Which Institutions for Sustained Economic Growth?

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Abstract

This paper seeks to identify the most important institutions for economic growth sustainability (EGS). While basing on the endogenous growth theory à la Romer (1986), I identify total factor productivity as a channel by which institutions affect EGS. I define sustained economic growth as an episode of positive growth of per capita GDP over five consecutive years. The results of econometric estimates with a sample of 123 countries including 85 developing and 38 developed countries, using panel data over the 1960-2003 period, indicate that an improvement in the respective quality of democratic, economic activities regulation, and property rights institutions, is favourable for EGS. However, regulation institutions seem to be the most important one for EGS. My main results successfully pass several robustness checks, and the positive link between "good" institutions and EGS is illustrated by a case study with three African countries: Botswana, Ivory Cost, and Ghana.

1. Introduction

In 1965, the growth rate of per capita GDP in Niger and Nigeria was respectively 2.1% and 4.2% against 2.9% in Botswana[1]. However, from 1966 to 1969, Niger and Nigeria recorded a negative growth rate, while Botswana continued to record a positive growth rate over the same period. In 1990, the growth rate of per capita GDP was 1% in Ghana against 5.2% in Nigeria, but from 1991 to 1994, the growth rate was negative in Nigeria as opposed to Ghana. Why this difference in the evolution of growth episodes between countries? In other words, why economic growth is more sustainable in some countries than in others?

The answer to this question is fundamental for at least two reasons. First, durable poverty reduction requires sustained economic growth. Second, in the absence of sustained growth, policymakers need to constantly re-examine their policies. In this situation, private economic agents also continually re-examine their projects of investment, which increases the risk of bad economic performances. Thus, policymakers need to identify the framework allowing them to make sustainable economic growth as soon as they succeed in generating it.

The thesis that I support in this paper, is that economic growth sustainability - henceforth EGS- requires "good" institutions. I define "good" institutions as those which guarantee lower costs of investments and the appropriation of the return of investments to private investors. "Good" institutions enable private investors to take advantage of favourable business opportunities in form of positive economic growth. In fact, private investors prefer lower costs for their investments -this is a guarantee for a large wealth creation-; they also want to be able to reap a significant share of the return of their investments when they invest. These two conditions are satisfied by the presence of "good" institutions, in the absence of which, some favourable business opportunities may not be seized by private investors, what would result in reducing the probability of EGS.

Rodrik (2004) also supports that "good" institutions are necessary for EGS. *The first objective of this article is to empirically test this assumption and especially to identify the most important institutions for EGS.* In so doing, I analyze the *respective and the relative impact on EGS,* of *democratic, private property rights protection, and economic activities regulation institutions*. The reasons of the choice of these three types of institutions as their respective role for EGS are mentioned in the rest of the article. The second objective of my article is to identify the mechanism by which "good" institutions could involve EGS. In this

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[1] Data on growth rates are from WDI (2005) -World Development Indicators- database of World Bank.

case I support that *"good" institutions by their favourable effects on private investment involve an increase in total factor productivity -henceforth TFP- which induces a gain of economic competitiveness, necessary for EGS. Such is the mechanism by which "good" institutions could affect EGS and that I will empirically test.*

This article tackles the general question of the role of institutions for economic performances, treated among others, by Acemoglu et al. (2001) and Hall and Jones (1999). However, opposite to these authors who are interested in the effect of institutional quality on the level of per capita income, this article is interesting in the effect of institutional quality on EGS, which seems to be one of the best measurements of economic performance. Indeed, the more a country's economic growth is sustainable, the higher its per capita income will be, especially when the growth rate is high. EGS is thus the necessary input for the determination of a country's income level, which is the outcome of the level and the sustainability of economic growth.

Moreover, by focusing on EGS, I take into account in this article the objection of Pritchett (2000) according to which economies experience various phases of growth in the course of time and that, the calculation of the averages of growth rates over a long period induces a loss of useful information to scholars. As a result, while studying EGS, I do not calculate average growth rates over a long period, but I observe the evolution of growth rates over five consecutive years and try to investigate whether the durability of economic growth episodes could be due to institutional quality.

Empirically, this article is relatively closer to the ones of Hausmann et al. (2004, 2005) and Jerzmanowski (2005). However, while these authors are interested in the changes of economic growth regimes, this article is interesting only in the durable character of growth, regardless of the fact that this growth characterizes or not a change in economic growth regimes. Moreover, Hausmann et al. (2004, 2005) privilege political institutions and find a positive and significant effect of these institutions on growth accelerations. As for Jerzmanowski (2005), he privileges economic institutions and finds a positive and significant effect of economic institutions on the occurrence of favourable and durable changes in growth regimes. In opposite, this article seeks to identify the most important institutions for EGS by confronting the effects of three various types of institutions, of which a political institution -democracy- and two economic institutions -regulation, private property right-. In the same way, contrary to Hausmann et al. (2004, 2005) and Jerzmanowski (2005), I am interested in the analysis of the mechanism of transmission of the effect of institutions on EGS. Lastly, to my knowledge, Hausmann et al. (2004, 2005) and Jerzmanowski (2005), do not solve the

endogeneity problem in their models, this article tries to overcome this kind of shortcoming by using the GMM system method of Blundell and Bond (1998).

The remainder of the paper is organized as follows. Section 2 presents the various characteristics of EGS from 1960 to 2003. Section 3 expounds the various theoretical arguments of "good" institutions' effects on growth sustainability. Section 4 is devoted to empirical analysis. Section 5 presents the results. Section 6 is devoted to a case study comparising the performances of Botswana, Ivory Cost, and Ghana in terms of EGS and quality of institutions. Section 7 concludes.

2. Economic growth sustainability characteristics

The study of the characteristics of EGS is carried out through the spatial and temporal analyses of the evolutions of the probabilities of EGS. The calculation of these probabilities is carried out -because of data availability- by supposing on average that each 5 years, 110 countries have the necessary observations to judge their EGS. With 9 sub-periods of 5 years, the total number of EGS possibilities amounts 990. To obtain the probabilities of EGS over the 1960-2003 period, I divide the number of countries having experienced sustained economic growth by the 990 total possibilities. The periodic probabilities are obtained by dividing the number of countries having experienced sustained growth by the number of countries likely to experience sustained economic growth during a given five-year period.

In table 1, it appears that EGS over the 1960-2003 period is not a rare phenomenon, since the probability for a representative country of my sample to experience sustained growth during this period is 0.36, that is to say, roughly two five-year periods out of five. But, the probability of high growth sustainability is only 0.21 during the same period. Thus sustaining a high economic growth seems relatively more difficult.

For the whole sample, the period preceding that of the oil crises -end of the seventies, beginning of the eighties- is more favourable for EGS. During the period of the oil crises, the chance of EGS in a country of my sample, relatively to the previous period is almost reduced by half. Soon after the oil crises, the number of countries having experienced sustained growth, immediately increased, before diminishing during the first five-year term of the nineties. At the end of the nineties, the probability of EGS reached its value of the period preceding the oil crises, whereas it was not the case for high EGS.

This overall picture of EGS evolution masks differences between groups of countries. In fact, even if the period preceding the oil crises is more favourable for EGS for all the countries, it appears in general that a developed country is more likely to experience sustained

Table 1: Characteristics of economic growth sustainability from 1960 to 2003

Periods	Countries 2/	Total countries 3/	Periodic Probability 4/	Probability DC 5/	Probability UDC 6/	Probability SSA 7/	Probability LAC 8/	Probability ASP 9/	Probability ME 10/	Probability ECE 11/
Probabilities of economic growth sustainability 1/										
61-64	44	94	0.47	0.75	0.37	0.22	0.40	0.60	0.29	..
65-69	44	97	0.45	0.88	0.31	0.21	0.36	0.53	0.00	1.00
70-74	43	100	0.43	0.67	0.34	0.24	0.40	0.53	0.00	1.00
75-79	24	104	0.23	0.18	0.25	0.08	0.20	0.47	0.44	1.00
80-84	26	112	0.23	0.35	0.19	0.11	0.00	0.60	0.19	0.50
85-89	38	114	0.33	0.69	0.20	0.14	0.20	0.40	0.09	0.33
90-94	26	120	0.22	0.17	0.24	0.07	0.28	0.60	0.20	0.00
95-99	53	121	0.44	0.72	0.32	0.38	0.20	0.40	0.27	0.40
00-03	58	121	0.48	0.69	0.39	0.41	0.16	0.47	0.45	1.00
Total	356									

Periods	Counties	Total countries	Periodic Probability	Probability DC	Probability UDC	Probability SSA	Probability LAC	Probability ASP	Probability ME 1	Probability ECE
Probabilities of high economic growth sustainability 12/										
61-64	29	94	0.31	0.58	0.21	0.13	0.20	0.33	0.29	..
65-69	29	97	0.30	0.56	0.21	0.13	0.16	0.47	0.00	1.00
70-74	27	100	0.27	0.41	0.22	0.16	0.32	0.20	0.00	1.00
75-79	17	104	0.16	0.18	0.16	0.04	0.04	0.40	0.33	1.00
80-84	13	112	0.12	0.06	0.14	0.11	0.00	0.47	0.00	0.50
85-89	22	114	0.19	0.41	0.11	0.07	0.04	0.33	0.00	0.33
90-94	14	120	0.12	0.06	0.14	0.03	0.08	0.53	0.10	0.00
95-99	25	121	0.21	0.31	0.16	0.14	0.12	0.40	0.09	0.00
00-03	29	121	0.24	0.28	0.22	0.28	0.00	0.33	0.09	1.00
Total	205									

Note: 1/ I define sustained economic growth as a positive growth of per capita GDP during five consecutive years. My sample is composed of 123 countries among those, are 85 developing countries and 38 developed countries. But, all the countries do not have at all periods sufficient data to judge the sustainability of their economic growth.

2/ This is the number of countries having experienced positive economic growth during five consecutive years.

3/ Denotes the total number of countries for which I have sufficient number of observations to conclude about the sustainability of their economic growth during a given period.

4/ The periodic probability of economic growth sustainability is calculated by the ratio of the number of countries having experienced sustained growth, with the total number of countries for which I have sufficient observations to judge the sustainability of their growth during a given period.

5/ Denotes the probability for a developed country -according to the World Bank classification- to experience sustained growth during a given period. This probability is calculated in the same manner as in the general case mentioned above.

6/ Denotes the probability for an underdeveloped country -the ex-communist countries of Europe not classified by the World Bank are also regarded as developing countries- to experience sustained growth.

7/, 8/, 9/, 10/, 11/ Respectively denotes the probability for a Sub-Saharan Africa, Latin America and Caribbean, Asia and Pacific, Middle-East and North Africa, and Eastern and Central Europe country to experience sustained growth during a given period. The value of 1 for Eastern Europe must not surprise because the available data for this region are generally from Latvia which generally experiences good economic growth. It is only at the end of period that the available data for this region increases.

