UNU-MERIT Working Paper Series

#2012-036

Stylized facts of governance, institutions and economic development. Exploring the institutional profiles database

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Working Paper Series on Institutions and Economic Growth: IPD WP05

This working paper is part of the research programme on 'Institutions, Governance and Long-term Economic Growth', a partnership between the French Development Agency (AFD) and the Maastricht Graduate School of Governance (Maastricht University – UNU-Merit). The research builds on the Institutional Profiles Database IPD, jointly developed by AFD and the French Ministry of the Economy since 2001.

ISSN 1871-9872

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AFD-MGSoG/UNU-Merit Working Paper Series on
« Institutions, Governance and Long term Growth »

In 2010, the French Development Agency (AFD) initiated a partnership with the Maastricht Graduate School of Governance (Maastricht University - UNU-Merit) with a view to exploring the conceptual and econometric relationships between institutions and long-term growth. As a development bank with a long-term lending horizon, AFD is particularly interested in better understanding the determinants of countries' long term economic, social, and political trajectory.

AFD has thus developed a programme on "Institutions, Governance, and Long-term Growth" dealing with the five following dimensions:

(i) Measuring institutions and discussing the meaning of such measures, notably through the Institutional Profiles Database;
(ii) Testing the econometric relationship between institutional measures and long term growth;
(iii) Exploring through a series of country case studies the historical relationship between processes of economic accumulation, forms of political organisation, and social cohesion;
(iv) Discussing conceptual frameworks for making sense of the interaction between political, social and economic forces in the process of development;
(v) Developing methodologies for political economy analyses.

The MGSoG/UNU-Merit team is involved in the five dimensions with a particular focus on the first two. Its primary objective is to explore the Institutional Profiles Database jointly developed by AFD and the French Ministry of the Economy since 2001. Institutional Profiles Database is unique by its scope (about 350 elementary questions pertaining to all institutional dimensions covering 148 countries in 2012), its entirely free access, and its ambition to incorporate the most recent theoretical advances in the field of political economy.

The present series intends to convey the results of our ongoing research, and in so doing to reflect the wealth of issues that can be fruitfully addressed from an "institutionalist" perspective. We hope that readers will find these papers stimulating and useful to develop their own understanding and research.

Nicolas Meisel (AFD)
Adam Szirmai (MGSoG/UNU-Merit)

For more information on the programme, please visit our websites:
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Stylized Facts of Governance, Institutions and Economic Development. Exploring the Institutional Profiles Database

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This version: 30 January 2012

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Abstract

The empirical literature on economic growth agrees that institutions and governance are important determinants of long-run economic growth rates. As a stylized fact, this literature points to a strong correlation between the level of GDP per capita and the general development level of institutions and governance. However, the growth rate of GDP per capita itself, as well as other indicators that are broadly associated with the level of economic development, are generally much less strongly correlated with the level of institutional development. We document these correlations, and argue that there is a need for a broader set of stylized facts about institutions, governance and economic development, covering the broader set of economic indicators, including the growth rate itself. To find such stylized facts, we use canonical correlation analysis. We use a database on institutions and governance that has a very large number of indicators, and our analysis produces a number of aggregated measurements of institutions and governance that broadly correlate with patterns of economic development. The analysis confirms the correlation between the general level of economic development on the one hand, and institutional development on the other hand, which is the core stylized fact identified in the literature. In addition to this, our analysis points to the general attitude towards markets, and the level of financial development as specific dimensions of the institutional and governance characteristics of a country that correlate highly with specific development patterns. In particular, we find that a positive attitude towards markets combined with a low level of financial development goes together with growth rates, based on catching-up. We also find that a tendency towards market steering combined with strong financial development goes together with a high involvement in international trade (openness), combined with a low investment rate.

Keywords: institutions, governance, economic development

JEL codes: O1, O16, O17

I thank Thomas Ziesemer for comments on a previous version.

1. Introduction

Governance and institutions are popular long-run determinants of economic growth and development in the empirical economic literature. For example, Rodrik et al. (2004, abstract) conclude from an elaborate empirical model that "the quality of institutions trumps everything else" as an explanation of differences in income levels between countries. Kaufmann and Kraay (2002) open by stating that "[p]er capita income and the quality of governance are strongly correlated across countries". Although "institutions" and "governance" are hardly synonyms, there is enough of a connection between the two concepts to consider these statements as part of the same general approach to explaining economic growth and development.

