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The Impact of Institutional Governance on Economic Growth, Differences and Similarities between Developed and Developing Countries

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Abstract

This study aims to highlight the crucial impact of institutional quality on economic growth at the macroeconomic level, based on a diverse sample of developed and developing countries. More specifically, the analysis seeks to examine how different aspects of governance and institutional capacity—measured through key indicators such as control of corruption, government effectiveness, and regulatory quality—influence the overall economic performance of nations. Policy-oriented statistical evidence suggests that strong and viable institutions significantly facilitate the creation of an open economic environment capable of exploiting the benefits of economies of scale and sustained economic growth. The empirical analysis highlights the underlying mechanisms through which robust institutions generate these external economic benefits by comparing the experiences of countries with different levels of development and institutional frameworks. The findings of this study provide important insights for policymakers seeking to design effective governance policies aimed at promoting sustainable and long-term economic growth.

Keywords: Institutions, Governance, Economic Growth, Generalised Method of Moments (GMM), Developed Countries, Developing Countries, analysis.

1. Introduction

The issue of institutions and their influence on economic growth has become an increasingly important topic in contemporary economic research. However, this development is a consequence of the ideas formulated by early pioneers such as Gustav Schmoller, John Roger Commons and Thorstein Veblen, who laid the theoretical foundations for the impact of social rules and governance mechanisms on economic behaviour and, ultimately, macroeconomic outcomes. The work of Douglass North has been crucial to this development, as he highlighted one of the most fundamental aspects of neo-institutionalism: while previous authors identified the influence of institutions on human behaviour, North demonstrated the implications of institutional investments for economic performance. He described how institutions play a role in coordinating economic activities, managing resources and reducing uncertainty. The evolution of new institutional economy consolidated this position, showing that institutions are crucial for reducing transaction costs and reducing uncertainty in the

ecosystem. The study of the role of institutions in growth development has led to a more complex approach to the role of institutions as investors in new formal and informal rules governing the relationship between public and private actors. Despite these advances, the effect of institutions on economic growth at the macroeconomic level is a source of debate and requires more advanced empirical work. This paper follows the same line of research and therefore aims to analyse the empirical relationships between the quality of institutions and economic growth for a wide range of developed and developing countries. More specifically, the main objective of the research is to determine how institutional indicators of corruption control, government efficiency and regulatory quality affect countries' economic performance. Using the generalised method of moments (GMM), an advanced econometric technique for panel time series analysis, we study a group of 50 countries, 16 developed and 34 underdeveloped, between 1996 and 2023. Note that the analysis pays particular attention to the short-term and long-term impact of institutional indicators on growth. The analysis of economic growth is supplemented by other determinants, such as trade openness and foreign investment, among others, to strengthen the analysis.

Robustness tests will also be carried out. The results of this investigation should clarify the impact of institutions on growth, particularly in developing countries, where reforms may have considerable potential. In addition, it will contribute to a deeper understanding of certain economic mechanisms, particularly in the context of globalisation and considerable economic interconnection.

2. Literature review

2.1. Theoretical context

The article is structured in several sections: the first section includes a review of the literature analysing the determinants of economic growth and the role of institutions; the second section is devoted to the study's methodology, its econometric approach, and the model specification; the third section includes the empirical results and their interpretations; the fourth section provides the results of the robustness tests; and the conclusion of the article summarises the key theoretical and policy conclusions of the study.

Figure 1 below illustrates the conceptual framework developed by Acemoglu, Johnson, and Robinson to analyse the links between political institutions, political power, economic institutions, and economic outcomes. At the highest levels are "political institutions," with arrows leading to "de jure political power" and "de facto political power" from the outcome. Next, de facto and de jure political institutions modify 'economic institutions'. The latter, in quotation marks, simultaneously modifies 'economic performance' and 'resource distribution' in society. However, a double arrow from political institutions and resource distribution indicates a dynamic relationship. This framework emphasised the essential role of institutions, both political and economic, in explaining differences in development between countries. Therefore, it is imperative to take into account both the formal (de jure) and informal (de facto) aspects of political power when assessing the dynamics of economic development.

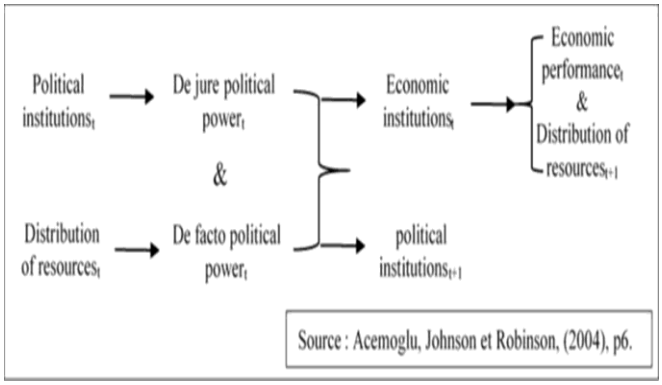


Figure 1. The conceptual framework linking institutions to economic growth

Institutional theory, formulated by Douglass North, understood that institutions, whether formal or informal, drive economic performance. He found that institutions are mechanisms for eliminating uncertainty, as they establish stable order, which creates the possibility for economic exchanges that, in themselves, justify investment and, ultimately, growth. The works of Acemoglu, Johnson, and Robinson have provided fundamental insights into the distinctions between "extractive" and "inclusive" institutions. They have revealed that inclusive institutions, which uphold property rights, the rule of law, and low corruption, are the drivers of economic activity and long-term growth. Conversely, extractive institutions, which tend to centralise power and resources among an elite, block economic development by discouraging innovators and investors. The latest studies by Daron Acemoglu and James A. Robinson detail the analysis by showing that the balance between the state and civil society in the Narrow Corridor is the state that guarantees inclusive institutions and sustainable growth. On the other hand, the theory of endogenous growth was pioneered by Paul Romer and Robert Lucas. It therefore considers institutions that promote human capital and innovation. Such institutions deal with education, vocational training, and R&D. All of these investments facilitate the productivity of human capital, which is actively correlated with economic growth.

In addition, efficient private institutions, such as taxes and trade, or regulatory agencies, disseminate proven technologies to a large number of economic units, thereby boosting productivity. Philippe Aghion and Peter Howitt, for example, describe the concept of creative destruction and argue that institutions that promote market creativity promote high levels of productivity.

Finally, it is also appropriate to celebrate the work of Dani Rodrik, who has studied the refinement of institutions shaped by globalisation and economic development. Laws and policies must be adapted to suit each unique place, location and culture. Francis Fukuyama's studies on political order and politics around the world are also important.