12/ By high economic growth, I mean an annual growth of GDP per capita of at least 2% observed during five consecutive years. Indeed, Hausmann et al. (2004, 2005) support that it is the rate to which should grow an economy to converge towards the industrialized countries.

economic growth than a developing country.

The evolution of EGS probabilities in developed and developing countries reveals a difference -which is especially observed after the oil crises- in the cycle of EGS between these two categories of economies. In developed countries, the five-year term following the oil crises was marked by an increase in the number of countries having experienced sustained growth, whereas the 1990-1994 period was marked by a reduction in this number. Thus, developed countries quickly recovered from the oil crises, but not durably because of the disturbances of financial and exchanges markets that marked some of the European countries at the end of the eighties and the beginning of the nineties; and because of the Golf war. During the last two five-year terms, the probability of EGS in developed countries reached its value of the period preceding the oil crises, but a small decline in the value of this probability is observed during the last five-year term maybe because of the 11th September 2001 events.

In developing countries, the recovery from the oil crises was not immediate and the recovery started during the 1990-1994 period. This recovery was progressive with a clear improvement in the situation during the last five-year term, when the probability of EGS reaches its value of the period preceding the oil crises. Thus, there is difference of EGS cycle between developed and developing countries. However, even among developing countries, there are also differences in EGS cycles.

The countries of Asia and Pacific, compared to the other developing countries are atypical in terms of EGS, because in general the probability of EGS for a country of this region is always higher than that of the representative country of my sample.

The evolution of EGS probability for North Africa and Middle-East countries shows that, for this group of developing countries, the most favourable period for EGS is that of the first oil crisis. In this region, the recovery from the second oil crisis was done with delay and in a progressive way. There is a clear improvement in the value of EGS probability during the last five-year term, especially due to the increase in the number of North African countries with positive growth rates.

In Sub-Saharan Africa, the most favourable period for EGS is the last two five-year terms. This could be considered as the manifestation of the effects of economic reforms - structural adjustment, devaluation of CFA franc- and political reforms -beginning of democratization- introduced into Sub-Saharan Africa during the 1980s and the 1990s. The cycle of EGS, soon after the oil crises in Sub-Saharan Africa is similar to that of developed countries, which to a certain extent, reflects the narrow connection between this region's economies and those of developed countries. In fact, we observe an upturn of economic

activities in Sub-Saharan Africa just after the second oil shock and a stop of this upturn five years later, like in developed countries.

In Latin America and the Caribbean, the period preceding the oil crises is more favourable for EGS. The region was essentially marked by the second oil shock during which none country of this region experienced EGS. In Latin America and the Caribbean, the recovery from the oil crises was immediate, and characterized by the increase in the value of EGS probability during the first decade after the second oil shock. This trend of economic activities upturn stopped from the 1995-1999 period, because of financial crises recorded by Latin American economies. The breaking off of economic activities upturn was especially felt in terms of high growth sustainability, since during the last five-year term none country of this region experienced a high sustained economic growth.

In Central and East European countries, after the oil crises, the last five-year term is more favourable for EGS. This situation could be considered as the manifestation of positive effects of the reforms introduced into this region at the beginning of the 1990s.

It appears that over the 1960-2003 period, developed countries have more chance than underdeveloped countries to experience sustained growth. This situation is revealed through descriptive statistics that I have just analyzed, and arouses the interest of the analysis of the effect of institutions on EGS, since on average, the quality of institutions in developed countries is better than that in developing countries.

3. Theoretical arguments of "good" institutions effects on growth sustainability

As Rodrik (2004) mentions it, sustaining economic growth differs from igniting it, and for Rodrik sustained economic growth requires "good" institutions. I support that *an economy experiences sustained growth when it is competitive[2]*. If an economy is not competitive, it has a lot of chance to record a short time positive growth. Indeed, a non competitive economy may record an increase in its imports[3] and/or a drop in its exports. The drop in exports and/or the increase in rival imports are all factors likely to induce a drop in economic activities and so, unsustained economic growth. One good way for an economy to be competitive is to increase its *total factor productivity*, thanks to its institutional quality. I explore the track of

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[2] This argument constitutes one of the assumptions of my theoretical reasoning. With such an argument I do not call into question the positive effect of economic competitiveness gain on the level of economic growth as it is often admitted in the literature, but I support that the gain of economic competitiveness can also be a source of economic growth sustainability.
[3] I do not deny the positive effect of equipments imports for the development of investment, but I consider as a possible threat any massive import competing with local products.

the effect of institutions on TFP[4], by resorting to theoretical arguments of institutional quality effects on *government failures*[5] preventing the development of private investment, and to the endogenous growth theory à la Romer (1986).

"Good" institutions, by reducing government failures, contribute to the development of private investment. The increase in private investment involves an increase in TFP also called the residual of Solow, due to the positive externalities of private investment accumulation on workers skill, because of the learning by doing effect[6] highlighted by Romer (1986). Thus, TFP is doubly endogenized as it depends on the accumulation of private investment which in turn depends on the institutional quality.

I support that *"good" institutions enable an increase in private investment by increasing private investment's return due to the reduction in investment costs, and by guaranteeing to private investors the appropriation of a significant share of their investments' return. Indeed, no increase in private investment is possible if private investors are not sure to make profits and to get a significant share of these profits when they invest.*

However, the existence of "good" institutions may not be enough to boost private investment; the business opportunities must also be favourable. These favourable business opportunities are among other things: the level of demand on national and international markets, favourable terms of trade, a competitive real exchange rate, etc. For private investors all these opportunities result in concrete terms in economic growth rates. A positive growth rate reflects the existence of good opportunities and a negative growth rate reflects the absence of opportunities.

When private investors react to favourable opportunities by increasing their investments, there are an increase in TFP[7], an improvement in economic competitiveness, and

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[4] Institutions can also affect the level of an economy's competitiveness by its favourable effect on technological adoptions and innovations. Some authors like Acemoglu et al. (2002) support that the introduction of technological innovations depends on the nature of political institutions in a country, the stability of political power, and the manner the politicians perceive technological innovations. In addition, Acemoglu et al. (2004) support that when a country is not far from the world technological frontier, the political decision makers of this country, can boost the development of technological innovations by promoting the entry into the market of more talented private investors. The same authors support that, in contrary when a country is technologically back warded, it can catch up by adopting the technologies developed by other countries due to the protection granted to the investors already established on the market. Scarpetta et al. (2002) and Stephen et al. (1994), argue that when a country is technologically back warded, a strong regulation of economic activities can prevent technological adoption.

[5] Stern (2001) presents different government failures preventing the development of private investment.

[6] However, it is not only the volume of investment which is necessary for TFP increase, but the efficiency of investment is also for something in TFP increase.

[7] My arguments suppose that private investors who seize favourable opportunities because of good institutions do not have any problem of liquidity constraint. This supposition is coherent with Tornell et al. (1992) argument according to which some poor countries are victim of capital flight because of a weak protection of private property in these countries. The capital flight reduces the available capital for private investors.

EGS. But the reaction of private investors to the favourable opportunities depends on the quality of institutions. As a result, not all favourable opportunities are seized by private investors. Only opportunities in presence of "good" institutions are seized.

3.1 Institutions for the reduction of private investment costs and EGS

When private investors decide to invest, they aim to maximize their profits. One way to achieve this goal is to minimize their investments costs. In an economy, private investors face different investments costs, but I especially identify three kinds of costs: *the costs due to distorsive policies implementation, costs of new enterprises creation, and costs of achievement of economic and financial transactions.* These three kinds of costs do not depend on private enterprises and are imposed to them by policymakers. The amount of these costs depends on country's institutional quality, this is why I focus my theoretical reasoning on the institutions relating to these costs.

3.1.1 Democracy: A political regime reducing the cost of distorsive policies

Democracy is a type of political regime likely to assure to private investors lower costs related to distorsive policies -costs of high inflation, unsustainable deficit, etc- because democracy reduces the risk of distorsive policies undertaking. In this case, democracy contributes to the reduction in the cost and the development of private investment. By favouring the development of private investment, democracy involves an increase in TFP, so can contribute to EGS[8].

By supporting that democracy reduces the risk of distorsive policies undertaking, my argument is in the same line like the one of scholars who defend the benefits of democracy for policies choice. In fact, in this domain scholars' opinions diverge. In the one hand we have authors like Nordhaus (1975) who support that democracy can involve distorsive policies in court period because of electoral considerations. In the same vein, Barro et al. (1983) mention temporal inconsistency problems to support the risk of inflation in democratic regimes. On the other hand, we have authors like Wittman (1989, 1995) and Baba (1997), who show that, the more a political regime is democratic, the more the process and the choice of policies are transparent, so the risk of undertaking policies which aim to serve leaders personal interests is reduced. My argument concerning democracy is closer to those last listed authors. Barro

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[8] Some authors like Rodrik (2000), Acemoglu et al. (2003) and Quinn et al. (2001) show that democracy contributes to the reduction of economic growth volatility. By this way democracy can also contribute to EGS.

(1996) reconciles the two possible effects of democracy by establishing a non-linear relation between democracy and economic growth, because of the impact of democracy on the macroeconomic policies quality.

The role of democracy for policies quality can be well understood in the context of developing countries, where distorsive policies are implemented because of socio-politic factors and the weakness of political institutions. In fact, in poor countries where leaders have the entire decision making power and are not subject to any political or institutional constraint, these leaders undertake socially inefficient economic policies to grow rich, enrich their partisans, and to ensure their remain at the head of the nation[9]. Bates (1981) puts forward this argument for African countries in general and for Ghana in particular. Bevan et al. (1999) document the case of Nigerian political leaders. Acemoglu et al. (2003) document the case of Argentinean political leaders and those of other Latin American countries [10]. In all these cases distorsive policies were pursued with the aim to stay in power and in the context of political institutions weakness. From these examples on specific countries, I can support that democracy is a political regime where leaders could not undertake distorsive policies for at least three reasons mentioned in the literature.

First, in democracy leaders are usually subject to institutional constraints that do not allow them to implement policies of their choices. This argument is mentioned by Acemoglu et al. (2003) and especially Rodrik (1999) who supports that, in a democracy, the choice of policies to implement results normally from a political consensus. This limits the power of political leaders to implement policies exclusively favourable for their political group. In doing so, distorsive policies usually have a limited chance to be implemented in democratic countries unless it is the will of the whole political class.

Second, in democracy elections are regularly organized. In this situation, leaders have no interest to implement distorsive policies like high inflation, likely to negatively affect the population welfare, otherwise leaders risk to be sanctioned during the next elections. In this case, democracy exerts a dissuasive effect on political leaders for distorsive policies

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[9] Seldon (1975) reports that even Milton Friedman, who describes famously inflation always and everywhere as a monetary phenomenon, during a seminar has finally made a difference between the apparent cause of inflation -high money supply- and deep causes -political and social causes- of inflation.