In particular, in this paper, we will follow the definition of governance offered by Kaufmann et al. (2010, p. 4): "the traditions and institutions by which authority in a country is exercised. This includes (a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them." According to this definition, governance is a specific subset of "traditions and institutions". The literature usually follows North (1990, p. 3) in defining "institutions" as "the rules of the game in a society or, more formally, […] the humanly devised constraints that shape human interaction." The combination of the two definitions sees governance as a specific subset of the rules of the game in society that specifies how authority and power is exercised and translated into policy. This is the way in which we will understand governance and institutions in this paper. This definition immediately clarifies the relationship between institutions and governance on the one hand, and economic development on the other hand. Institutions, for example in the form of property rights, set the incentives associated to economic actions, while the quality of governance will determine the success or failure of economic policies aimed at stimulating development.

A part of the literature provides very concrete policy recommendations about the type of governance that is necessary to stimulate economic growth. For example, the notion of "good governance" is strongly associated with empirical work carried out at the World Bank (e.g., Kaufmann et al. al, 2004, 2010). In this view, a set of governance characteristics including, for example, democratic values (in a broad sense, i.e., also covering aspects that are not directly related to elections, such as freedom of the press), clear property rights that are protected by the legal system, control of corruption, and free markets in which governments play a non-decisive role, provides the optimal setting for achieving high growth rates. What characterizes this set of institutions and governance characteristics is that they originated, and are still found in their strongest firm, in the Western world that consists of Europe and North America. This view of the virtue of Western institutions and governance mechanisms is also found in the so-called Washington consensus (Williamson, 1990). Others, such as Rodrik (2005), take a more pluralistic view of institutions and governance, and argue that a range of institutional settings and governance mechanisms is compatible with high growth.

Even though "good governance" (whether defined in the Washington consensus way, or otherwise) is prescribed as a recipe for growth, the growth rate of the economy is rarely the dependent variable in the econometric exercises that dominate the literature (e.g., Acemoglu et al., 2001; Kaufmann and Kraay, 2002; Rodrik et al., 2004). Instead, the level of GDP per capita is used as the dependent variable in most econometric work in the field. Obviously, the level of GDP per capita in a country

is relatively high (as compared to other countries) because that country achieved high growth rates in the past. But the link between current institutions and past growth performance is an indirect one at best, and ingenious econometric strategies are necessary to establish the direction of causality in this relationship.

The direct and univariate correlation between institutions and governance (no matter how these are measured precisely) on the one hand, and GDP per capita on the other hand, is very strong. This is an important stylized fact that often justifies (e.g., Kaufmann and Kraay, 2002) the econometric interest in trying to establish a causal link from institutions/governance to economic development. Such stylized facts are the prime interest in this paper. Our aim is not to contribute to the econometric debate about the causal relationship between growth, or the level of economic development, and institutions or governance. Instead, we want to broaden the debate by looking for a set of stylized fact that involves a broader set of economic variables than just the level of GDP per capita. We also want to include other variables, such as the growth rate itself, and variables such as investment and openness, into the set of stylized facts about institutions, governance and economic development.

The obvious way in which this can be done is by broadening the set of correlations, and include the aforementioned economic variables in a correlation table with indicators of institutions and governance. But this does not achieve the aimed goals, because such univariate correlations are generally low, as compared to the correlations that are found for GDP per capita. This phenomenon will be documented below. As an alternative to this simple strategy, we propose a more sophisticated methodology, canonical correlation analysis, which allows us to combine several economic indicators into a joint correlation with a set of indicators for institutions and governance. In this way, we will be able to derive a number of stylized facts, including the well-known one about the strong correlation between the level of GDP per capita and the level of institutional development.

In the econometric literature, an additional issue plays an important role. This is the role of geography in shaping institutions and governance. This emphasis on geography arises from the econometric need to “explain” institutions themselves. Geography is the ultimate exogenous factor that is not determined by the economy or by institutions, and hence it is a prime candidate to explain differences in institutions between countries (e.g., Engerman and Sokoloff, 1997; Acemoglu et al., 2001). We include geography in the analysis below, by relating the stylized patterns of institutions and governance that we derive in the canonical correlation analysis to geographical patterns.

The rest of the paper is organized as follows. In Section 2, the stylized fact that dominates the literature, i.e., a strong correlation between institutions and governance on the one hand, and GDP per capita on the other hand, is illustrated using data for a large set of countries. This section concludes with an argument why this stylized fact must be broadened, and formulates a set of interrelated research questions that will be used to achieve this goal. Section 3 introduces the methodology that will be used, and also presents the dataset that will be used to measure institutions and governance. In Section 4, we provide an overview of the database on institutions and governance, and describe the variables that will be derived from this database and used in the subsequent analysis. Section 5 presents the results from the canonical correlation analysis, and

presents the stylized facts that are derived using this method. Section 6 concludes the analysis by way of a discussion of the main results, and an outlook on future research.