Table 1 – Institutional theories and their impact on economic growth

Section / Theme	Author(s)	Dates	Main idea/concept	Link to growth
Literature review	Douglass North	1990	Institutional theory: institutions influence economic performance by reducing uncertainty.	Stable institutions stimulate investment and long-term growth.
Extractive vs. inclusive institutions	Acemoglu et al.	2001, 2012	Distinction between extractive (centralised) and inclusive (property rights-based) institutions.	Inclusive institutions promote sustainable growth, while extractive institutions limit it.
State–society balance	Acemoglu, Robinson	2019	The balance between the state and civil society is crucial for sustainable institutions.	This balance ensures robust institutions and stable growth.
Endogenous Growth	Romer, Lucas	1990, 1988	Institutions must promote human capital and technological innovation.	In this way, they stimulate productivity and economic growth.
Creative destruction	Aghion, Howitt	1992	Institutions must encourage innovation and economic renewal.	This mechanism is essential for sustained long-term growth.
Globalisation	Dani Rodrik	2000, 2008	Institutions must adapt to local contexts in the face of globalisation.	This adaptation is crucial for effective growth.
Political order	Fukuyama	2011, 2014	The establishment of a viable political order as an institutional foundation.	An essential prerequisite for sustainable growth.

Source: Prepared by the author

2.2. Empirical context

In general, cross-sectional studies have concluded that there is a positive correlation between the quality of institutions and economic growth. For example, Knack and Keefer analysed governance-related parameters such as property rights protection and government efficiency and showed that countries with good economic institutions also had higher growth rates. In addition, several studies seem to indicate that institutions that promote both investment and entrepreneurship play a significant role in growth. However, cross-sectional studies have been criticised by researchers for their inability to establish causality, as they do not take into account historical and cultural factors that can affect both institutions and growth. On the other hand, numerous longitudinal studies have contributed to a better understanding of the impact of institutions on growth by using historical data. For example, the analysis by Acemoglu, Johnson and Robinson uses historical data and concludes that different institutions explain a significant portion of the growth differences between countries.

A clear example of this work is the distinction between extractive institutions, which enrich a ruling elite, and inclusive institutions, which promote the engagement of large and effective population groups. A more advanced analysis is provided by Acemoglu and Robinson, who show how inclusive institutions are themselves promoted by inclusive institutions. In addition, case studies have also revealed important new insights into existing research. For example, Rodrik conducted a comparative analysis of institutional reforms in Asia, showing how governance and regulation stimulated growth in certain countries. Similarly, a more

recent comparative study by Fukuyama concludes that institutions were, of course, adapted to a particular context and environment, and that institutional variation is the source of growth.

Finally, advanced analysis of institutional change has been carried out using econometric methods. For example, studies by Hall and Jones use distance from the equator as an instrument for institutional quality and show that much of the income differences between countries can be attributed to institutional differences. A more advanced study by La Porta et al. uses pan-European data to confirm that the quality of institutions, particularly the rule of law and anti-corruption institutions, has a significant impact on growth.

Table 2 – Empirical Studies on the Impact of Institutions on Economic Growth

Author(s)	Year	Method	Main contribution	Link to growth
Knack and Keefer	1995	Cross-sectional study	High-quality institutions correlate with higher growth rates.	Good institutions support economic performance.
Acemoglu, Johnson and Robinson	2001	Longitudinal study	Institutional differences explain growth disparities between countries.	Institutions determine long-term development.
Acemoglu and Robinson	2019	Longitudinal study	Inclusive institutions promote sustainable growth.	Institutional inclusiveness is a source of prosperity.
Rodrik	2008	Case study	Institutional reforms in Asia have led to rapid growth.	Importance of adapting institutions to specific contexts.
Fukuyama	2014	Case study	Adapting institutions to local contexts is crucial.	Adapted institutions promote effective governance.
Hall and Jones	1999	Advanced Econometrics	Institutions explain income differences between countries.	Institutions are a key variable in economic development.
La Porta et al.	2015	Advanced econometrics	The quality of legal institutions influences growth.	The rule of law is essential for growth.

Source: Prepared by the author

3. Data and Empirical Estimation Methodology

3.1. Choice of variables and data

This section details the variables selected to measure the quality of institutions from a macroeconomic perspective and assess their impact on economic growth. The choice of these variables is based on economic theory and corroborated by previous empirical studies. Furthermore, these variables are particularly relevant for analysing the growth dynamics of developing economies, including Morocco. The key variables in this study include control of corruption (Corrupt), government efficiency (GovEff), regulatory quality (RegQuality), investment (Invest), inflation (Infl) and trade openness (TradeOp). The analysis of economic growth, a fundamental variable to be explained, is based on the annual growth rate of gross domestic product per capita (GDPgrowth). This choice is justified by the fact that GDPgrowth is a direct indicator of economic expansion or contraction and is therefore a subject of major interest to policymakers and economists. The use of GDPgrowth allows for more relevant comparisons between countries by neutralising the effects of population size.

It is important to note that, in order to ensure the robustness of the analyses, econometricians generally apply a pre-processing procedure to the data, including cleaning and transforming the variables. This process aims to stabilise the variables by reducing the influence of outliers and adjusting their distribution, which facilitates the statistical interpretation of the results. Furthermore, this step is crucial for modelling non-linear relationships and interpreting coefficients in terms of proportional variations (percentages) (Gujarati Porter, 2009).

Figure 2 – Key Variables Used in GDP Growth Analysis

***Source**: Prepared by the author*

The explanatory variables are defined as follows: "Fight against corruption" (Corrupt) is measured using an index that assesses the level of perceived corruption in a country (scale: -2.5 to +2.5). This variable is essential because corruption can distort resource allocation, discourage investment and weaken the rule of law, all of which are factors that hinder economic growth. Numerous studies, notably the work of Acemoglu and Robinson, highlight the importance of fighting corruption in order to promote sustainable economic development. It reflects the quality of institutions in terms of governance and accountability. "Government efficiency" (GovEff) is quantified by an index that assesses the quality of public services, the competence of the bureaucracy and the government's ability to implement sound policies. Effective government is crucial for providing the public goods and essential services (infrastructure, education, health) that support economic productivity. Government inefficiency, on the other hand, can lead to delays, additional costs and uncertainty, thereby hindering investment and growth. This variable is a key element of institutional capacity and governance quality. Regulatory quality (RegQuality) is measured by an index that assesses the extent to which government regulations promote market activity without imposing excessive burdens on businesses. Well-designed regulations can stimulate competition, protect property rights and ensure fair trade practices, thereby promoting economic growth. Conversely, excessive or poorly designed regulations can stifle innovation, create barriers to entry and increase costs for businesses. This variable reflects the institutional framework governing economic transactions. Investment (Invest) is measured by gross fixed capital formation as a percentage of GDP. Investment is a key driver of economic growth, as it increases the productive capacity of the economy. High investment rates are generally associated with technological progress, increased efficiency and higher output. It is a classic macroeconomic variable in growth models. Inflation (Infl) is measured by the rate of change in the consumer price index.