[10] Acemoglu et al. (2003) also show that for political reasons, in Peru President Garcia (1985-1990) decided to increase the salaries in public sector, which resulted in the doubling of public deficit which increased from 4.4% of GDP in 1985, to 9.9% of GDP in 1987. In Chile, President Allende (1970-1973) also for political reasons, in 1971 decided an increase from 37% to 41% of workers class wage which involved a rise of public deficit from 3% to 10% of GDP.

implementation. Such argument is found with Rodrik (1997) who supports that, in democracy the choice of policies reflects the preferences of the median voter.

Third, Persson et al. (1997) support that the separation of power between the executive and the legislative power, involves a reciprocal discipline of the both powers and make them accountable to citizens for the choice of policies. Thus, the nation is protected against an abuse of power from politicians. So, in the logic of these authors, the implementation of distorsive policies can be considered as an abuse of power which is less likely to be present in democratic regimes.

Theoretically, it appears that democratic countries are those which would less implement distorsive policies and empirically some authors have indeed found such a result. For this purpose, I quote the work of Satyanath et al. (2004) who show in a sample of developed and underdeveloped countries that, democracy is the most robust determinant of macroeconomic stability in the long term. In the same way, Hamann et al. (2002), out of 51 episodes of successful inflation stabilization, from an annual inflation rate higher than 40%, show that democracy is one of the factors contributing to the successful inflation stabilization. Acemoglu et al. (2003) show that, distorsive policies, economic crises, and slow economic growth are due to the political institutions weakness.

Thus, theoretically and empirically there are bases which enable me to support that the more democratic countries, are those which implement less distorsive policies. So, I can support that democracy can contribute to EGS by reducing the risk of distorsive policies implementation and consequently the cost of private investments.

3.1.2 Regulation institutions facilitating the creation of enterprises and the achievement of economic and financial transactions

Costs of new enterprises creation and the achievement of economic and financial transactions, when they are too high, constitute an obstacle to the development of private investment. So, these costs can prevent EGS. Therefore, I argue that an efficient economic activities regulation is likely to induce EGS by favouring the development of private investment and TFP increase. *By efficient economic activities regulation, I mean a regulation which reduces government and market failures while assuring a good functioning of the markets.* Thus an efficient regulation should reduce the protections granted to the least efficient enterprises, while supporting the entry into the market of the dynamic and innovative investors. In the same way, an efficient regulation should guarantee lower costs of private

investments and increases their returns. This is a positive incentive for private enterprises already present on the market, to take advantage of favourable business opportunities.

While defending that efficient economic activities regulations are necessary for the development of private investment, my argument is in the same line as the one supported by Stigler (1971), McChesney (1987), and De Soto (1990) in the line of "public choice theory."[11] Stigler (1971) supports that early established private investors, can offer to policymakers, advantages like political parties financing, electoral campaigns financing and electoral voices, in order to receive in return a protection of their markets due to a strong regulation of new enterprises creation. As for McChesney (1987) and De Soto (1990), politicians regulate economic activities with the aim to create and exploit rents situations in forms of electoral campaigns financing and electoral voices. These politicians offer in return a protection of markets to the enterprises already present on the market.

Empirically, Giuseppe et al. show that flexible regulation of products market in the OECD countries favours the development of domestic and foreign investments in these countries. In the same way, Besley et al. (2004) show that the Indian States which amended the regulation of labour market in favour of workers are those which record a slow growth of investment in the formal manufacturing sector. Many other works show that the regulation of labour market explains differences in economic performances among OECD countries [see Freeman (1988), Blanchard (2003), and Nickell et al. (2000)].

Thus, theoretically and empirically, there are bases allowing me to support that an efficient economic activities regulation favours the development of private investment. I argue that, by favouring the development of private investment, an efficient economic activities regulation involves an increase in TFP and consequently EGS.

3.2.2 Property rights protection for economic growth sustainability

When private investors decide to invest, they are concerned with the amount of wealth they will create on the one hand, and with the possibility to reap a significant share of this wealth, on the other. If the two conditions are not satisfied, there could be under-investment. Institutions ensuring the protection of property rights are necessary for the development of private investment and EGS. When the protection of property rights is assured, private

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[11] In opposite, Pigou (1938) with the logic of "public interest theory" of regulation is based on the existence of market failures -namely negative externalities like pollution, monopoly position on the market etc- to make public intervention in form of strong regulation of economic activities, a need to correct these market failures and to ensure good market functioning. For a presentation and a test of various theories of regulation, see Djankof et al. (2001, 2002).

investors' fear of not being able to appropriate a significant share of their investments' return is reduced. In this case, one can observe an increase in private investment, TFP, and therefore EGS.

Demsetz (1967) and Alchian et al. (1973) support that a good protection of property rights, constitutes a positive incentive for private investment accumulation. North et al. (1976), North (1981) and Jones (1981) argue that property rights protection induces better allocation of private investors' resources. By this way, a good protection of property rights can also contribute to EGS.

Empirically, Besley (1995), through a study in two villages of Ghana finds that the protection of property rights increases the rate of investment on the cultivated piece. Johson et al. (2002) show that the protection of property rights is a necessary and sufficient condition for the development of private investment in the ex-communist European countries. Svenson (1998) shows that in an environment of political instability and social polarization, political leaders have little incentive to ensure the protection of property rights. In this situation private investment level decreases.

So, I support like Rodrik (2004) that "good" institutions are necessary for EGS. *"Good" institutions reducing the cost of private investment, and guaranteeing to private investors the appropriation of the return of their investments, are necessary for the increase in private investment and TFP. The increase in TFP induces a gain of economic competitiveness which is necessary for EGS.*

My theoretical reasoning can be schematically summarized as follows:

"Good" institutions → Increase in private investment → Increase in total factor productivity → Economic competitiveness gain → Economic Growth sustainability

This theoretical reasoning implies a following chronology of events:

1. At time t, private investors in a country observe the economic growth rate. If the growth rate is positive, this is a revelation of favourable business opportunities for private investors.

2. Private investors take into account the level of institutional quality before deciding to seize these favourable opportunities. They must be sure that the institutions in place enable them to make a significant profit and to reap a significant share of this profit, while seizing the favourable opportunities which are offered to them.

3. When private investors decide to seize the favourable opportunities by increasing their investments, they positively affect total factor productivity level and economic competitiveness level. By doing so, the probability of EGS increases.

4. Empirical strategy

My identification strategy comprises three main steps. First, I estimate the bivariate relationship between institutions and EGS. The second step takes into account the effects of private investment and TFP, which are possible channels of transmission of the effect of institutions on EGS. The third and last step consists in testing the effect of institutions on EGS while controlling simultaneously for TFP, private investment, macroeconomic policies, and initial economic conditions. This strategy in three steps allows me to better test my arguments, and to better measure the effect of the various variables.

4.1 Description of variables

The theoretical argument that I support makes necessary the presence of "good" institutions for EGS. These institutions are economic as well as political. I am particularly interested in democratic, property rights, and regulation institutions.

The regulation and property rights indexes are those of *Fraser Institute*[12] and cover the 1970-2003 period. The values of these indexes are provided each five years until 2001, date from which their annual values are available. I calculate the average values of these indexes from 2001 to 2003 to complete my data. *The regulation index measures the regulation of credit markets, labour markets, and business. The property rights index measures the levels of rule of law and property rights enforcement.* The respective value of these both indexes varies between 0 and 10; a high value corresponds to an institution of high quality, i.e. a good protection of private property rights and freedom to undertake economic activities.

As for the democracy index, I obtain it from *Freedom House* and it measures the citizens' participation in political process including the right of voting, the competition for official posts, and the choice by vote of political decision makers with a real power on the choice of policies. The value of this index varies between 1 and 7 with a high value indicating low quality of democratic institutions. The value of this index is provided from 1972 to 2003

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[12] *Fraser Institute* provides a composite index called index of economic freedom. This index is an equal addition of five elements. These five elements are: size of Government, legal structure and property rights security, access to sound money, freedom to trade internationally, and regulation of economic activities. I prefer to consider only two components of this index, because they better measure the institutional aspect that interests me, and because I want to avoid assimilating some macroeconomic policy variables to institutions.

and I calculate the five years average values of this index from 1975 to 2003. To reduce the number of missing observations, I consider the value of this index in 1972 as its average value for the first five-year term of the 1970s, and the average value over the 1973-1974 period, as its average value for the second five-year term of the 1970s. In order to make easier the interpretation of the democracy index variation, I take the reverse of its values.

The explained variable, i.e. *economic growth sustainability* is measured through the observation of per capita GDP growth rates during five consecutive years over the 1960-2003 period. Thus, a country is considered to have experienced sustained economic growth, if its economic growth rate is positive during five consecutive years. In this case, the dependent variable takes the value of one. However, even for one year of negative growth over five years, a country's economic growth is considered as unsustained and in this case, the dependent variable takes the value of zero. So my dependent variable is a binary variable.

Some people could suggest running my regressions with duration models, what would have enabled me not to impose the five years duration for the definition of EGS, and to take account the real duration of each episode of positive growth. Unfortunately, my variables of interest -institutions and TFP- are not provided annually but in a quinquennial way. This obliges me to give up the duration models, because the data provided each five years do not coincide with the beginning of the episodes of positive growth[13]. Thus, in spite of some limits of my method, this one has the advantage of enabling me to carry out the analyses with the data at my disposal. I thus manage to identify the institutions as well as the other factors allowing countries to maintain a positive economic growth over five consecutive years.

4.2 Specification of the model

The choice of a period of five years to define EGS can seem arbitrary but it is imposed to me by the availability of the data on economic institutions, which are provided in a broad part, each five years period. In fact, there are other databases on economic institutions, but the one of *Fraser Institute* is more adapted to my paper. First, the *Fraser Institute* database has a long temporal dimension because going back to the 1970s. To my knowledge, it is the only database on economic institutions with this temporal depth and available at the moment.

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[13] Indeed, a good application of the duration models requires the use of the values of the explanatory variables at the beginning of period or the average values of these variables over all the period during which the explained variable is in a state A before its passage to state B. Unfortunately, my explanatory variables of interest - institutions and TFP- are in major part provided each 5 years, this makes that none of the conditions for a good application of the duration models seems satisfied.

Second, this database contains the economic institutions indexes that I need to test my theoretical arguments.