2. Stylized facts and research questions

The modern growth literature views governance and institutions as prime determinants of long-run economic growth patterns. The basic idea is that with "good governance" and "good institutions," the market system will provide optimal incentives for investment in tangible and intangible assets, and hence lead to higher standards of living. The theoretical link between institutions and governance on the one hand, end economic growth and prosperity on the other hand, is often illustrated by cross-country correlations between standards of living and a set of governance and institutions indicators. Such correlations are usually strongly positive, and hence the governance and institutions indicators used are taken as indicators of "good practice." The correlation between governance/institutions and standards of living is an important stylized fact in the field of empirical analysis of economic growth.

An example of this stylized fact is provided in Figure 1. On the horizontal axis of the subfigures, we display the six main indicators that are found in the World Bank's "Worldwide Governance Indicators" (WGI) dataset, and on the vertical axis we display GDP per capita in 2000 (taken from the Penn World Tables). The figure contains 123 observations (countries), which are the countries for which observations are available in our main database (the Institutional Profiles Database, this will be introduced below). The WGI dataset contains 6 separate indicators, which are themselves aggregations of various other indicators. In other words, the 6 WGI indicators are composite indicators, constructed by applying a weighting scheme to a larger number of indicators. The basic idea behind such composite indicators is that the underlying concept that one wants to measure is not well captured by an individual indicator, but can be approximated by the larger set of indicators. Kaufmann et al. (2010) describe the broad ideas behind the WGI database, as well as its construction.

The 6 WGI indicators measure different aspects of institutions and governance: voice and accountability (which measures democratic values), political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. All 6 indicators appear to be closely correlated with GDP per capita, as is evident from the graphs. The correlation coefficients, in the order that the graphs appear, are 0.57, 0.67, 0.82, 0.76, 0.80 and 0.79. In all cases, the developed nations, e.g., Europe and North America, appear in the right upper corner. Asian nations such as Singapore and Hongkong are also often found in the right upper corner, but this is not always the case. These latter two countries are, for example, found on the top of the ranking for political stability and absence of violence, and regulatory quality, but further behind on voice and accountability.

Another obvious feature from the graphs in Figure 1 is that the spread of observations around the regression lines that are drawn in the figure is larger for countries with low scores for the WGI indicators and GDP per capita (i.e., the further we move towards the left-lower corner). This means that institutional variety (as measured by these indicators) is larger for countries at lower levels of

development, or, alternatively, that economic development levels vary more at low levels of institutional development.