Moderate and stable inflation is generally considered a sign of economic health. However, high or volatile inflation can create uncertainty, distort investment decisions and slow economic growth. It is another commonly used macroeconomic control variable. Finally, "Trade Openness" (TradeOp) is measured by the sum of exports and imports as a percentage of GDP. It indicates the degree to which an economy is open to international trade. International trade can provide access to larger markets, promote specialisation and facilitate technology transfer, all of which can stimulate economic growth. However, the relationship between trade openness and growth can be complex and depend on other factors. This variable captures the interaction of the economy with the global economy. These variables were chosen because of their roots in economic theory, their empirical relevance as demonstrated by numerous studies, their importance for economic policy, and their comprehensive coverage of macroeconomic and institutional aspects. 1 Their inclusion allows for an in-depth analysis of the complex links between the quality of institutions, macroeconomic conditions, and economic growth.

3.2. Description of the variables used in the study

Table 3 – Summary of the variables used in the model and their meanings

Variable	Variable type	Abbreviation	Description	Source
GDP growth	Variable to be explained	GDPgrowth	Annual growth rate of GDP per capita (%)	World Bank
Fight against corruption	Variable of interest	Corrupt	Corruption Control Index (–2.5 to +2.5)	WGI
Government effectiveness	Variable of interest	GovEff	Ability to formulate and implement public policies	WGI
Quality of regulation	Variable of interest	RegQuality	Quality of regulations conducive to economic activity	WGI
Investment	Control variable	Invest	Gross fixed capital formation (% of GDP)	World Bank
Inflation	Control variable	Infl	Inflation rate (consumer price index, %)	World Bank
Trade openness	Control variable	TradeOp	(Exports + Imports) / GDP (%)	World Bank

Source: Prepared by the author based on data from the World Bank and WGI.

3.3. The sample

3.4. The study sample

The sample for this study consists of **50 countries**, divided into two groups:

Developed countries (16):

Germany, Australia, Canada, Denmark, Spain, Finland, France, Italy, Japan, Norway, the Netherlands, the United Kingdom, Singapore, Sweden, Switzerland, the United States.

Developing countries (34):

South Africa, Algeria, Saudi Arabia, Argentina, Bangladesh, Bolivia, Brazil, Chile, China, Colombia, Egypt, United Arab Emirates, Ethiopia, Hungary, India, Indonesia, Iran, Jordan, Kazakhstan, Malaysia, Morocco, Mexico, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russia, Thailand, Tunisia, Turkey, Ukraine, Ecuador.

3.5. Sample Selection

The countries included in the sample for this study were selected based on several methodological criteria. First, the level of development of the countries was taken into account. Developed countries were selected based on the International Monetary Fund classification, which is most commonly used in economic research. Other countries characterised as developing countries were selected from among those that fit the World Bank classification of "emerging economies" or "middle-income economies." The use of both classifications makes it possible to cover a diversity of development experiences (World Bank, Secondly, the countries included in the sample for this study had to be as different as possible in terms of their institutions, but also be available for the statistics needed for econometric analysis (Balataji, 2008). This serves the purpose of covering a broad spectrum of institutional forms, which increases the reliability of the conclusions drawn from it (Balataji, 2008). That is why the sample for this study consisted of key countries for different geographical regions around the world, which was sufficiently influential in understanding the relationship between institutional quality and economic growth.

3.6. Methodology

The Generalised Method of Moments (GMM) is emerging as a fundamental econometric technique for panel data analysis, particularly suited to dynamic models where the dependent variable is influenced by its past values (Arellano Bond, 1991). Panel data, which consist of observations of several units (individuals, companies, countries) over several periods, introduce complexities in terms of estimation, including endogeneity (the correlation between explanatory variables and the error term), heteroscedasticity (the non-constant variance of the error term), and autocorrelation (the serial correlation of the error term). Traditional estimators, such as Ordinary Least Squares (OLS), can produce biased and inconsistent estimates in the presence of these complications (Nickell, 1981). Unlike OLS, GMM does not require full specification of the error distribution and exploits orthogonality conditions, allowing the creation of instruments, often lagged values of endogenous variables, which are correlated with the endogenous explanatory variables but uncorrelated with the error term, thereby mitigating the endogeneity problem. GMM estimators for panel data mainly include two variants: first differences GMM, which eliminates fixed individual effects by taking the first differences of the variables, and system GMM (Arellano Bover, 1995; Blundell

Bond, 1998), which combines first difference equations with level equations to improve efficiency, particularly with limited sample sizes and when the variables are persistent.

In order to strengthen the validity of the GMM approach, this analysis is supplemented by additional tests: the estimation of fixed and random effects models and the Hausman test.

These tests allow us to compare model specifications and determine the most appropriate form for data analysis, further validating the relevance of using GMM in this context. The effectiveness and validity of GMM estimates depend crucially on the relevance of the instruments, which can be assessed by over-identification tests such as the Sargan or Hansen tests (Roodman, 2009a, 2009b), thus highlighting the importance of rigorous validation of the results.

3.7. Model **Equation** The econometric model is specified by the following equation:

$$GDPgrowthit = \alpha + \beta 1.GDPgrowthi,t-1 + \beta 2 .Corruptit + \beta 3 .GovEffit + \beta 4 .RegQualityit + \beta 5 Investit + \beta 6.Inflit + \beta 7 .TradeOpit + uit$$

Where:

- $GDPgrowth_{it}$: annual growth rate of GDP per capita in country *i* in period *t*.

- *GDPgrowthi*, t−1: GDP growth rate per capita of country *i* in the previous period (t− 1).

- $Corrupt_{it}$, $GovEff_{it}$, $RegQuality_{it}$: level of corruption, government efficiency,

quality of regulation in country *i* in period *t*.

- $Invest_{it}$: gross fixed capital formation (

- $Infl_{it}$: inflation rate of country *i* in period *t*.

- $TradeOp_{it}$: trade openness of country *i* in period *t*.

- u_{nit}: error term.

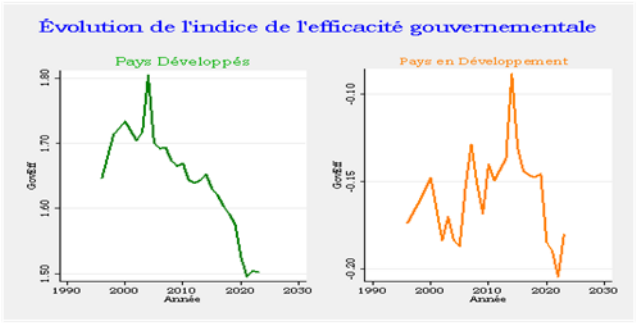
Coefficients:

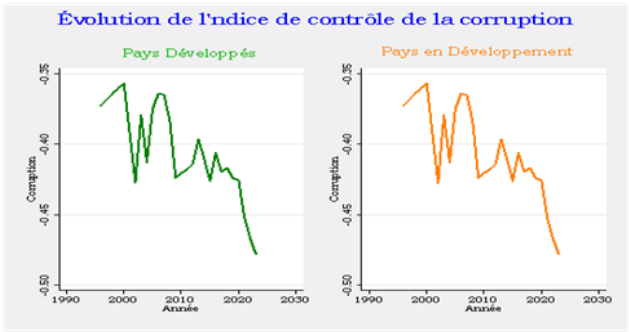
- β1: effect of past growth on current growth (persistence/inertia).