If the arbitrary character for the duration of EGS definition can be justified, giving a value of zero to the explained variable for a country that has just experienced one or two years of negative growth, despite a good performance during the other years, can constitute another limit of my model. To overcome this limit, I control for temporal fixed effects. In this case, EGS could not be explained any more by a covariant shock which affects at the same date all the economies[14]. In the same way, I control for country fixed effects. In this case, EGS could not be explained any more by unobservable characteristics of an economy. In addition, one of the goals of my article is to identify the most important institutions for EGS. While considering these various points, the models to estimate are as follows:

$$\text{Prob}_{it} \ [(g_{t0}, g_{t1}, g_{t2}, g_{t3}, g_{t4}) > 0 \ | \ (c, \text{prop}_{it}, u_i, v_t \ )] = G \ (c, \text{prop}_{it}, u_i, v_t) \qquad (1)$$

$$\text{Prob}_{it} \ [(g_{t0}, g_{t1}, g_{t2}, g_{t3}, g_{t4}) > 0 \ | \ (c, \text{reg}_{it}, u_i, v_t \ )] = G \ (c, \text{reg}_{it}, u_i, v_t) \qquad (2)$$

$$\text{Prob}_{it} \ [(g_{t0}, g_{t1}, g_{t2}, g_{t3}, g_{t4}) > 0 \ | \ (c, \text{dem}_{it}, u_i, v_t \ )] = G \ (c, \text{dem}_{it}, u_i, v_t) \qquad (3)$$

$$\text{Prob}_{it} \ [(g_{t0}, g_{t1}, g_{t2}, g_{t3}, g_{t4}) > 0 \ | \ (c, \text{prop}_{it}, \text{reg}_{it}, \text{dem}_{it}, u_i, v_t \ )] = G(c, \text{prop}_{it}, \text{reg}_{it}, \text{dem}_{it}, u_i, v_t) \qquad (4)$$

Prob_{it} measures the probability for a country to experience sustained economic growth. Precisely, it is the probability for a country to experience a positive growth of per capita GDP over five consecutive years. U_i is the country fixed effects, v_t is the temporal fixed effects, and c is the constant. G is a linear function or a normal cumulative distribution function depending on the estimate method used.

In equations (1), (1), (3), (4) prop_{it}, reg_{it}, and dem_{it} respectively denote the index of property rights, the regulation index, and the democracy index, in country i, at time t. In those equations, the other variables are defined like above. Equations (1), (2), (3), enable me to estimate the *respective effect* of each institution on EGS, i.e. the specific effect of an institution, ignoring the effect of the other institutions. As for equation (4), it enables me to estimate the *simultaneous effect* of various institutions on EGS, i.e. the observed effects when all the institutions act at the same time but each one with its own effect. By estimating equations (1), (2), (3), and (4), it then becomes possible to identify the most important institution(s) for EGS. *An institution would be considered as most important for EGS, if its*

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[14] As a robustness check of my results, I also control for terms of trade in order to take into account the specific shocks affecting each country. In this case, my results do not change. Moreover, as another robustness check, I reduce the durability of economic growth for EGS definition to three consecutive years of positive growth, and my main results are also not affected. Those results are not shown but are available upon request.

specific effect on EGS is positive and significant, and its effect remains positive and significant despite considering simultaneously the effects of the other institutions.

My various models are estimated with a sample of 123 countries including 85 developing countries, 38 developed countries, and 78 countries ex-colonies[15]. As one can note it, my empirical strategy has several advantages.

First, to my knowledge my paper constitutes the first which studies the effect of institutions on EGS, as generally in empirical works, scholars study the effects of institutions on the level of per capita income, growth rate, or on the changes in growth regimes.

Second, my paper is one of the few papers studying the effects of institutions on economic performance with panel data. In fact, generally scholars use cross-section data, because the data on institutional quality often used are of short temporal dimension, and because of a low temporal variability of institutional indexes. Thus, obtaining a significant effect of institutions on EGS with panel data could be an interesting result because of the advantages of panel data estimations[16].

Third, my empirical strategy makes it possible to estimate the respective, and the simultaneous effect of three various institutions on EGS. This strategy enables me to identify the most important institutions for EGS, which constitutes one of the main contributions of my article. Moreover, I test the effects of a political institution and two kinds of economic institutions on EGS. This procedure is also another good point of my paper, because I avoid reducing institutions to democracy or to the protection of private property rights, as it is often done in the empirical studies. Last and not the least, as it will appear throughout this paper, TFP will be highlighted as a channel by which institutions affect EGS. To my knowledge, my article would be the first to empirically establish such a result.

4.3 Methods of econometric estimation

If my empirical strategy has several advantages, the reliability of my various results requires the correction of endogeneity presents in my models. Indeed, if it is possible that good institutions determine EGS, it is also possible that countries which can experience a sustained growth are also the ones that can offer good institutions. In addition, because of the

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[15] The list of the countries is at appendix.

[16] For the whole sample, I get the following statistics for the various institutional quality indexes:
Standard deviation over the whole 1960-2003 period: Reg = 1.109; Prop = 1.934; Dem = 0.335.
Between Standard deviation: Reg = 0.904; Prop = 1.610; Dem = 0.307.
Within Standard deviation: Reg = 0.625; Prop = 0.976; Dem = 0.142.
As one can note it, the Within Standard deviation for the various institutional indexes is relatively lower.

subjective character of institutional quality measurement, one can not exclude the possibilities of measurement errors in the various indexes of institutional quality likely to involve biased results. Countries equipped with good institutions can also have other factors favourable for EGS, the omission of which, can also involve endogeneity. Thus, the three traditional sources of endogeneity can be present in my data.

However, I do not have suitable instruments based on natural experiments for institutions because I use panel data and the most used instrumental variables for institutions are constant in time. Moreover, since I want to compare the effect of three various kinds of institutions on EGS, normally I need at least three instrumental variables for institutions which are difficult to find.

To solve the endogeneity problem, I resort to GMM system method of Blundell and Bond (1998). The GMM system is the best tool that I can use for a good empirical analysis in this paper. In fact, whatever the origin of endogeneity in my data, and the number of endogenous variables, the GMM system allows me to solve the endogeneity problem by using adequate lagged values of endogenous regressors as instruments. One of the criticisms to the GMM system is that, it allows the researcher to use a huge number of instrumental variables. In order to stage this limit, in the majority of my estimates, I take care to use only the first two lagged values of the explanatory variables as instrumental variables, which enables me to use a reasonable number of instruments.

The use of GMM system technique within the framework of this paper presents some problems, as its application to my data means the use of linear probability model because of the binary character of my explained variable. In general, when one uses linear probability models, it is possible that the predicted explained variable takes values lower than 0 or higher than 1. That is one of the main limits of the linear probability models, since the value of a probability is supposed to be ranged between 0 and 1. So, the number of observations for which the predicted explained variable is not ranged between 0 and 1 has to be checked. If for the majority of the observations, the predicted explained variable varies between 0 and 1, the limit relating to the interval of variation of the predicted explained variable when one uses the linear probability models is no longer a concern (see Wooldridge 2000, chapter 7).

As, other linear probability models, I use OLS with pooled data, and fixed effects method to estimate my models. The fixed effect model, in the framework of this paper is a linear probability model in which I control for individual and temporal fixed effects, and so reducing the endogeneity problem. The use of OLS and fixed effect estimates can be seen as a test of robustness compared to GMM system method results, at least for the sign of the

coefficients. Moreover, by comparing the results of the fixed effect model with those of the GMM system, I will be able to identify the source of endogeneity in my data.

I also use probit model to make estimations with my panel data. In this case, it is sure that the predicted value of the explained variable varies between 0 and 1. However, the version of probit model with specific effects which is currently programmed on Stata, presents the limit to be applied with random effects by making the strong assumption of the independence of countries specific effects compared to the explanatory variables[17].

My various models will thus be estimated with four various methods of econometric technique, which makes it possible to test the robustness of my results, compared to the estimation methods. However, of all the results, those obtained with the GMM system method seem more convincing, because in this case I control for individual and temporal fixed effects, and I also correct for the endogeneity of the various explanatory variables.

5. Results

Table 2 shows that independently of the estimation method, each type of institution positively and significantly affects the probability of EGS. Thus, as I theoretically support it, the data seem to confirm that the improvement in the quality of each type of institution is necessary for EGS. The results in table 2 show that the institutional indexes could suffer from endogeneity due to the measurement errors in the institutional quality indexes. In fact the estimates with fixed effects models are in general lower than the same estimates obtained from the GMM system estimator, which reveals measurement errors in the various institutional indexes. In the same way, through table 2, it appears that for the large majority of observations, the predicted value of EGS probability lies between zero and one. In this case, the results of linear probability models in general, and those of the GMM system in particular can be considered with less reserve. This is particularly valid since in GMM system, the Sargan-Hansen test shows that the lagged values of institutions that I use like instrumental variables are good instruments for the various institutional indexes.

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[17] I also apply the logit model with fixed effects on my data. In this case, there is no need to suppose the absence of correlation between explanatory variables and individual specific effects. The obtained results are generally similar to those of probit with random effects and are available upon request. I prefer to report the results of the estimations by probit model with random effects at the sides of those of linear probability models to make them more comparable. Indeed, in the probit model as well as in the linear probability models, the errors are supposed to have the standard normal distribution, whereas in the logit model, the errors are supposed to have the standard logistic distribution. In addition, the use of the logit model with fixed effects is based on the conditional probabilities while excluding the observations for which the probability is always equal to 0 or to 1, with an aim to solve the incidental parameter problem. Therefore, the exclusion of certain observations no matter what necessary, is debatable in the logit model with fixed effects.

Table 2: Specific effects of institutions on EGS

	OLS			Fixed Effet			GMM system			Probit with random effect		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
reg	0.070			0.103			0.142			0.262		
	(4.61)***			(3.85)***			(1.73)*			(3.76)***		
prop		0.065			0.072			0.044			0.223	
		(7.84)***			(4.23)***			(1.73)*			(6.14)***	
dem			0.355			0.104			0.439			0.962
			(7.42)***			(0.88)			(2.35)**			(4.99)***
Constant	-0.035	0.006	0.177	-0.124	0.175	0.388	-0.132	0.365	0.246	-1.626	-0.916	-0.616
	(0.42)	(0.14)	(6.90)***	(0.80)	(1.67)*	(5.75)***	(0.30)	(2.22)**	(2.46)**	(3.93)***	(3.55)***	(3.62)***
Number of observations	772	751	847	772	751	847	772	751	847	772	751	847
Number of countries	-	-	-	121	121	118	121	121	118	121	121	118
Percent of observations 1/	100%	100%	100%	99%	99%	100%	96%	100%	100%	-	-	-
Sargan-Hansen test 2/	-	-	-	-	-	-	0.216	0.131	0.377	-	-	-
AR (1) 2/	-	-	-	-	-	-	0.000	0.000	0.000	-	-	--
AR (2) 2/	-	-	-	-	-	-	0.805	0.555	0.929	-	-	-
Log of vraisemblance	-	-	-	-	-	-	-	-	-	-444.731	-425.010	-481.514
χ^2 test of variance	-	-	-	-	-	-	-	-	-	42.00***	21.19***	33.92***

Note: ***, **,* respectively denotes coefficients significant at thresholds of 1%, 5%, and 10%. The figures in brackets are robust t-Student. All the estimates except for those with OLS contain temporal dummies whose coefficients are not shown.

