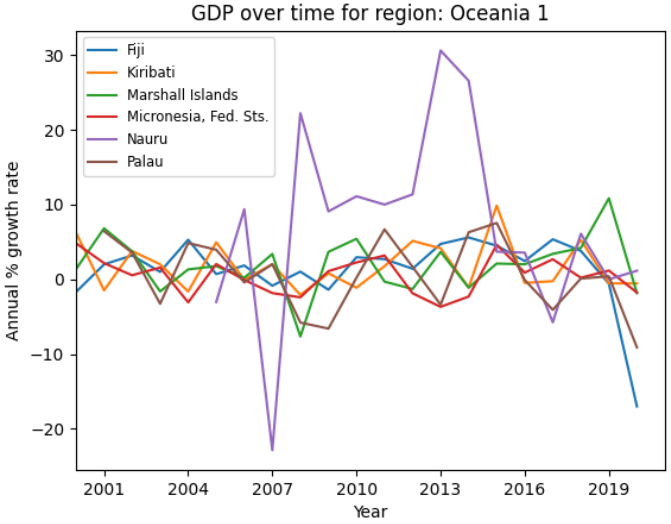

RQ over time for region: Caribbean 2
Percentile rank
Year
Grenada
Haiti
Jamaica
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines

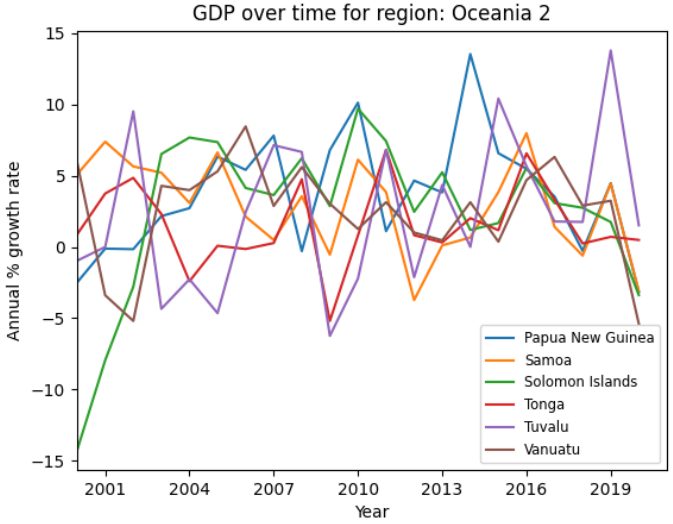

GDP over time for region: Greater Antilles
Annual % growth rate
Year
Cuba
Dominican Republic
Haiti
Jamaica
Puerto Rico

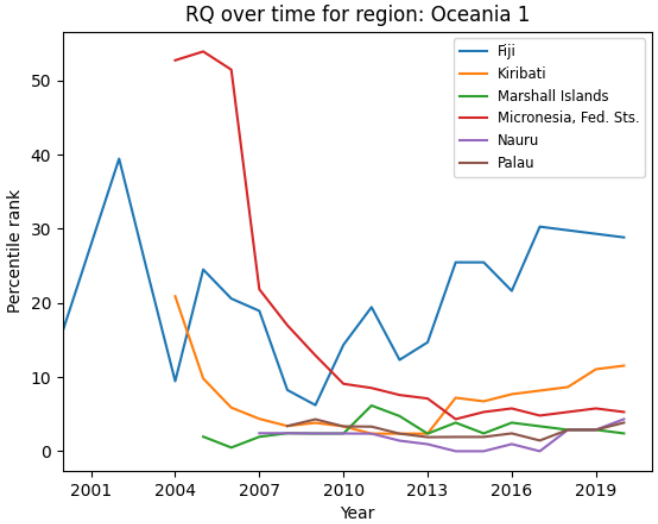

GDP over time for region: Overseas Territories
Annual % growth rate
Year
American Samoa
Aruba
Bermuda
Cayman Islands
Puerto Rico
Virgin Islands (U.S.)

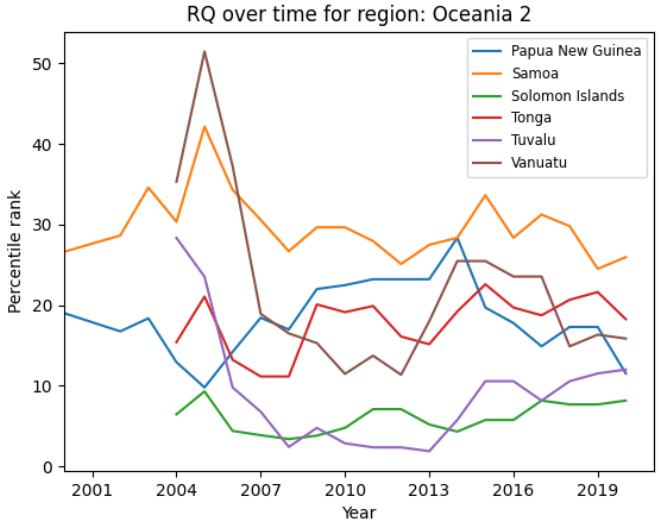

RQ over time for region: Greater Antilles
Percentile rank
Year
Cuba
Dominican Republic
Haiti
Jamaica
Puerto Rico


RQ over time for region: Overseas Territories
Percentile rank
Year
American Samoa
Aruba
Bermuda
Cayman Islands
Puerto Rico
Virgin Islands (U.S.)


GDP over time for region: Oceania 1
Annual % growth rate
Year
Fiji
Kiribati
Marshall Islands
Micronesia, Fed. Sts.
Nauru
Palau


GDP over time for region: Oceania 2
Annual % growth rate
Year
Papua New Guinea
Samoa
Solomon Islands
Tonga
Tuvalu
Vanuatu


RQ over time for region: Oceania 1
Percentile rank
Year
Fiji
Kiribati
Marshall Islands
Micronesia, Fed. Sts.
Nauru
Palau


RQ over time for region: Oceania 2
Percentile rank
Year
Papua New Guinea
Samoa
Solomon Islands
Tonga
Tuvalu
Vanuatu