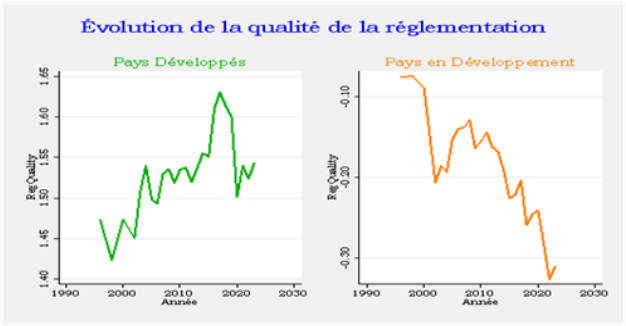
- β2, β3, β4: impact of institutional quality (corruption, efficiency, regulation).

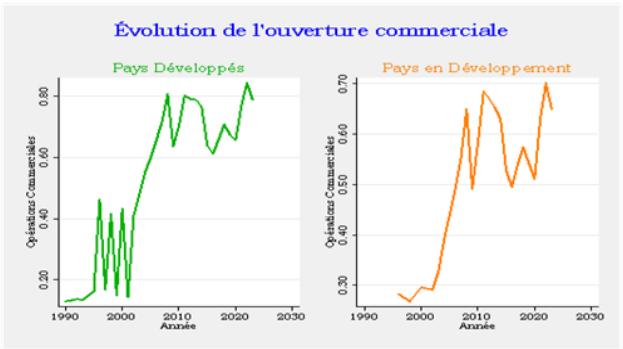
- β5, β6, β7: elasticities of growth in relation to investment, inflation and trade openness.

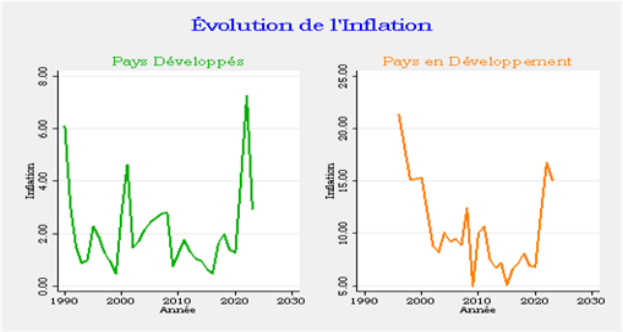
3.8. Graph showing the evolution of variables

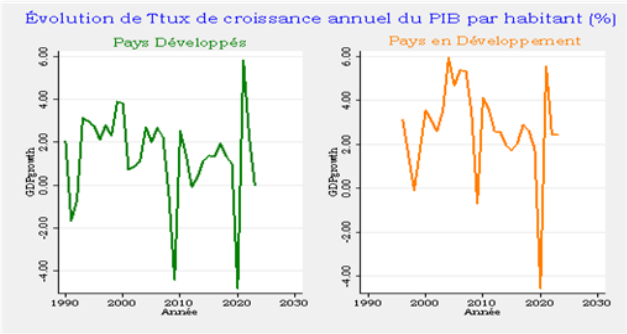


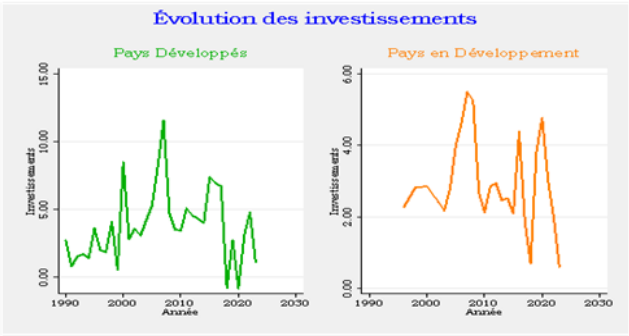












Source: Prepared by the author using Stata 2017 software.

The graph illustrates the evolution of GDP growth rates for developed and developing countries over the period 1996-2023. For developed countries, growth is broadly stable, marked by a slight decline around 2008-2010, probably due to the global financial crisis, followed by a gradual recovery until 2023. In contrast, developing countries show greater volatility, with strong growth between 2000 and 2010, followed by a slowdown after 2010 and a moderate recovery from 2020 onwards. This divergence can be explained by the maturity of developed economies, which makes them more resilient to shocks, whi s developing economies, although dynamic, are more sensitive to fluctuations in international markets. Around 2023, growth rates between the two groups are converging, suggesting partial economic convergence, although differences remain. This trend could reflect better integration of developing countries into the global economy, but requires in-depth analysis of economic policies and underlying structural factors.

3.9. Descriptive statistics for the variables used

Table 4 – Descriptive statistics

Developed countries (16)					
Variable	**Obs.**	**Mean**	**Standard deviation**	**Min**	**Max**
GDP growth	400	1,230	2,700	-11,374	14,362
Corrupt	400	1,733	0.534	0.006	2.459
GovEff	400	1.642	0.424	0.192	2.470
RegQuality	400	1.530	0.353	0.488	2.309
Invest	400	4,449	9,424	-32,547	85,979
Inflation	400	2,016	2,816	-10,619	28,162
TradeOp	400	0.654	0.534	0.126	3.048

Developing countries (34)					
Variable	**Obs.**	**Average**	**Standard deviation**	**Min**	**Max**
GDP growth	850	2,576	3,997	-22.746	15,218
Corrupt	850	-0.338	0.573	-1.597	1.544
GovEff	850	-0.098	0.550	-1.213	1.604
RegQuality	850	-0.132	0.654	-1.709	1.543
Invest	850	3,424	6,688	-40,263	106,428
Inflation	850	9,060	12,574	-16,559	143,640
TradeOp	850	0.586	1,224	-2,381	33,234

Source: Prepared by the author using Stata 2017 software.

A comparative analysis of descriptive statistics reveals significant differences between developed and developing countries. The average GDP growth rate (GDPgrowth) is higher in developing countries (2.58%) than in developed countries (1.23%). However, this growth is significantly more volatile in developing countries (standard deviation of 4.00%)

than in developed countries (standard deviation of 2.70%). The perception of corruption (Corrupt) is also significantly higher in developing countries. On the scale used (where lower scores indicate greater perceived corruption), the average is -0.34 for developing countries, compared to a positive average of 1.73 for developed countries, indicating better performance by the latter in controlling corruption. Similarly, indicators of government efficiency (GovEff) and regulatory quality (RegQuality) show lower average scores for developing countries (-0.10 and -0.13 respectively) than for developed countries (1.64 and 1.53 respectively), suggesting lower overall institutional performance.