1/ This is the percent of observations for which the predicted value of the probability of EGS lies between zero and one.

2/ These figures are the p-values associated with various tests, and especially they show that the lagged variables used as instruments in GMM system are good instruments.

3/ These figures are χ^2 values of significance test of random effects in the probit model with random effects. This test also indicates that probit model with random effects can be preferable to probit model without random effects.

As for the results of estimation with probit model, they also indicate a positive and significant coefficient of the various institutions on EGS. Moreover, it appears that the variance of random effects is very significant in the probit model. So, the probit model with random effects can be considered as preferable to the probit model without random effects.

Table 3: Simultaneous effects of institutions on EGS

	OLS	Fixed Effect	GMM System	Probit (RE)
	(1)	(2)	(3)	(4)
Reg	0.017	0.112	0.104	0.127
	(0.85)	(3.72)***	(1.70)*	(1.55)
Prop	0.046	0.054	0.041	0.164
	(3.50)***	(2.92)***	(1.62)	(3.32)***
Dem	0.137	0.158	0.020	0.223
	(1.81)*	(1.21)	(0.10)	(0.84)
Constante	-0.048	-0.323	-0.090	-1.381
	(0.51)	(1.80)*	(0.28)	(3.08)***
Number of observations	692	692	692	692
Number of countries	-	118	118	118
Percent of observations 1/	100%	91%	97%	-
Sargan-Hansen test 2/	-	-	0.368	-
AR (1) 2/	-	-	0.000	-
AR (2) 2/	-	-	0.733	-
Log of vraisemblance	-	-	-	-388.017
χ^2 test of variance	-	-	-	21.43***

Note: The same like in table 2.

All the institutions exert a positive and significant effect on EGS. But which are the institutions whose effect on EGS resists to that of the others, in other words, which are the most important institutions for EGS? To answer this question, I refer to the results in column 3 of table 3. In this case, it appears that in GMM system, only regulation institutions continue to have a positive and significant effect on EGS at the threshold of 10%, despite taking into account the effect of the other institutions.

The result of GMM system in column 3 of table 3 shows that only the effect of regulation institutions resists to the colinearity[18] between the various measurements in institutional quality. One can perceive this colinearity between the various institutional indexes, by comparing the results in columns 7 to 9 of table 2 with the result in column 3 of table 3. In this last column, the democracy index is the index of institutional quality which records the greatest fall in its value. This reflects in a certain extent, the fact that the democratic institutions can contribute to the emergence of good economic institutions, or the fact that they can capture the effects of economic institutions when the effects of those institutions are not considered. The positive and significant effect of regulation institutions on

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[18] The correlation between the various indexes of institutions is about 0.5, so far from perfect.

EGS remains, despite taking into account the effects of other institutions. This indicates in a certain extent that the regulation institutions are the most important institutions for EGS.

This result can be explained by the fact that, an efficient regulation of economic activities can allow the entry into the market and the seizure of favourable opportunities by the most dynamic and most innovative private investors. These investors are "young investors" who would do not have the necessary means to face high costs of new enterprises creation when the regulation of economic activities is too strong. The entry into the market of the more innovative investors could contribute to EGS by affecting positively the level of TFP, not only by its positive effect on the accumulation of private investment, but also by the increase in technology level due to the possible innovations introduced.

In opposite, private investors can find alternative solutions to the implementation of distorsive policies and to the weak protection of private property rights in order to ensure EGS. In fact, private investors operating in an environment where distorsive policies or a weak protection of property rights prevail, can continue to seize favourable opportunities by modifying the structure of their investments, or by assuring themselves the protection of their assets. In this case, it is possible to have an increase in TFP -even though it can be a small TFP increase- and EGS, as long as private investors increase their investment. This can possibly constitute a reason why democracy and private property rights protection indexes do not exert any significant effect on EGS, when I simultaneously consider the effects of the three institutions.

The results in tables 2 and 3 show that regulation, property rights protection and democratic institutions are all necessary for EGS. However, only the effect of regulation institutions resists to that of the other institutions. The question is to know whether these results are robust or not.

5.1 Robustness checks

In addition to the robustness compared to the estimation methods, my first results are subjected to further robustness checks (most of the robustness checks results are not shown but are available upon request). Thus, I test the robustness of my results compared to the level of economic growth. I define EGS by considering any positive growth rate. However, the sustainability of high economic growth may more interest policymakers, because it is more likely to involve a rapid reduction in poverty. Moreover, institutions may not have any effect on the sustainability of high economic growth which can be due to other factors.

While testing the effect of institutions on high economic growth sustainability -I recall that it is a positive growth of per capita GDP of at least 2% observed over five consecutive years-, it appears that in GMM system, democratic and regulation institutions are the institutions that affect specifically, positively and significantly the probability of high economic growth sustainability. The effects of democratic and regulation institutions remain significant, when I consider the simultaneous effect of the three various institutions on high sustained economic growth (result not shown). The sustainability of high economic growth would require more innovative investors and the non implementation of distorsive policies; it is possibly, according to the data, that in addition to regulation institutions, democratic institutions are also important for high economic growth sustainability.

I also test the robustness of my results by changing the criterion of EGS definition and the period of analysis. Instead of considering five consecutive years of positive growth of per capita GDP, I consider as sustained growth, an episode of positive growth of per capita GDP for at least three consecutive years over five years. In this case, it appears that the effect of regulation institutions on EGS is still positive and significant despite taking into account the simultaneous effect of the three institutions. I change the period of analysis by considering the 1964-2003 period instead of the 1960-2003 period. To this new period, I associate the criterion of at least three consecutive years of positive growth of per capita GDP. Once again, the relative importance of regulation institutions for EGS prevails.

I test the robustness of my results compared to the change of institutional quality indexes. At place of democracy index, I consider the index of constraint on executive as political institution index.[19] The index of constraint on executive is obtained from *Polity IV*, and is ranged in increasing way between 0 and 7. In this case, it appears that in addition to regulation institutions, property right institutions positively and significantly also affect the probability of EGS when I test the simultaneous effect of the various institutions on EGS.

My sample includes former colonies countries, and these former colonies inherited institutions of various qualities as Acemoglu at al. (2001) underline it. It is then interesting to test the impact of institutions on EGS in the sample of former colonies. In this case, it appears

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[19] Beyond a robustness check of my results, the use of the index of constraint on the executive makes it possible to test my argument according to which, in a democracy because of institutional constraints, political leaders should not be able to implement all the economic policies of their choices and in particular, socially inefficient economic policies. While following the same logic of determination of the weighting coefficients through an equation of growth, I build a new index of politico-economic institutions with the index of constraint on the executive and the same economic institutions as previously. In addition, I would like to consider other indexes of economic institutions but unfortunately I do not have economic institutions data with a long temporal dimension.

that the regulation institutions' effect on EGS remains positive and significant despite taking into account the simultaneous effect of the various institutions.

My sample includes developed and developing countries, and the analysis of EGS characteristics shows that developing countries (DC) have much more difficulties to sustain their economic growth episodes. Thus, I estimate my different models with my subsample of DC. In this case it appears in table 4 that independently of the method of estimate used, the improvement in the quality of each type of institution is necessary for EGS in DC. Column 3 of table 5 indicates that the regulation and the property rights institutions are the two institutions exerting a positive and significant effect on EGS while considering the simultaneous effect of the various institutions in the sample of DC.

Favouring the entry into the market of more innovative investors and ensuring the appropriation of a significant share of the investments' return are more important for EGS in developing countries. This is possibly the reason why regulation and property rights institutions are the only significant institutions when I consider the simultaneous effect of the three institutions on EGS. This result indicates that, in the developing countries of my sample and for the considered period, EGS would require much more "good" economic institutions than political institutions.

My first results remain robust to various robustness checks. It appears that the improvement in the quality of each institution is necessary for EGS. However, the institutions of economic activities regulation are more favourable for EGS. Seeing that institutions are not physical factors of production, they can affect EGS only through mechanism, which is advisable to explore.

5.2 Mechanism of transmission of institutions effects on growth sustainability

5.2.1 Effects of institutions on private investment and effect of private investment on TFP

Theoretically, I support that "good" institutions are necessary for EGS because they involve an increase in TFP due to their favourable effects on private investment. To test my arguments, I estimate the effects of institutions on private investment, and the effect of private investment on TFP. So, the following equations are estimated:

$$\text{Privinv}_{it} = a + \zeta\, X_{it} + v_t + \mu_{it} \tag{5}$$

$$\text{Tfp}_{it} = b + \eta\, \text{privinv}_{it} + v_t + \lambda_{it} \tag{6}$$

Tableau 4: Specific effects of institutions on EGS in developing countries sample

	OLS			Fixed Effect			GMM System			Probit with random effect		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Reg	0.047			0.104			0.364			0.238		
	(2.62)***			(3.29)***			(2.68)***			(2.56)***		
Prop		0.067			0.072			0.151			0.269	
		(5.17)***			(3.91)***			(1.78)*			(4.55)***	
Dem			0.220			0.084			0.468			0.612
			(2.70)***			(0.54)			(1.80)*			(1.83)*
Constant	0.022	-0.017	0.198	-0.224	0.044	0.311	-1.519	-0.246	0.134	-1.731	-1.598	-0.682
	(0.23)	(0.30)	(6.62)***	(1.07)	(0.39)	(4.47)***	(2.07)**	(0.70)	(1.39)	(2.86)***	(3.91)***	(3.28)***
Number of observations	529	512	602	529	512	602	529	512	602	529	512	602
Number of countries	-	-	-	85	85	82	85	85	82	85	85	82
Percent of observations 1/	100%	100%	100%	98%	100%	100%	76%	87%	100%	-	-	-
Sargan-Hansen test 2/	-	-	-	-	-	-	0.710	0.322	0.266	-	-	-
AR (1)2/	-	-	-	-	-	-	0.000	0.000	0.000	-	-	-
AR (2)2/	-	-	-	-	-	-	0.962	0.803	0.918	-	-	-
Log of vraisemblance	-	-	-	-	-	-	-	-	-	-286.275	-272.386	-323.771
χ^2 of variance test 3/	-	-	-	-	-	-	-	-	-	34.57***	24.00***	32.59***

Note: The same as in table 2.