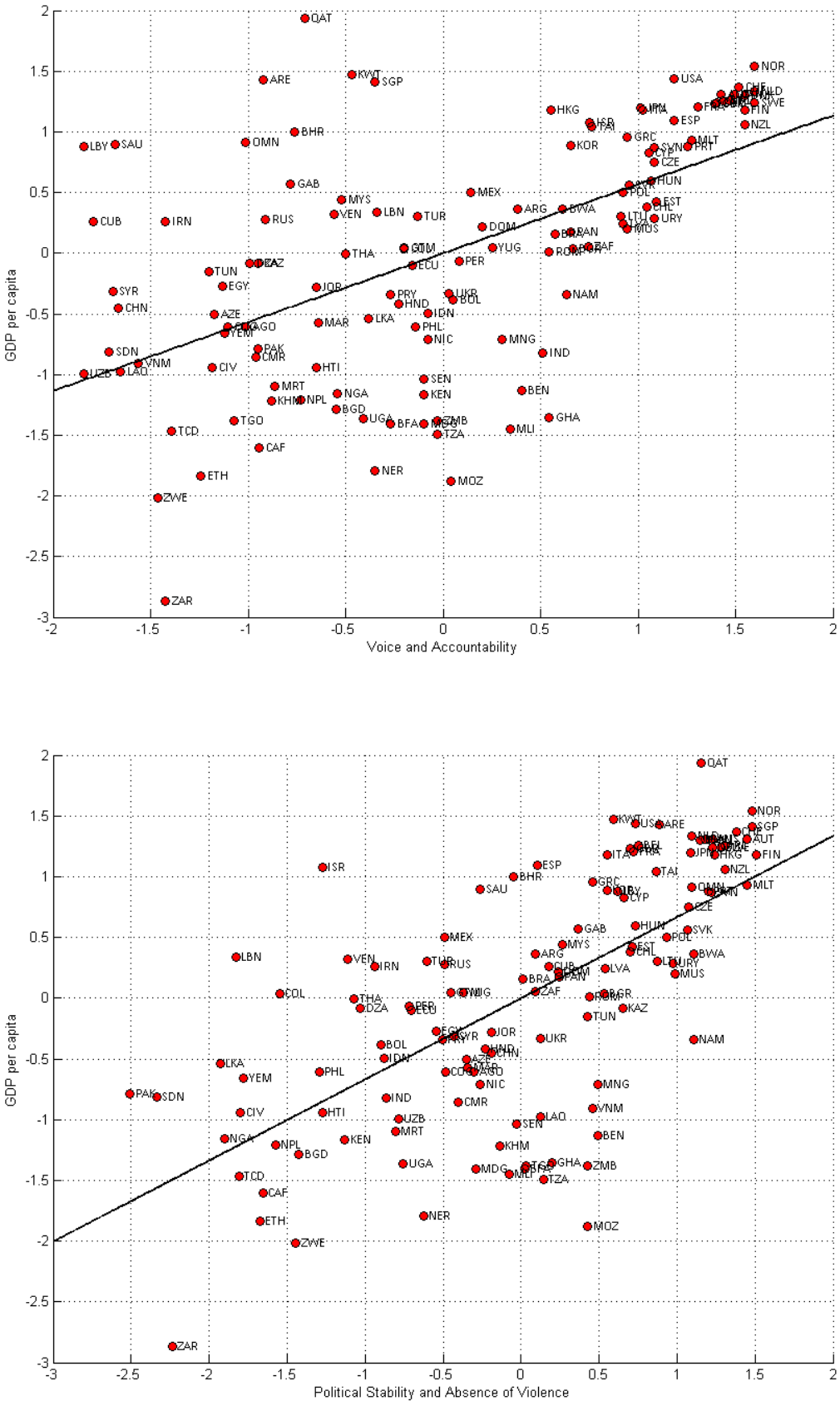

Figure 1. Partial correlation between GDP per capita and World Bank Governance indicators