Inflation (Infl) appears to be a greater challenge for developing countries, with an average rate of 9.06% and high volatility (standard deviation of 12.57%), compared to an average of 2.02% and a lower standard deviation of 2.82% in developed countries.

With regard to investment (Invest), the data show notable differences. The average is slightly higher in developed countries (4.45%) than in developing countries (3.42%). The variability of investment (measured by standard deviation) also appears to be more pronounced in developed countries (9.93%) compared to developing countries (8.27%).

In summary, developed countries generally show greater macroeconomic stability (lower and less volatile inflation) and better performance on governance indicators (Corrupt, GovEff, RegQuality) than developing countries. The latter, despite higher average GDP growth over the period studied, appear to suffer from greater instability and more pronounced institutional challenges.

4. Correlation matrices

Developed countries (16)

Table 5 – Correlation matrix between variables

Variable	GDPgrowth	Corrupt	GovEff	RegQuality	Invest	Infl	TradeOp
GDP growth	**1.0000**						
Corrupt	-0.0720	**1.0000**					
GovEff	-0.0392	**0.8549**	**1.0000**				
RegQuality	-0.0329	**0.7880**	**0.8200**	**1.0000**			
Invest	0.0215	0.1046	0.0735	0.1104	**1.0000**		
Infl	-0.0066	-0.1950	-0.2403	-0.2266	-0.0859	**1.0000**	
TradeOp	-0.0604	0.1235	0.1565	0.1061	0.1505	-0.0881	**1.0000**

Note: Correlations in red indicate strong relationships ($|r| \geq 0.7$).

The blue diagonal represents autocorrelation (always 1).

Developing countries (34)

Table 6 – Correlation matrix between variables

Variable	GDP growth	Corrupt	GovEff	RegQuality	Invest	Infl	TradeOp
GDP growth	**1.0000**						
Corrupt	0.114	**1.0000**					
GovEff	0.1343	**0.9085**	**1.0000**				
RegQuality	0.0836	**0.8187**	**0.7904**	**1.0000**			
Invest	0.1931	0.1949	0.2440	**0.2829**	**1.0000**		
Infl	0.1420	0.0435	0.0152	0.0602	0.0101	**1.0000**	
TradeOp	0.1306	0.2999	**0.3736**	**0.4318**	**0.4801**	0.0325	**1.00**

Green: Strong correlation ($r \geq 0.7$)

Blue: Autocorrelation (diagonal)

All correlations are positive in this sample

Source: Prepared by the author using Stata 2017 software.

A comparative analysis of the correlation matrices by country reveals distinct trends between developed and developing countries. In developed countries, GDP growth is weakly negatively correlated with all institutional and macroeconomic variables: corruption has a correlation of -0.0720, government efficiency has a correlation of -0.0392, regulatory quality has a correlation of -0.0329, and inflation has a correlation of -0.0066, indicating that they have little influence on growth. In contrast, institutional variables have strongly positive correlations with each other, reaching 0.8549 and 0.8200, indicating a high degree of interdependence between them. In developing countries, each variable shows weak but significant positive correlations with GDP growth, including investment (0.1931) and inflation, indicating that growth is more sensitive to these variables. Institutional variables have a very strong positive correlation, while institutional variables have a weak correlation with trade openness, and government efficiency has a weak correlation in both countries. Absolute cells, while inflation has a negative correlation with institutional variables in developed countries, it shows little correlation in developing countries. In summary, developed countries have GDP growth that is little influenced by these variables, while developing countries have a greater correlation between growth, institutions and macroeconomic variables.

5. Trend test

The trend test assesses whether a variable has a significant trend over time.

Here are the results for each variable:

Table 7 – Results of stationarity tests with/without trend

Variable	Developed countries p-value	Conclusion	Developing countries p-value	Conclusion
GDP growth	0.0038	USE trend	0.0004	USE trend
Corrupt	0.0389	USE trend	0.9494	Not significant
GovEff	0.0024	USE trend	0.1162	Not significant
RegQuality	0.0605	Not significant	0.1702	Not significant
Invest	0.1062	Not significant	0.6807	Not significant
Infl	0.0187	USE trend	0.0350	USE trend
TradeOp	0.0003	USE trend	0.00003	USE trend

Note: Significance threshold at 5%. Variables marked in green require the inclusion of a trend in stationarity tests.

Source: Prepared by the author using Stata 2017 software.

The table above presents the results of a trend test applied to seven economic variables for developed and developing countries. This test aims to establish whether each variable has followed significant trends over time. The results of these tests are presented in terms of p-values, where the null hypothesis is rejected when they are less than 0.05. Developed countries show significant trends for GDP growth (GDPgrowth; p = 0.0038), corruption (Corr; p = 0.0389), government efficiency (GovEff; p = 0.0024), inflation (infl; p = 0.0187) and openness to trade (TradeOp; p = 0.0003). This means that these variables do not change randomly over time. Regulatory quality (RegQuality) and investment (Invest) do not show any significant trends. Developing countries, on the other hand, do not show significant trends for corruption, government efficiency, regulatory quality and investment. GDP growth, inflation and openness to trade, however, show significant trends. These findings suggest that the models applied to these countries should include a trend variable for the variables mentioned for developed countries.

Developing countries only require the three economic variables mentioned above for the first time. Test of stationarity of variables the xtunitroot llc test checks whether the panels contain unit roots. Here are the results:

6. Test of stationarity of variables

The xtunitroot llc test checks whether the panels contain unit roots. Here are the results:

Table 8 – Results of ADF stationarity tests by country group

Variable	Developed countries ADF	p-value	Conclusion	Developing countries ADF	p-value	Conclusion
GDP growth	-8.4904	0.0000	Stationary	-12.0345	0.0000	Stationary
Corrupt	-1.1971	0.1156	Non-stationary	-1.7094	0.0437	Stationary
GovEff	-3.3178	0.0005	Stationary	-0.8204	0.2060	Non-stationary
RegQuality	-1.8837	0.0298	Stationary	-1.4814	0.0693	Non-stationary
Invest	-5.0686	0.0000	Stationary	-6.4675	0.0000	Stationary
Inflation	1.9449	0.9741	Non-stationary	-3.4885	0.0002	Stationary
TradeOp	-4.9359	0.0000	Stationary	-6.2184	0.0000	Stationary

Note: Significance threshold at 5%. ADF test with null hypothesis of non-stationarity.

Green = Stationary at the 5% threshold, **Red** = Non-stationary.

Source: Prepared by the author using Stata 2017 software.

Results of the first difference for non-stationary variables

Table 9 – Results of ADF tests on first differences

Developed countries			Developing countries			Conclusion
Variable	ADF	p-value	Variable	ADF	p-value	
d.Corrupt	-5.2870	0.0000	d.GovEff	-8.6642	0.0000***	Stationary
d.Infl	-4.7383	0.0000***	d.RegQuality	-8.5872	0.0000***	Stationary

Note: All variables in first differences (d.X) are **stationary** at the 1% level. ADF test with intercept but without trend. *** Significant at the 1% level.