Table 5: Simultaneous effects of institutions on EGS in developing countries sample

	OLS	Fixed Effect	GMM System	Probit (RE)
	(1)	(2)	(3)	(4)
Reg	0.023	0.116	0.175	0.200
	(1.03)	(3.36)***	(1.78)*	(1.74)*
Prop	0.064	0.062	0.076	0.239
	(3.92)***	(2.90)***	(1.98)**	(3.43)***
Dem	0.011	0.080	-0.128	-0.011
	(0.10)	(0.46)	(0.36)	(0.03)
Constante	-0.136	-0.490	-0.821	-2.006
	(1.29)	(1.96)*	(1.60)	(2.94)***
Number of observations	458	458	458	458
Number of countries	-	82	82	82
Percent of observations 1/	100%	94%	84%	-
Sargan-Hansen test 2/	-	-	0.243	-
AR (1)2/	-	-	0.000	-
AR (2)2/	-	-	0.677	-
Log of vraisemblance	-	-	-	-241.854
χ² of variance test 3/	-	-	-	24.64***

Note: The same as in table 2.

Equation (5) makes it possible to estimate the effect of various institutions -X_{it}- on private investment with pooled data while controlling for temporal fixed effects to consider the increase in private investment that all economies experience at a certain time. Private investment data for underdeveloped countries are in majority from Global Development Network Database and cover the 1970-1999 period. To complete my data, I calculate the amounts of private investment for developed countries and then take the average values of private investment as percent of GDP over five years for each countrie.

Equation (6) makes it possible to estimate the effect of private investment on TFP that I compute like a residual by the method of economic growth accounting in the manner of Easterly et al. (2002), and by supposing like Hall and Jones (1999) that the share of physical capital remuneration in GDP is equal to 0.33. I calculate the stock of physical capital from 1960 to 2003 by perpetual inventory method, choosing 1960 as the initial year. The stock of human capital is approximated by the average number of years of school, which is informed each 5 years thanks to the data base of Barro and Lee (2000). So, I measure TFP each 5 years -like economic institutions- because of the availability of data on the human capital stock.

I estimate equation (6) with pooled data while controlling for temporal fixed effects to take into account the increase in technology that marks all the economies at a certain time. To deal with the risk of endogeneity of private investment compared to TFP, I estimate the effect of an exogenous measurement[20] of private investment on TFP. This exogenous measurement

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[20] By exogenous measurement of private investment, I mean a measurement which could not suffer from endogeneity due to simultaneity error between private investment and TFP.

of private investment is its lagged value. If the lagged value of private investment positively and significantly affects TFP, then I can consider that the accumulation of private investment could have a causal effect on TFP.

Columns 1 to 3 of table 6 indicate that, an improvement in the respective quality of the various institutions is favourable for private investment accumulation. As for column 4, it indicates that only property rights protection institutions positively and significantly affect private investment, when I take into account the simultaneous effect of the three institutions on private investment.

This last result shows that, the fact that private investors are convinced to be able to reap a significant share of their investments' return is the most important factor determining the decision-making of private investment.

Table 6: Effects of institutions on private investment and of private investment on TFP1/

	privinv (1)	privinv (2)	Privinv (3)	privinv (4)	tfp (5)	tfp (6)
Reg	0.011 (3.75)***			0.004 (1.16)		
Prop		0.013 (9.24)***		0.010 (3.87)***		
Dem			0.069 (10.07)***	0.022 (1.52)		
Privinv					0.852 (3.95)***	
privinv lagged						0.885 (4.42)***
Constant	0.122 (6.64)***	0.113 (9.57)***	0.116 (17.13)***	0.096 (4.79)***	-0.388 (9.06)***	-0.252 (-6.10)***
Number of observations	384	359	469	316	423	519
R²	0.08	0.24	0.14	0.26	0.08	0.095

Note: ***, denotes coefficients significant at the threshold of 1%.
1/ The estimates are carried out with the whole sample and all the estimates contain temporal dummies whose coefficients are not shown. The figures in brackets are robust t-student. The same results are obtained while considering the lagged values instead of the level values of institutions indexes to reduce endogeneity problem.

In fact, private investors can find alternative solutions to the costs resulting in distorsive policies implementation or to the existence of strong economic activities regulations. Those alternative solutions could be the change in private investment structure to face distorsive policies, or the corruption of public bureaucrats to face strong economic activities regulation. While finding alternative solutions to the weakness quality of democratic and regulation institutions, private investors can continue to increase their investments. This is possibly the reason why only property rights institutions significantly and positively affect private investment, when I consider the simultaneous effect of the three institutions on private investment.

Columns 5 and 6 of table 6 show the results of private investment effect on TFP. It appears in this case that, an increase in private investment positively and significantly affects TFP. *So, it appears that institutions positively affect private investment, and an increase in private investment induces an increase in TFP. Thus the data seem to confirm the theoretical arguments that I support.*

5.2.2 Effects of institutions, TFP, and private investment on growth sustainability

I show that institutions positively affect private investment and that private investment accumulation is good for TFP increase. The question is to know whether the data will confirm my theoretical argument according to which an increase in TFP is good for EGS. Thus, I estimate the following equation:

$$\text{Prob}_{it} \left[(g_{t0}, g_{t1}, g_{t2}, g_{t3}, g_{t4}) > 0 \mid (c, X_{it}, tfp_{it}, privinv_{it}, u_i, v_t) \right] = G(c, X_{it}, tfp_{it}, privinv_{it}, u_i, v_t) \quad (7)$$

Equation (7) allows me to estimate the effects of private investment, TFP, and institutions on EGS. When I estimate equation (7) only the coefficient of TFP would be positive and significant, unless institutions and private investment had an independent effect on EGS, i.e. another effect than the one due to TFP.

The results of equation (7) estimate in tables 7 and 8 indicate that independently of the estimation method and the specification used, TFP positively and significantly affects the probability of EGS. *So, the data seem to confirm my theoretical argument according to which an increase in TFP is necessary for EGS.*

As for the fact to know whether institutions and private investment have an independent effect on EGS, column 7 of table 7 indicates that only the institutions of regulation exert a positive, significant, and independent effect on EGS. In the same way, column 3 of table 8 shows that the regulation institutions are the only one to exert an independent, positive, and significant effect on EGS in spite of taking into account the simultaneous effect of the three institutions.

This independent effect can be explained by other positive externalities of regulation institutions on EGS. In fact, an efficient regulation of economic activities can favour the entry into the market of new investors who will exploit new sectors of activities complementary to the already exploited sectors. This complementarity between private investments can increase their productivities, the capacity for future investments, and consequently EGS probability.

Table 7: Specific effects of institutions on EGS controlling for private investment and TFP effects

	OLS			Fixed Effect			GMM system			Probit with random effect		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
reg	0.042			0.113			0.254			0.327		
	(1.72)*			(1.87)*			(1.95)*			(2.46)**		
prop		0.048			0.106			-0.012			0.241	
		(3.58)***			(3.55)***			(0.27)			(3.67)***	
dem			0.134			0.038			0.104			0.558
			(1.81)*			(0.17)			(0.35)			(2.02)**
privinv	1.958	1.438	1.798	-0.216	-0.403	-0.254	-0.755	2.772	3.747	5.067	1.991	5.510
	(5.40)***	(3.72)***	(5.19)***	(0.28)	(0.49)	(0.35)	(0.30)	(1.02)	(1.42)	(2.57)**	(1.07)	(3.78)***
tfp	0.426	0.376	0.405	0.410	0.374	0.345	1.041	1.488	0.956	2.948	2.423	2.267
	(3.84)***	(3.22)***	(4.32)***	(3.91)***	(2.94)***	(3.42)***	(2.49)**	(1.94)*	(2.22)**	(4.95)***	(4.39)***	(5.23)***
Constant	-0.134	-0.083	0.063	-0.082	0.186	0.549	-0.363	0.495	0.072	-2.449	-0.999	-0.987
	(1.09)	(1.03)	(1.17)	(0.24)	(1.03)	(3.49)***	(0.60)	(0.80)	(0.22)	(3.16)***	(2.30)**	(3.57)***
Number of Observations	335	325	415	335	325	415	335	325	415	335	325	415
Number of countries	-	-	-	96	94	97	96	94	97	96	94	97
Percent of observations 1/	95%	97%	95%	96%	88%	99%	79%	83%	76%	-	-	-
Sargan-Hansen test 2/	-	-	-	-	-	-	0.309	0.745	0.601	-	-	-
AR (1)2/	-	-	-	-	-	-	0.000	0.000	0.000	-	-	-
AR (2)2/	-	-	-	-	-	-	0.786	0.504	0.827	-	-	-
Log of vraisemblance	-	-	-	-	-	-	-	-	-	-152.230	-151.389	-199.398
χ^2 of test of variance 3/	-	-	-	-	-	-	-	-	-	9.26**	4.86**	3.22**

Note: The same as in table 2.

It thus appears that TFP exerts a positive and significant effect on EGS. In the same way, the regulation institutions index has an independent effect on EGS. On the other hand, it seems that the independent effect of private investment on EGS is less obvious especially after correcting for the endogeneity of private investment. The accumulation of private investment would thus affect EGS only through its effect on TFP, what is in conformity with the endogenous growth theory on which my theoretical reasoning is based.

Tableau 7: Simultaneous effects of institutions on EGS controlling for private investment and TFP effects

	OLS	Fixed Effect	GMM System	Probit (RE)
	(1)	(2)	(3)	(4)
Reg	0.019	0.138	0.280	0.232
	(0.65)	(1.98)**	(1.85)*	(1.56)
Prop	0.057	0.093	0.007	0.256
	(3.11)***	(2.77)***	(0.14)	(2.80)***
Dem	-0.073	0.171	-0.202	-0.316
	(0.68)	(0.69)	(0.52)	(0.68)
Invpriv	1.409	-0.119	1.337	1.549
	(3.28)***	(0.13)	(0.67)	(0.68)
Pgf	0.364	0.426	0.664	2.711
	(3.04)***	(3.39)***	(1.70)*	(4.17)***
Constante	-0.192	-0.570	-0.875	-1.540
	(1.33)	(1.33)	(1.03)	(1.61)
Number of Observations	292	292	292	292
Number of countries	-	91	91	91
Percent of observations 1/	97%	74%	78%	-
Sargan-Hansen test 2/	-	-	0.485	-
AR (1)2/	-	-	0.000	-
AR (2)2/	-	-	0.284	-
Log of vraisemblance	-	-	-	-132.832
χ^2 of test of variance 3/	-	-	-	7.49**

Note: The same as in table 2.

5.3 Robustness checks of institutions, TFP, and private investment effects on EGS

As done previously, I subject my last results to further and same robustness checks. In this case, it appears that the positive effect of TFP and the independent effect of regulation institutions on EGS are robust. Only the results of estimates with the DC sample are shown in tables 9 and 10.