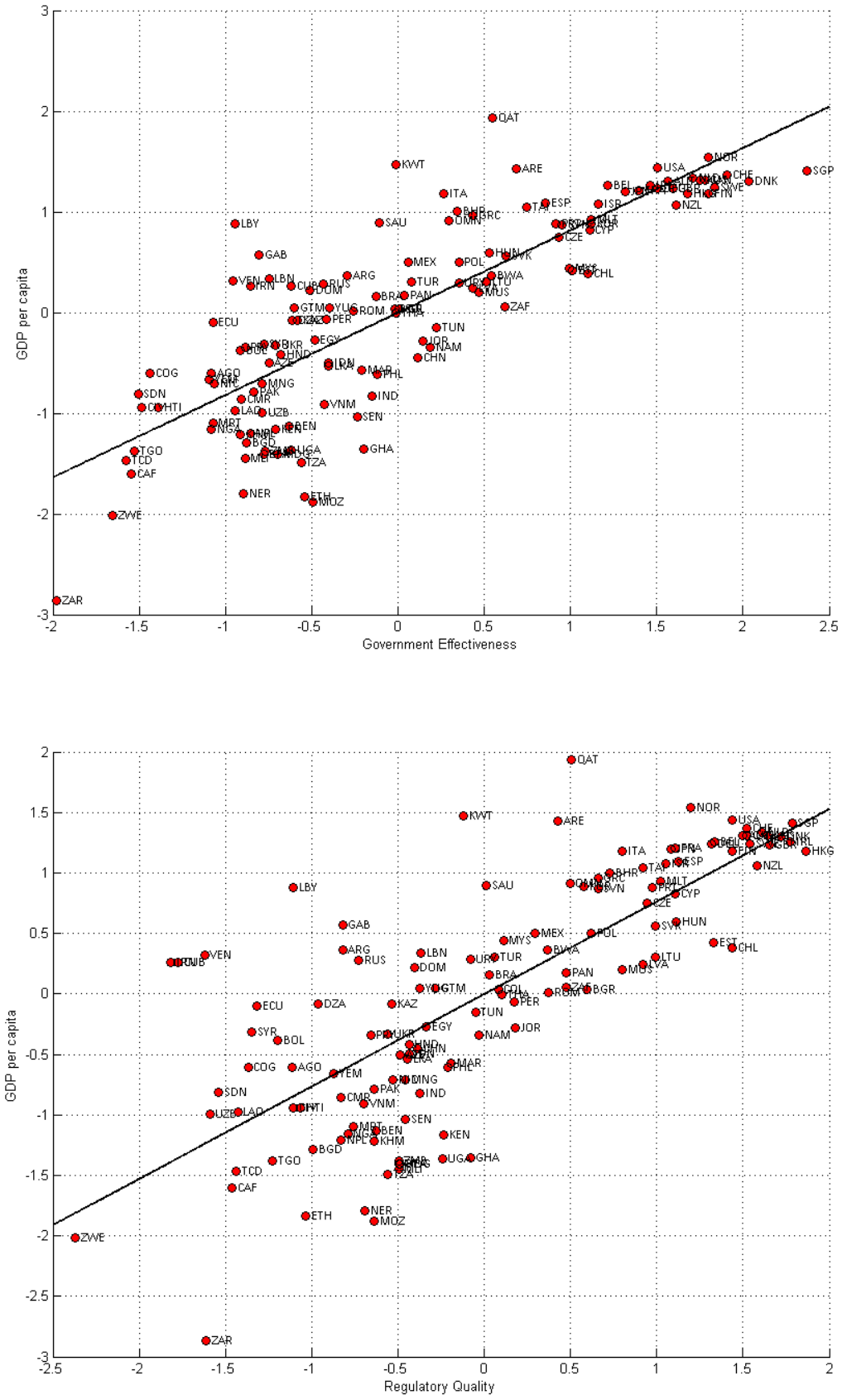

Figure 1. Partial correlation between GDP per capita and World Bank Governance indicators (continued)

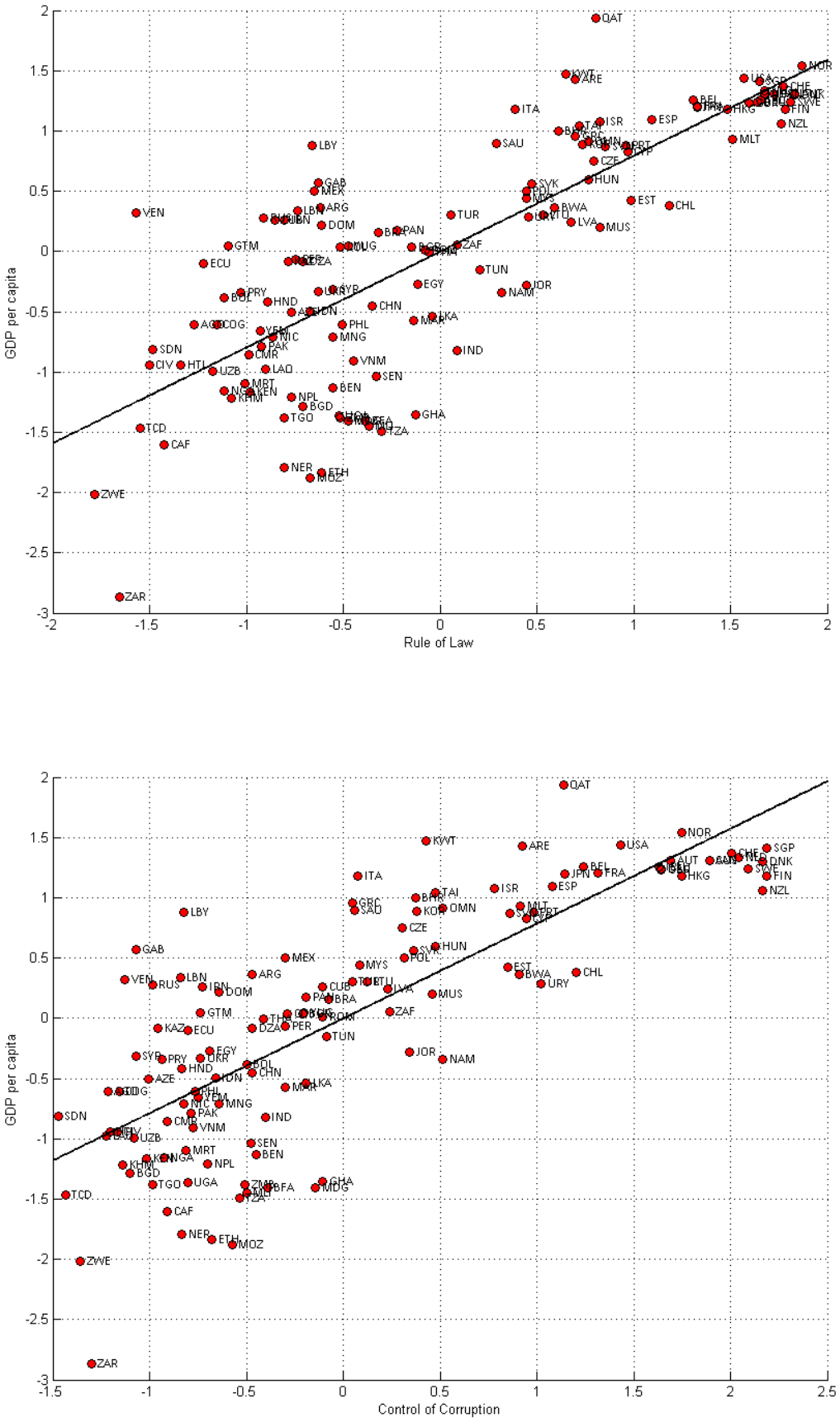

Figure 1. Partial correlation between GDP per capita and World Bank Governance indicators (continued)