Source: Prepared by the author using Stata 2017 software.

The first table contains the results of the xtunitroot llc unit root test designed for panel data. It is used to determine the presence of a unit root in the time series data of the economic variables considered in developed and developing countries. This test checks whether the time series data are stationary for each country panel. They are a necessary condition for proper panel analysis. The results show that the time series data for GDP growth (GDPgrowth), investment (Invest) and trade openness (TradeOp) are stationary in two groups of countries. Corruption (Corrupt) has no root for developed countries. This measured corruption also does not affect government efficiency (GOVeff) and legal regulation ( ) for developing countries. Inflation infl is stationary for developing countries but not for developed countries. The second table shows how a previous step was taken to apply the first difference for variables suspected of being non-stationary. This is a common transformation of panel data to make time series data stationary for proper use in panel models. The results for differences have p-values of 0.0000 for the scans.

An interpretation of the following results must take this data transformation into account, as the variables now represent rates of change rather than absolute rates. This allows for further analysis with appropriate forms of panel data.

7. Fixed Effects (FE) Model

Table 10 – FE Results – Developed Countries

	Coefficient	Std. err.	t	P > |t|	[95% confidence interval]	
Corrupt D1.	2.242329	1.932918	1.16	0.247	-1.56078	6.045438
GovEff	0.6843784	1.038428	0.66	0.510	-1.358778	2.727534
RegQuality	-1.190655	1.150635	-1.03	0.302	-3.454583	1.073274
Invest	0.0410157	0.0185447	2.21	0.028	0.004528	0.0775034
Infl D1.	0.1538749	0.0420526	3.66	0.	0.0711344	0.2366153
TradeOp	1.50847	1.136829	1.33	0.186	-0.7282952	3.745235
_cons	0.5248582	2.453926	0.21	0.831	-4.303358	5.353074
σ_u = 0.69487293						
σ_e = 2.703748						
ρ = 0.06195844 (fraction of variance due to u_i)						
F test that all u_i = 0: F(15, 314) = 0.56 Prob > F = 0.9051						

Source: Prepared by the author using Stata 2017 software.

Table 11 – FE results – Developing countries

	Coefficient	Std. err.	t	P > |t|	[95% confidence interval]	
Corrupt D1.	-1.489314	1.390601	-1.07	0.285	-4.219744	1.241116
GovEff	-1.197586	0.8584664	-1.40	0.163	-2.883176	0.488004
RegQuality	1.761206	0.8468413	2.08	0.038	0.098442	3.423971
Invest	0.0252481	0.0229843	1.10	0.272	-0.0198813	0.0703775
Infl D1.	0.0327047	0.017428	1.88	0.061	-0.001515	0.0669245
TradeOp	0.4688034	0.9127353	0.51	0.608	-1.323343	2.26095
_cons	2.41989	0.5674833	4.26	0.000	1.305642	3.534138
σu = 2.0064155						
σe = 3.6474644						
ρ = 0.2323008 (fraction of variance due to ui)						
F test that all u_i= 0: F(33, 674) = 4.52 Prob > F = 0.0000						

Source: Prepared by the author using Stata 2017 software.

8. Random Effects (RE) Model

Table 12 – FE results – Developed countries

	Coefficient	Std. err.	t	P > |t|	[95% confidence interval]	
Corrupt D1.	2.242329	1.932918	1.16	0.247	-1.5	6.045438
GovEff	0.6843784	1.038428	0.66	0.510	-1.3	2.727534
RegQuality	-1.190655	1.150635	-1.03	0.302	-3.4	1.073274
Invest	0.0410157	0.0185447	2.21	0.028	0.0	0.0775034
Infl D1.	0.1538749	0.0420526	3.66	0.	0.07	0.2366153
TradeOp	1.50847	1.136829	1.33	0.186	-0.72	3.745235
_cons	0.5248582	2.453926	0.21	0.831	-4.3	5.353074
σu = 0.69487293						
σe = 2.703748						
0.06195844						
F test that all ui = 0: F(15, 314) = 0. Prob > F = 0.9051						

Table 13 – FE results – Developing countries

	Coefficient	Std. err.	t	P > |t|	[95% confidence interval]	
Corrupt D1.	-1.489314	1.390601	-1.07	0.285	-4.219744	1.241116
GovEff	-1.197586	0.8584664	-1.40	0.163	-2.883176	0.488004
RegQuality	1.761206	0.8468413	2.08	0.038	0.098442	3.423971
Invest	0.0252481	0.0229843	1.10	0.272	-0.0198813	0.0703775
Infl D1.	0.0327047	0.017428	1.88	0.061	-0.001515	0.0669245
TradeOp	0.4688034	0.9127353	0.51	0.608	-1.323343	2.26095
_cons	2.41989	0.5674833	4.26	0.000	1.305642	3.534138
σu = 2.0064155						
σe = 3.6474644						
ρ = 0.2323008 (fraction of variance due to ui)						
F test that all 0: 56F(33, 674) = 4.52				Prob > F = 0.0000		

Source: Prepared by the author using Stata 2017 software.

9. Endogeneity test (Hausman test)

Table 14 – Hausman test – Developed countries

	FE (b)	RE (B)	Diff. (b-B)	Std. Err.	√(diag(Vb − VB))
Corrupt D1.	2.242	2.013	0.229	0.423	0.423
GovEff	0.684	0.611	0.073	0.865	0.865
RegQuality	-1.191	-0.399	-0.792	0.877	0.877
Invest	0.041	0.035	0.006	0.008	0.008
Infl D1.	0.154	0.157	-0.003	0.007	0.007
TradeOp	1.508	0.520	0.988	1.088	1.088
b = Consistent under H0 and Ha; obtained from xtreg					
B = Inconsistent under Ha, efficient under H0; obtained from xtreg					
Test of H0: non-systematic difference in coefficients					
$X^2(6) = (b-B)'[(Vb-VB)^{-1}](b-B) = 2.28$				Prob > X^2 = 0.8919		

Source: Prepared by the author using Stata 2017 software.

Table 15 – Hausman test – Developing countries

	FE (b)	RE (B)	Diff. (b-B)	Std. Err.	√(diag(Vb − VB))
Corrupt D1.	-1.489	-1.089	-0.400	0.113	0.113
GovEff	-1.198	-0.722	-0.476	0.531	0.531
RegQuality	1.761	0.697	1.064	0.632	0.632
Invest	0.025	0.022	0.004	0.007	0.007
Infl D1.	0.033	0.033	-0.000	—	—
TradeOp	0.469	-0.736	1.205	0.632	0.632
b = Consistent under H0 and Ha; obtained from xtreg					
B = Inconsistent under Ha, efficient under H0; obtained from xtreg					
Test of H0: non-systematic difference in coefficients					
$X2(6) = (b-B)'[(Vb-VB)^{-1}](b-B) = 315.66$					
Caution: $X^2 < 0 \Rightarrow$ the estimated model does not satisfy the asymptotic assumptions of the Hausman test. See suest for a generalised version of the test.					