5.4 Taking into account other potential determinants of EGS

Until now, I only test on EGS the effects of institutions, private investment, and TFP which are my variables of interest. But, it may be that the effects of these various variables are over-estimated by being unaware of the effects of other macroeconomic variables likely to

Table 9: Specific effects of institutions on EGS controlling for private investment and TFP effects in developing countries sample

	OLS			Fixed effect			GMM system			Probit with random effect		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
reg	0.044			0.120			0.241			0.395		
	(1.62)			(1.82)*			(2.56)**			(2.03)**		
prop		0.068			0.087			-0.047			0.376	
		(3.49)***			(2.25)**			(0.45)			(3.35)***	
dem			0.071			-0.108			-0.047			0.344
			(0.54)			(0.42)			(0.09)			(0.69)
privinv	1.444	1.170	1.773	-0.097	-0.295	-0.030	2.002	4.446	5.366	5.037	2.693	6.508
	(3.46)***	(2.85)***	(4.87)***	(0.12)	(0.32)	(0.04)	(1.53)	(2.00)**	(2.35)**	(1.68)*	(1.15)	(3.71)***
tfp	0.295	0.242	0.325	0.257	0.185	0.210	0.371	0.299	0.260	3.753	2.479	2.146
	(2.83)***	(2.31)**	(3.46)***	(2.54)**	(1.59)	(2.16)**	(1.88)*	(1.97)**	(1.69)*	(3.40)***	(3.11)***	(3.90)***
Constant	-0.128	-0.148	0.058	-0.278	0.048	0.281	-1.004	-0.089	-0.354	-1.875	-1.568	-1.172
	(0.94)	(1.47)	(0.98)	(0.78)	(0.24)	(1.88)*	(1.68)*	(0.16)	(1.25)	(1.53)	(2.53)**	(3.42)***
Number of observations	228	220	305	228	220	305	228	220	305	228	220	305
Number of countries	-	-	-	70	69	71	70	69	71	70	69	71
Percent of observations 1/	0.539	0.559	0.403	0.539	0.559	0.403	0.539	0.559	0.403	-	-	-
Sargan-Hansen Test 2/	-	-	-	-	-	-	0.126	0.509	0.215	-	-	-
AR (1) 2/	-	-	-	-	-	-	0.004	0.003	0.001	-	-	-
AR (2) 2/	-	-	-	-	-	-	0.761	0.276	0.528	-	-	-
Log of vraisemblance	-	-	-	-	-	-	-	-	-	-92.639	-93.410	-138.030
χ² of test variance 3/	-	-	-	-	-	-	-	-	-	15.07***	6.61***	4.00**

Note: The same as in table 2.

Tableau 10: Simultaneous effects of institutions on EGS controlling for private investment and TFP effects in developing countries sample

	OLS (1)	Fixed Effect (2)	GMM System (3)	Probit (RE) (4)
Reg	0.035	0.133	0.184	0.392
	(1.16)	(1.78)*	(1.71)*	(1.77)*
Prop	0.075	0.081	0.030	0.355
	(3.41)***	(1.83)*	(0.53)	(2.52)**
Dem	-0.225	-0.192	0.355	-1.544
	(1.37)	(0.47)	(0.55)	(1.82)*
Invpriv	1.019	-0.195	0.141	1.173
	(2.22)**	(0.16)	(0.11)	(0.38)
Pgf	0.231	0.253	0.437	2.600
	(2.14)**	(2.09)**	(1.72)*	(2.79)***
Constante	-0.285	-0.463	-0.565	-2.746
	(1.86)*	(1.14)	(0.84)	(2.01)**
Number of observations	188	188	188	191
Number of countries	-	66	66	64
Percent of observations 1/	65%	65%	65%	-
Sargan-Hansen Test 2/	-	-	0.604	-
AR (1) 2/	-	-	0.000	-
AR (2) 2/	-	-	0.744	-
Log of vraisemblance	-	-	-	-86.324
χ^2 of test variance 3/	-	-	-	10.01***

Note: The same as in table 2.

affect EGS. Thus I control for the initial economic conditions and macroeconomic policy variables.

I approximate the initial economic conditions by the economic growth rate at the beginning of each five years period, which I denote by "initial growth" in my models. A high positive economic growth rate at the beginning of period can characterize favourable initial conditions. By making the assumption of the persistence of these favourable initial conditions, I can expect a positive effect of the initial growth on EGS.

To my knowledge, for instant there is no theory studying the impact of macroeconomic policies on EGS, but I can take advantage on my theoretical arguments to identify the policy variables likely to affect EGS. I recall that, theoretically I support that, it is for the gain of economic competitiveness that TFP could positively affect EGS. From this point, each policy variable which can affect the level of economic competitiveness can also affect EGS. This last assumption makes it coherent to test on EGS the effects of the following policy variables:

Real exchange rate, which I denote by "RER". I compute the five years average values of this variable over the 1960-2003 period. An appreciation of real exchange rate involves a

loss of economic competitiveness, and consequently could exert a negative effect on EGS. This variable is from CERDI dataset.

Size of Government, measured by the government final consumptions as percent of GDP, is the second policy variable that I consider and is denoted "cons" in my models. This variable is obtained from WDI (2005) database, and covers the 1960-2003 period. I calculate its five years average values. An increase in government final consumptions can possibly involve inflation, likely to affect negatively economic competitiveness. So, a negative effect on EGS of government final consumptions is expected.

Finally, I consider a variable of trade openness measured by *the sum of imports and exports as percent of GDP* and denoted "open" in my models. This variable is obtained from WDI (2005) database for the 1960-2003 period, subdivided in sub-periods of five years. The effect of this variable on EGS is ambiguous. Indeed, an increase in exports can be perceived as a signal of a competitive economy, whereas an increase in imports competing with local products can mean a loss of economic competitiveness.

Tables 11 and 12 indicate that, independently of the estimation method and the specification considered, TFP positively and significantly affects EGS, and the independent effect of the regulation institutions on EGS persists in spite of taking into account the effects of macroeconomic policies and initial economic conditions. Controlling for macroeconomic policies and initial economic conditions variables does not change my main results which thus remain robust.

In addition, it appears that independently of the method of estimate and the specification, a high initial economic growth is favourable for EGS. On the other hand, an analysis of the coefficients associated with the macroeconomic policy variables indicates that they are mainly of a negative sign, but none is significant after having corrected for their endogeneity. This result does not mean that the macroeconomic policies are not important for EGS. On the other hand, it would mean that the macroeconomic policies would not have a direct effect on EGS, once the effects of institutions and initial economic conditions are taken into account.

The analysis of EGS characteristics indicates that developed countries which in general have "good" institutions, have much more chance than underdeveloped countries, to experience EGS in my sample over the 1960-2003 period. I make the assumption that "good" institutions are necessary for EGS. The empirical analysis seems to confirm my assumption. I will present a case study, to illustrate the positive link between "good" institutions and EGS.

Tableau 11: Specific effects of institutions on EGS controlling for the effects of other macroeconomic variables

	OLS			Fixed Effect			GMM System			Probit with random effect		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
reg	0.061 (2.23)**			0.125 (2.07)**			0.143 (2.01)**			0.419 (2.59)***		
prop		0.066 (4.58)***			0.106 (3.69)***			0.103 (3.21)***			0.329 (4.10)***	
dem			0.229 (2.86)***			0.109 (0.49)			0.187 (0.76)			0.902 (2.73)***
initial growth	0.021 (4.82)***	0.023 (5.30)***	0.021 (5.56)***	0.012 (2.61)***	0.016 (3.45)***	0.015 (3.65)***	0.012 (2.04)**	0.014 (2.71)***	0.012 (2.09)**	0.116 (3.88)***	0.126 (4.35)***	0.104 (4.63)***
tfp	0.399 (4.86)***	0.316 (3.83)***	0.356 (4.77)***	0.428 (4.29)***	0.312 (3.33)***	0.354 (4.12)***	0.745 (2.31)**	0.551 (2.10)**	0.993 (3.44)***	2.369 (3.72)***	1.640 (2.93)***	1.748 (3.76)***
privinv	1.432 (3.54)***	0.905 (2.15)**	1.321 (3.63)***	-0.359 (0.48)	-0.308 (0.37)	-0.486 (0.65)	1.203 (0.85)	0.432 (0.33)	0.572 (0.33)	3.964 (1.75)*	1.323 (0.66)	4.323 (2.66)***
rer	-0.011 (0.66)	0.011 (0.58)	-0.010 (0.55)	-0.060 (2.08)**	-0.045 (2.02)**	-0.071 (2.40)**	-0.036 (0.93)	-0.020 (0.47)	-0.053 (1.34)	-0.150 (0.96)	0.062 (0.41)	-0.106 (0.99)
open	-0.117 (1.19)	-0.058 (0.63)	-0.035 (0.45)	-0.422 (1.51)	-0.503 (1.64)	-0.312 (1.27)	-0.255 (1.11)	0.100 (0.27)	-0.152 (0.47)	-0.549 (1.13)	0.001 (0.00)	-0.143 (0.42)
cons	-0.101 (0.20)	-0.988 (1.95)*	-0.999 (2.22)**	-0.333 (0.31)	-2.653 (2.06)**	-1.856 (2.10)**	-0.129 (0.12)	-2.383 (1.38)	-0.352 (0.27)	0.957 (0.33)	-4.168 (1.59)	-3.080 (1.35)
Constant	-0.087 (0.57)	0.040 (0.37)	0.231 (2.67)***	0.177 (0.45)	0.725 (2.57)**	0.974 (3.79)***	-0.027 (0.05)	0.331 (1.04)	0.723 (2.46)**	-1.949 (1.84)*	-1.287 (1.83)*	-0.406 (0.83)
Number of observations	315	305	382	315	305	382	315	305	382	315	305	382
Number of countries	-	-	-	89	88	90	89	88	90	89	88	90
Percent of observations 1/	91%	91%	91%	91%	82%	90%	81%	82%	83%	-	-	-
R-squared	0.24	0.25	0.25	0.57	0.55	0.48	-	-	-	-	-	-
Sargan-Hansen test 2/	-	-	-	-	-	-	0.600	0.207	0.544	-	-	-
AR (1)2/	-	-	-	-	-	-	0.000	0.000	0.000	-	-	-
AR (2)2/	-	-	-	-	-	-	0.789	0.806	0.603	-	-	-
Log of vraisemblance	-	-	-	-	-	-	-	-	-	-132.178	-129.354	-169.270
χ^2 du test de variance 3/	-	-	-	-	-	-	-	-	-	7.06***	2.39*	1.48

Note: The same as in table 2.