Differences in standards of living that are observed in today's global economy are the result of centuries-long differences in development patterns and growth rates. Thus, strictly speaking, the correlations in Figure 1 only show that those countries that today have "good governance and institutions" have grown relatively rapidly over sustained periods of time in the past. The correlations do not provide any direct evidence of a relationship between current growth rates and current governance/institutions, and not between past growth rates and past institutions/governance. Establishing a causal effect from governance and institutions to growth rates on the basis of these correlations alone is impossible, because historical data on institutions and governance are not included in the plots. In fact, one may just as well raise the hypothesis that current institutions and governance structures result from past economic performance (see, e.g., Glaeser et al., 2004).

In terms of econometric methods, a number of options exist in order to try to establish causality between standards of living and institutions/governance. Most often, the approach used is to instrument the governance and/or institutions indicators by variables (instruments) that are truly exogenous. Popular instruments are geographical variables such as climate (because this aspect of the natural environment is obviously not influenced by economic development), or data on "deep historical roots," such as colonization processes.

This paper is not aimed at elaborating such an econometric approach. Instead, it wants to elaborate on the side of the stylized facts about the relationship between governance and institutions on the one hand, and economic growth and development on the other hand. In order to do this, we broaden the set of economic indicators in the analysis beyond GDP per capita. We include 7 indicators, including GDP per capita in 2000, its average annual growth rate over the period 2000 – 2007,[1] and the variability of this growth rate. Another four indicators measure the structure of the economy in terms of spending categories (consumption, investment, government expenditures) and the openness (in terms of trade) of the economy. Table 1 presents the formal definitions of these variables, and the abbreviations that we will use to refer to them throughout this paper.

Table 1. Economic indicators used in the analysis

LY00	GDP per capita, 2000, in international dollars
GR	GDP per capita, average annual growth rate over 2000 – 2007
C	Consumption as a % of GDP, average 2000 – 2007
I	Investment as a % of GDP, average 2000 – 2007
G	Government expenditures as a % of GDP, average 2000 – 2007
OPEN	Exports plus imports as a % of GDP, average 2000 – 2007
VARG	Standard deviation of average annual growth rate of GDP per capita, 2000 – 2007

Source of the data: Penn World Tables.

It is also well-known that correlations between the governance and institutions indicators used in Figure 1, and a direct measure of current economic growth, are much lower (in fact, close to zero, or even negative) than the correlation with the level of GDP per capita (Figure 1). Table 2 provides

[1] Although data are available beyond 2007, we use this as the last year because we want to avoid including the impact of the global economic crisis that occurred in 2008. How institutions and governance affect the impact of the crisis is the topic of a separate analysis.

an overview of the correlation coefficients between the 7 economic indicators and the 6 WGI indicators. The top row of the table reproduces the correlations with the level of GDP per capita that we reviewed earlier in the discussion of Figure 1. In the other rows of the table, there is not a single entry that points to a correlation that is even as strong as the weakest correlation (0.57) from the first row.

Table 2. Correlation coefficients between economic variables and the 6 WGI indicators

	Voice and Accountability	Political Stability & Absence of Violence/Terrorism	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
LY00	0.57	0.67	0.82	0.76	0.80	0.79
GR	-0.07	0.08	-0.02	0.03	-0.04	-0.10
C	0.06	0.24	0.30	0.28	0.31	0.25
I	-0.20	-0.10	-0.23	-0.24	-0.21	-0.19
G	0.08	0.35	0.34	0.35	0.31	0.30
OPEN	-0.15	-0.39	-0.13	-0.18	-0.20	-0.22
GRVAR	-0.42	-0.36	-0.45	-0.45	-0.42	-0.37

The strongest correlations beyond the first row of the table are found for the GRVAR variable, and all of these correlations are negative. In other words, countries that are more developed in terms of institutions and governance, as measured by the WGI dataset, tend to have less variation in their growth rates (during the pre-crisis 2000s). There are also fairly strong, and positive, correlations between the share of government in GDP (G) and the WGI indicators, except for Voice and Accountability. Interestingly, investment (I) is negatively correlated with all 6 WGI indicators. The growth rate of GDP per capita (GR) shows very weak correlations (the maximum absolute value observed in Table 2 is 0.10). We can thus safely conclude from Table 2 that the correlations between institutions/governance and the level of economic development are very strong, but this correlation is much weaker for other economic indicators.

In interpreting the correlations between the economic indicators and the institutional indicators, it must be borne in mind that there is no single indicator that represents institutional quality in all its dimensions. As already stressed above, the indicators used here so far are composite indicators, weighting together many other indicators covering a range of aspects of the institutional environment. The alternative found in the literature (e.g., Acemoglu and Robinson, 2001) is to use a particular selection from the range individual indicators that is available. Institutions and governance are multi-faceted phenomena that are not directly observed in their entirety.