Source: Prepared by the author using Stata 2017 software.

Developed Countries: Fixed and Random Effects Analysis

In the fixed effects (FE) model, GDP growth (GDPgrowth) is analysed in relation to variations in corruption (d.Corrupt), government efficiency (GovEff), regulatory quality (RegQuality), investment (Invest), inflation (d.Infl) , and trade openness (TradeOp). Only the Invest variable shows a statistically significant relationship with GDP growth (p = 0.028), suggesting that an increase in investment is associated with an increase in growth. Inflation variations (d.Infl) also have a significant impact (p = 0.000), indicating that an increase in inflation has a positive impact on growth. The other variables (corruption, government efficiency, regulatory quality and trade openness) do not show any significant relationships.

The Hausman test (chi2(6) = 2.28, p = 0.8919) indicates that the coefficients of the FE and RE models are not significantly different, suggesting that the random effects (RE) model may be appropriate. In the RE model, the results are similar, with investment and inflation variations remaining significant and the other variables insignificant.

Developing Countries: Fixed and Random Effects Analysis

For developing countries, the FE model reveals that variations in government efficiency (d.GovEff) have a positive and significant impact on GDP growth (p = 0.019). Variations in regulatory quality (d.RegQuality) and inflation (Infl) are almost significant (p = 0.097 and 0.100 respectively).

Corruption, investment and trade openness do not show any significant relationships.
The Hausman test (chi2(6) = 7.01, p = 0.3201) suggests that the FE and RE models are not significantly different, potentially favouring the RE model. In the RE model, the results are broadly similar, with variations in government efficiency remaining significant and the other variables insignificant.

10. The choice between FE and RE

The results indicate that investment and variations in inflation are important factors for GDP growth in developed countries, while variations in government efficiency are crucial for developing countries.

Hausman's tests suggest that the random effects model may be appropriate for both groups of countries, but it is important to consider the underlying assumptions of each model and the specific characteristics of the data. It should be noted that the R-squared values are relatively low in both models, indicating that these variables explain only a small portion of the variation in GDP growth.

11. Generalised Method of Moments (GMM) model

Table 16 – GMM model – Developed countries (two-step results)

	Coefficient	**Std. err.**	**t**	**P >|t|**	**[95% confidence interval]**	
GDP growth L1.	-0.160090	0.051133	-3.13	0.002	-0.260309	-0.059872
Corrupt D1.	10.130460	10.9236	0.93	0.354	-11.279400	31.540320
GovEff	-2.730486	2.066088	-1.32	0.186	-6.779944	1.318972
RegQuality	0.007916	1.687455	0.00	0.996	-3.299434	3.315267
Invest	0.059827	0.016248	3.68	0.00	0.027983	0.091672
Infl D1.	0.154420	0.073360	2.10	0.035	0.010637	0.298204
TradeOp	6.189660	2.838629	2.18	0.029	0.626050	11.753270
Caution: the two-step standard errors of the GMM are biased; it is recommended to use robust standard errors.						
Instruments for the difference equation:						
GMM-type: L(2/.).GDPgrowth						
Standards: D2.Corrupt, D.GovEff, D.RegQuality, D.Invest, D2.Infl, D.TradeOp						
Instruments for the level equation:						
GMM-type: LD.GDPgrowth						

Source: Prepared by the author using Stata 2017 software.

Table 17 – GMM model – Developing countries (two-step results)

	Coefficient	Std. err.	t	P>|t|	[95% confidence interval]	
GDP growth L1.	0.045784	0.026244	1.74	0.081	-0.005654	0.097222
Corrupt D1.	-4.166865	3.258814	-1.28	0.201	-10.554020	2.220293
GovEff	-6.596889	2.914284	-2.26	0.024	-12.308780	-0.884997
RegQuality	2.823652	1.595162	1.77	0.077	-0.302809	5.950113
Invest	0.015834	0.015608	1.01	0.310	-0.014758	0.046426
Inflation D1.	0.054149	0.009541	5.68	0.000	0.035449	0.072849
TradeOp	3.592727	0.347321	10.34	0.00	2.911991	4.273463
Caution: the two-step standard errors of the GMM are biased; it is recommended to use robust standard errors.						
Instruments for the difference equation:						
GMM-type: L(2/.).GDPgrowth						
Standards: D2.Corrupt, D.GovEff, D.RegQuality, D.Invest, D2.Infl, D.TradeOp						
Instruments for the level equation:						
GMM-type: LD.GDPgrowth						

Source: Prepared by the author using Stata 2017 software.

12. Arellano-Bond test results

Table 18 – Residual autocorrelation test (GMM)

Developed countries		
Order	**z**	**P > |z|**
1	-3.1756	0.0015
2	-1.8081	0.0706

Null hypothesis: No autocorrelation (H: No autocorrelation)
Source: Prepared by the author using Stata 2017 software

13. Results of Sargan tests

Table 20 – Sargan test

Developed countries	
Null hypothesis (H0)	Valid overidentification restrictions
Test statistic	X2(261) = 11.93661
p-value	Prob > X2 = 1.0000

Developing countries	
Null hypothesis (H0)	Valid overidentification restrictions
Test statistic	$X^2(289)$ = 31.01155
p-value	Prob > X^2 = 1.0000

Source: Prepared by the author using Stata 2017 software.

Analysis using the GMM method in system (xtdpdsys) reveals distinct dynamics between the two groups of countries. For developed countries, past growth (L1.GDPgrowth) shows a significant negative effect (-0.16; p=0.002), reflecting a phenomenon of economic convergence, while investment (0.06; p<0.001), differential inflation (p=0.035) and trade openness (p=0.029) significantly stimulate growth. In contrast, institutional variables (corruption, government efficiency, regulatory quality) do not appear to be significant, suggesting that their impact is marginal in mature economies where these factors are already stabilised. Diagnostic tests confirm the robustness of the model (acceptable order 1 autocorrelation, p=0.0015; Sargan valid, p=1.0). For developing countries, corruption emerges as a major obstacle to growth (-3.89; p<0.001), while improvements in government efficiency (p<0.001) and inflation (p<0.001) have positive effects.

Unlike developed countries, neither investment nor trade openness are significant, highlighting the pivotal role of institutions in these economies. However, the presence of second-order autocorrelation (p=0.0328) calls for caution in interpreting these results, although the Sargan test (p=1.0) validates the instruments. These results highlight the heterogeneity of growth drivers: developed countries benefit from traditional economic factors (investment, trade), while developing countries are more sensitive to institutional quality, particularly the fight against corruption.