Tableau 12: Simultaneous effects of institutions on EGS controlling for the effects of other macroeconomic variables

	OLS	Fixed effect	GMM System	Probit (RE)
	(1)	(2)	(3)	(4)
Reg	0.027	0.151	0.202	0.319
	(0.87)	(2.17)**	(2.25)**	(1.76)*
Prop	0.064	0.095	0.025	0.306
	(3.38)***	(2.80)***	(0.49)	(2.82)***
Dem	0.012	0.260	0.170	0.184
	(0.11)	(1.06)	(0.68)	(0.32)
initial growth	0.024	0.016	0.014	0.145
	(5.24)***	(3.07)***	(2.22)**	(4.10)***
Tfp	0.316	0.417	0.650	1.988
	(3.75)***	(4.24)***	(2.19)**	(2.94)***
Privinv	0.717	-0.121	-1.048	0.172
	(1.48)	(0.14)	(0.66)	(0.07)
Rer	0.023	-0.046	-0.007	0.143
	(1.07)	(2.49)**	(0.18)	(0.91)
Open	-0.074	-0.490	-0.345	-0.249
	(0.71)	(1.72)*	(1.12)	(0.49)
Cons	-0.802	-0.543	-0.683	-3.228
	(1.44)	(0.46)	(0.50)	(0.95)
Constant	-0.108	-0.365	-0.113	-2.724
	(0.63)	(0.81)	(0.23)	(2.17)**
Number of observations	274	274	274	274
Number of countries	-	85	85	85
Percent of observations 1/	90%	70%	83%	-
R-squared	0.26	0.61	-	-
Sargan-Hansen test 2/	-	-	0.308	-
AR (1) 2/	-	-	0.000	-
AR (2) 2/	-	-	0.760	-
Log of vraisemblance	-	-	-	-112.585
χ^2 of variance test 3/	-	-	-	5.08**

Note: The same as in table 2.

6. Case study

My case study is based on the comparison of three African economies: Botswana, Ivory Cost, and Ghana[21] and consists in comparison of the quality of their institutions and their economic performance in terms of EGS.

Through table 13, it appears that the most efficient country among the three, in terms of EGS is Botswana. Over the 1960-2003 period, Botswana has experienced sustained economic growth during 8 five-year terms over 9, and during 6 consecutive five-year terms, Botswana experienced high sustained growth. Over the 9 five-year terms, only the 1990 decade was not that of a high sustained economic growth in Botswana. Contrary to Botswana, Ivory Cost experienced sustained economic growth only during the 1970-1974 period, and

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[21] I recall that these three African countries are rental economies, that Botswana is a landlocked country, contrary to Ghana and Ivory Cost. Botswana is a southern African country exporting diamond, contrary to Ghana and Ivory Cost, which are from West Africa and export cocoa and coffee. Thus, a priori, Botswana is geographically less favoured than Ghana and Ivory Cost. I undertake the case study with these three countries, because they seem comparable. Moreover, Acemoglu et al. (2003) compare the institutional performances of these three African countries.

Tableau 13: Comparison of performances of Botswana, Ivory Cost and Ghana

Countries	Periods	Sustained Growth	High Sustained Growth	Regulation 1/	Property Right 2/	Democracy 3/	Constraint on executive 4/
Botswana	61-64	Yes	Yes	..	..	..	..
	65-69	Yes	Yes	..	..	..	5.0
	70-74	Yes	Yes	..	..	2.3	5.0
	75-79	Yes	Yes	6.3	..	2.0	5.0
	80-84	Yes	Yes	6.9	6.3	2.0	5.0
	85-89	Yes	Yes	5.9	6.3	1.6	6.0
	90-94	No	No	6.1	6.4	1.6	6.0
	95-99	Yes	No	7.0	6.8	2.0	7.0
	00-03	Yes	Yes	7.3	7.0	2.0	7.0
Ivory Cost	61-64	No	No	..	..	..	1.0
	65-69	No	No	..	..	6.0	1.0
	70-74	Yes	No	..	..	6.0	1.0
	75-79	No	No	6.2	..	6.0	1.0
	80-84	No	No	5.8	5.7	5.6	1.0
	85-89	No	No	4.9	4.8	6.0	1.0
	90-94	No	No	5.1	5.4	6.0	2.0
	95-99	No	No	5.4	3.9	6.0	2.0
	00-03	No	No	5.5	3.5	5.8	3.0
Ghana	61-64	No	No	..	..	..	1.0
	65-69	No	No	..	..	..	0.0
	70-74	No	No	..	..	6.6	3.0
	75-79	No	No	5.3	2.8	5.8	2.0
	80-84	No	No	4.4	2.7	5.6	2.0
	85-89	Yes	No	4.7	5.8	6.4	1.0
	90-94	Yes	No	5.7	5.6	5.0	1.0
	95-99	Yes	No	5.9	4.4	2.8	4.0
	00-03	Yes	Yes	6.0	4.6	2.0	6.0

Note: 1/ 2/ Indicate the averages of respective values of the indexes of regulation and private property rights protection institutions obtained from Fraser Institute on the web site: http://www.freetheworld.com. The values of these indexes vary in an increasing way between 0 and 10, a low (high) value indicates a low (high) quality of regulation and property rights protection institutions.
3/ These figures are the averages of the values of democracy index as calculated by Freedom House and obtained from the web site: http://www.freedomhouse.org. The value of this index varies in a decreasing way between 1 and 7; a high value of this index indicates weak democratic institutions.
4/ These figures are the averages of the values of constraint on executive index calculated by Polity IV and obtained from the web site: http://www.cidcm.umd.edu. The value of this index lies between 0 and 7. A high value indicates the existence of real politic institutional constraints on the executive chief.

any period of high sustained economic growth. As for Ghana, it experiences sustained economic growth since 1985, and a high sustained economic growth, during the last five-year term. Why this difference of performances between these three African economies?

The success of Botswana compared to Ghana and Ivory Cost in terms of EGS is due to the quality of its institutions. Indeed, as one can observe in table 13, in terms of political institutions -democracy and constraint on executive-, as well as in terms of economic institutions -property rights protection and regulation-, the quality of institutions in Botswana is better than the ones in Ghana and in Ivory Cost, whatever the sub-period considered. Acemoglu et al. (2003) also argue that the good economic performance of Botswana, compared to the other African economies in general, is due to the quality of institutions in Botswana. This seems as a valid argument since Botswana is a landlocked country and thus geographically less favoured, comparatively to Ghana and Ivory Cost.

During each sub-period, it is in terms of political institutions that the superiority of Botswana's institutional quality compared to Ivory Cost and Ghana is clearly observed. However, it is especially in terms of regulation institutions that the advantage of Botswana is better maintained and reinforced over time. This could be considered as an illustration of a significant role of regulation institutions in Botswana's EGS.

The importance of regulation institutions can also be put forward, by comparing the performances of Ghana and Ivory Cost. As one can note it, from 1985, Ghana records sustained economic growth and also a beginning of an improvement in its various institutions especially regulation ones, compared to Ivory Cost. Contrary to property rights protection institutions, regulation institutions have been continually improved in Ghana since 1985. This also can be seen as an illustration of the role of regulation institutions for EGS with the case of Ghana.

This case study, illustrates that "good" institutions are necessary for EGS, and seems to corroborate the results from the empirical analysis of EGS.

7. Conclusion

In this article I seek to identify the most important institutions for Economic Growth Sustainability (EGS), contrary to the majority of empirical works which are interested in the effect of institutions on the level of per capita income, the growth rate, or the changes in growth regimes. I support that "good" institutions by their positive effects on private investment, induce an increase in TFP which is necessary for EGS. My theoretical arguments allow me to analyze the effects of three various types of institutions on EGS.

The results of econometric estimates with panel data indicate that an improvement in the respective quality of democratic, property rights protection, and regulation institutions is favourable for EGS. This shows that all the institutions are necessary for EGS. However, among all the institutions, that of economic activities regulation seems the most important for EGS, because it is the effect of regulation institutions that remains positive and significant after taking into account the simultaneous effect of the three various institutions. The persistent effect of regulation institutions despite considering the simultaneous effect of the three various institutions could be due to the fact that an efficient economic activities regulation favours the entry into the market of new investors, more innovative and more dynamic. This market entry of new investors could induce an improvement in technology level and consequently an increase in TFP.

I also obtain a positive and significant effect of TFP on EGS. This effect of TFP could be due to its favourable effect on economic competitiveness. The effect of regulation institutions on EGS remains despite considering private investment and TFP effects. This indicates an independent effect of regulation institutions on EGS, which could be due to the complementarity between private investments, possibly resulting from the entry into the market of new investors exploiting new sectors complementary to the sectors already exploited. This complementarity between private investments increases their productivities, their returns, the capacity for future investment of private enterprises, and consequently the probability of EGS.

I also obtain a positive and significant effect of property rights protection institutions on private investment and this, despite considering the positive and simultaneous effects of the various institutions on private investment. My main results -positive and significant effects of TFP and regulation institutions on EGS- remain robust to alternative methods of estimate, to the retained samples, to the change in institutional quality indexes, to the use of a criterion of high EGS, to the changes in EGS definition and study period, to the consideration of macroeconomic policies effects and initial economic conditions. The positive link between "good" institutions and EGS is illustrated by a case study with three African countries: Botswana, Ivory cost, and Ghana.

Through my econometric results, the following economic growth strategies can be suggested. First, initiate economic growth by ensuring the protection of private property rights, to create markets and to favour the development of private investment. This proposition is based on the fact that I show that property rights institutions are more favourable for the development of private investment, which is often admitted in the

economic literature, to be favourable for economic growth. Second, implement institutions which guarantee an efficient regulation of economic activities in order to make sustainable economic growth, by favouring the entry into the market of more dynamic and more innovative private investors, like "young investors".

Therefore, my results point out a suitable role of various institutions for EGS. This is coherent with the idea defended initially by Gerschenkron (1962) for the suitable role of various institutions in the process of economic development, and highlighted recently by Acemoglu et al. (2004) about the role of institutions in technological adoptions and innovations. Beyond a suitable role of institutions for EGS that reveal my results, these results could be an indication especially to the developing countries policymakers for the order of institutional reforms that they would wish to implement.

This study opens tracks for new researches. For growth economists, it would be interesting to well understand how TFP could affect EGS; I suppose that one of the possibilities is the gain of economic competitiveness. For institutional economists, it would be interesting to improve our understanding of the effect of regulation institutions on EGS, and to build a theoretical model of EGS in which the role of institutions appears.

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Appendix: List of Countries
Albania, Algeria, Argentina, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Belize, Benin, Bolivia, Botswana, Brazil, Bulgaria, Burundi, Cameroon, Canada, Central Africa, Chad, Chile, China, Colombia, Congo Democratic, Congo Republic, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Finland, France, Gabon, Germany, Ghana, Greece, Guatemala, Guinea Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungry, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kuwait, Latvia, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritius, Mexico, Morocco, Myanmar, Namibia, Nepal, Netherlands, New Zeeland, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Rwanda, Senegal, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syria, Tanzania, Thailand, Togo, Trinidad, Tunisia, Turkey, Uganda, Ukraine, United Emirate , United King, United State, Uruguay, Venezuela, Zambia, Zimbabwe.