The weightings used in the construction of these composite indicators are likely to influence the correlations that were reported in Figure 1 and Table 2. This means that the stylized facts that often are the starting point of the analysis of institutions/governance and economic growth, also depend on these weights. In case that the stylized facts are formulated in terms of single governance/ institutions indicators, they will depend on the particular choice for a single indicator that is made by the researcher.

Very little theory is available to guide the choice of weights that are used to construct the composite indicators, or to select individual indicators from the large spectrum that is available. For lack of such a theoretical framework, the weighting schemes that are employed are often simply equal weights, or hierarchical systems in which weighting within and between different levels of indicators is done on the basis of equal weights. However, there is nothing, besides the attractiveness of having a simple concept, that speaks for such equal weights constructs.

This leads us to a formulation of the research questions of this paper. We want to explore the available set of indicators on institutions and governance to investigate whether, at lower levels of aggregation of these indicators, we can discover a stronger and broader set of stylized facts than the correlation between the level of economic development and the level of institutional development (i.e., Figure 1). Thus, we ask whether there any aspects of institutions and governance that we have overlooked (or "aggregated away") in Figure 1 and Table 2, and which show higher correlation coefficients with the economic variables that we have selected, and, in particular, with growth.

A slight variation of this research question starts by asking whether there are any typical ("stylized") patterns within either the set of economic variables, or the set of institutional/ governance indicators. An example of such a pattern that might be found within the economic development indicators dataset is the typical negative correlation between the level of GDP per capita and the subsequent growth rate. This negative correlation is well-known in the literature about economic growth (see, e.g., Abramovitz, 1986, Verspagen, 1991, and Barro and Sala-i-Martin, 1995) and is either interpreted as a phenomenon related to the international diffusion of technological knowledge (Fagerberg, Srholec and Verspagen, 2010), or to the transition of a country's growth path to a steady state as predicted by e.g., the Solow model of economic growth (Solow, 1956).

If such stylized patterns exist both in the economic development domain and the institutions/ governance domain, an interesting question is how these patterns in the two domains are related to each other. Continuing the previous "catching-up" example, the question would become whether a "catching-up" pattern of economic development is correlated with a typical pattern for institutions/governance. Our main research questions here are whether we can detect such patterns in the data, how these patterns can be interpreted, and what they imply for the research agenda on governance, growth and institutions.

3. Data and methodology

For the dataset on institutions and governance, we resort to a different source, mainly because we want to start from a larger set of basic indicators than just the 6 WGI indicators that were used before. We therefore use the Institutional Profiles Database (IPD), which is a database that is based on a survey among French diplomats, asking them about institutional and governance characteristics of the countries in which they serve. The IPD database is described in detail in Meisel and Ould Aoudia (2007). We use the 2009 version of the database, which covers 123 countries across the world. Berthelier et al. (2004) use an older version of the database to derive a number of stylized facts about development and institutions.

The questions in the IPD survey are categorized in a 2-dimensional scheme, which covers 4 "sectors" and nine "functions" of the institutional system. The "sectors" cover the broad types of institutions and governance mechanisms that can be found, and are specified as follows: A) public institutions and civil society; B) the market for goods and services; C) the capital market; D) the labour market and social relations. The "functions" cover broad purposes of the system, and are specified as follows: (i) political institutions, (ii) security, law and order, (iii) functioning of public administrations, (iv) free operation of markets, (v) coordination of stakeholders and strategic vision, (vi) security of transactions and contracts, (vii) market regulation and social dialogue, (viii) openness to the outside world, and (ix) social cohesion. While this categorization yields, in principle, 9x4=36 subclasses of indicators, some of these potential subclasses are empty, resulting in 26 subclasses of indicators.

The IPD database contains 367 "elementary items", which are essentially questions that were posed to the respondents. These questions ask the respondent to rank a particular institutional aspect of the country in which they work on either a 1 – 4 or a 0 – 4 scale. The exact meaning of the scale differs per question, but is always explained with the question. Usually, if the scale is 0 – 4, it is somewhat "discontinuous" from 0 to 1, but "continuous" for 1 – 4. An example question is "Do the representative political institutions (parliament or equivalent) operate in compliance with the formal rules in force (constitution or equivalent)?", for which the answers would be "0 = no representative institutions. If representative institutions, from 1 = operation far from in compliance with the formal rules in force to 4 = operation closely in line with the rules in force".