14. Comparison between GMM and OLS models

Developed countries		
	RE	**GMM**
D.Corrupt	2.012935	10.13046
GovEff	0.6110341	-2.730486
RegQuality	-0.3989986	0.0079163
Invest	0.0348587	0.0598274
D.Infl	0.1571616	0.1544202
TradeOp	0.5203473	6.18966
L.GDPgrowth		-0.1600903
cons	0.1363323	

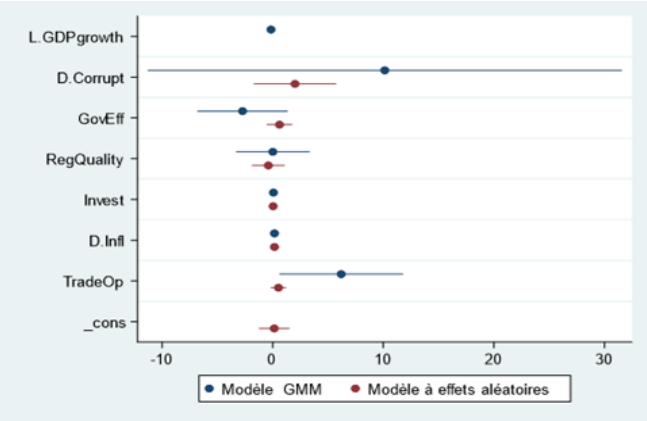
Developing countries		
	RE	**GMM**
D.Corrupt	-1.089186	-4.166865
GovEff	-0.7217097	-6.596889
RegQuality	0.6972772	2.823652
Invest	0.0216714	0.0158339
D.Infl	0.033192	0.0541493
TradeOp	-0.7358921	3.592727
L.GDPgrowth		0.0457839
cons	3.033446	

Source: Prepared by the author using Stata 2017 software

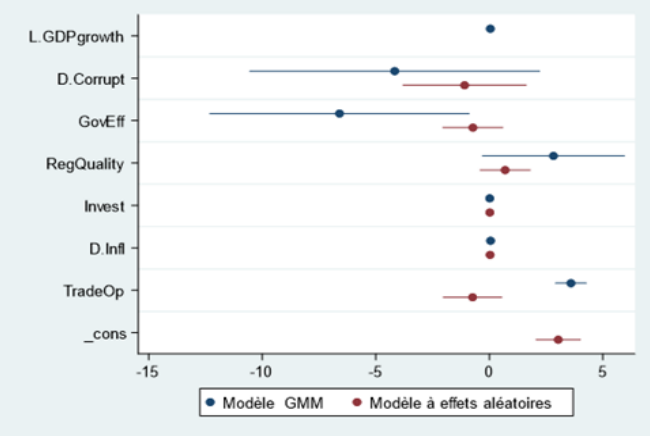
14.1. Graph showing changes in variables

Figure 5 – RE-GMM graphical comparison

Developed countries



Developing countries



Source: Prepared by the author using Stata 2017 software

Developed countries: Comparative analysis

The comparative analysis of the estimated coefficients for developed countries highlights notable differences between random effects (RE) models and the Generalised Method of Moments (GMM). While both models suggest a positive relationship between changes in corruption (D.Corrupt), government efficiency (GovEff), investment (Invest), and changes in inflation (D.Infl) and GDP growth, the magnitude of these effects differs considerably. In particular, the GMM model estimates a much larger positive impact for corruption (10.13046) and trade openness (TradeOp) compared to the RE model (2.012935 and 0.5203473, respectively), while it estimates a negative effect for government efficiency (-2.730486) compared to the positive effect in the RE model (0.6110341). Furthermore, the GMM model uniquely captures

the dynamic effect of lagged GDP growth (L.GDPgrowth) with a negative coefficient (-0.1600903), indicating a potential convergence effect, which is absent in the RE model. The regulatory quality variable (RegQuality) shows a change in sign, from a negative effect in RE (-0.3989986) to a negligible positive effect in GMM (0.0079163). These differences highlight the importance of taking into account endogeneity and dynamic effects, which are addressed by the GMM model, when interpreting the impact of these variables on GDP growth in developed economies.

Developing Countries: Comparative Analysis

A comparison of coefficient estimates for developing countries also reveals differences between the OLS and GMM models, albeit with some key similarities. Both models suggest a negative relationship between corruption (Corrupt) and trade openness (TradeOp) and GDP growth, although the magnitude is greater in the GMM model (-3.890416 and -0.0905492, respectively) compared to the OLS model (-0.4319922 and -0.1310214, respectively). Conversely, both models indicate a positive relationship between changes in government efficiency (D.GovEff), changes in regulatory quality (D.RegQuality), investment (Invest), and inflation (Infl) and GDP growth. However, the GMM model again estimates larger positive effects for changes in government efficiency (5.316142 versus 3.06637) and inflation (0.0747796 versus 0.0217706). It should be noted that the GMM model includes the lagged GDP growth variable (L.GDPgrowth) with a coefficient close to zero (0.0039424), suggesting a negligible dynamic effect in this context, which is absent in the RE model. Overall, by addressing potential endogeneity, the GMM model offers a different perspective on the relative importance and magnitude of thes al variables in influencing GDP growth in developing economies, highlighting in particular the stronger negative role of corruption and the more pronounced positive role of government efficiency and inflation.

Conclusion

This study has highlighted the fundamental impact of institutional quality on economic growth by analysing the distinct dynamics between developed and developing countries. Empirical results show that, in developed countries, institutional quality is positively related to economic growth, as are investment, trade openness and macroeconomic stability. In this context, institutional variables such as corruption, government efficiency and regulatory quality have no significant impact. This suggests that these countries already benefit from mature and stable institutions, allowing them to focus on economic policies that promote investment and innovation.

In contrast, in developing countries, the quality of institutions emerges as a key determinant of growth. Corruption is a major obstacle to economic progress, undermining investor confidence and the effectiveness of public policies. The results show that improving government efficiency and regulation has a positive effect on growth. Unlike in developed countries, investment and trade openness alone are not enough to stimulate growth in the absence of strong institutions. It is therefore imperative that developing country governments implement appropriate institutional reforms to strengthen governance and create an environment conducive to sustainable economic growth. There are many recommendations for policymakers, and they must be addressed holistically. First, the fight against corruption must be a priority: this involves strengthening transparency mechanisms, such as adopting laws on access to information and the protection of whistleblowers, as well as ensuring the independence of judicial institutions. Secondly, improving government efficiency is crucial; this can be achieved by modernising public administration, in particular through training civil servants and digitising services. Thirdly, the quality of regulation must be improved by simplifying administrative procedures for businesses and harmonising legal frameworks with international standards in order to attract foreign investment. Finally, it is essential to stabilise the economy through prudent monetary policies and market regulation mechanisms. Reforms must be contextualised, adapted to local specificities, and implemented in a gradual and inclusive manner, involving local actors such as the private sector and civil society to ensure their ownership and sustainability. By incorporating these recommendations, governments can not only stimulate economic growth, but also ensure sustainable and equitable development for the entire population.

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