The 367 elementary items are aggregated into 2 hierarchical levels, one containing 133 variables, and the other one 93 variables. These aggregated variables are obtained by taking weighted averages of questions that address a similar issue. For example, the aggregate variable "legality of political institutions" combines the following 5 questions: (i) Freedom and legality of elections, (ii) Do the representative political institutions (parliament or equivalent) operate in compliance with the formal rules in force (constitution or equivalent)? (iii) Do the political oversight institutions (constitutional court or equivalent, etc.) operate in compliance with the formal rules in force (constitution or equivalent)? (iv) Are there any institutions that de jure or de facto have a significant influence over the political running of the country alongside the legal institutions (political party, religious organisation, armed body, etc.)? (v) Participation of armed forces in political life, de jure or de facto.

The aggregate question is measured on a 0 – 4 scale, and is a weighted average of the individual answers. The weights in the weighted average are equal to the standard deviation of answers over countries. This is done in order to give a larger weight to items that discriminate more between countries. Thus, in the hypothetical case that all countries would have the same score, the item would receive a weight of zero.

The data for the version of the database that we use (IPD-2009) was collected by the French Ministry of Finance, and hence the respondents had a professional obligation to invest the necessary effort to complete the long survey. The respondents were chosen among those working in the French diplomatic service (usually, economic missions) in the country for which the data were being collected. The data were cleaned by the survey organizers, and where necessary, the respondents were contacted again to make sure that a complete response was received.

The methodology that will be used here is canonical correlation analysis (CCA).[2] This is a technique that is vaguely related to factor analysis, or principal components analysis (PCA). Because PCA is more widely used than CCA, we start by giving a brief description of how PCA works, and then explain how CCA differs. The basic idea in PCA, which is a specific type of factor analysis, is to reduce the number of variables in a dataset by constructing a set of new variables, each of which is a weighted average of the original variables. The weights in this weighted average are chosen in such a way that if one projects[3] the original data on the new variable, the sum of the residuals of this projection is minimized. Mathematically, this minimization is obtained by maximizing the variance of the new variable, which is also called a principal component.

Technically, the weights in PCA are equal to the eigenvector of the correlation (or covariance) matrix that describes the original data. A number of these eigenvectors exists (as many as there are variables in the original dataset), and the residual of the projection is minimized by taking the eigenvector with the largest eigenvalue. Interestingly, the residuals from the projection given by the first eigenvector, are in turn "best" projected onto the second eigenvector, and so on for each next eigenvector. Thus, when we rank the eigenvectors of the correlation matrix by the corresponding eigenvalues, each next eigenvector summarizes, in the best possible way, the part of the data that has not yet been summarized.

The idea of reducing a dataset by taking weighted averages of the original variables is shared between PCA and CCA. It is an attractive idea in the context of the data that we have used so far, because, as was described above, we are trying to capture a concept ("institutions and governance", or "economic development") that is not well described by a single variable, but instead can be captured by a combination of indicators. This is why others who have used the IPD have opted for PCA as a main exploration technique (e.g., Meisel and Ould Aoudia, 2007; De Combrugghe and Farla, 2011). The WGI indicators that we used above are in fact weighted averages of a larger set of indicators dealing with institutions and governance. Instead of the specific weighting schemes that were used to construct the 6 composite indicators in Figure 1, we could also use weights that are obtained from PCA, or, as will be done below, from canonical correlation analysis.

The main thing that distinguishes CCA from PCA is that it uses two datasets rather than one. For example, we could use one dataset that captures various aspects of "institutions and governance", which could be IPD, and one dataset that captures various aspects of "economic development". Canonical correlation analysis reduces both datasets to a lower number of dimensions, as PCA does with its single dataset. Like PCA, CCA also works by taking weighted averages of the original variables. The way in which these weights are found, and this is different from PCA, is by maximization of the correlation coefficient between the two new variables, i.e., one for each dataset. Thus, canonical correlation analysis summarizes each dataset in such a way that the new variables that result from the summary are maximally correlated (whereas PCA choses the weights in such a way that the original data and the new variable are maximally correlated).

Like PCA, canonical correlation analysis works by finding eigenvalues and eigenvectors. However, there are now two matrices on which this is done, one for each dataset, and both of these matrices are somewhat more complicated than the correlation matrix that is used in PCA. Still, the basic idea

[22] A general reference that explains the technical details of canonical correlation analysis and principal components analysis, is Anderson (2003).
[3] Projection means "vector projection".

of using subsequent eigenvectors, ranked on corresponding eigenvalues, remains the same. The pair consisting of the first eigenvector in each of the datasets yields the largest correlation, the next pair the next largest correlation, etc.

It is easily seen how this idea of maximizing correlations between summaries of two datasets links up to our research questions, which ask for stylized descriptions (summaries) of data patterns that describe the main correlations between the phenomena that are of interest to us, i.e., economic development, institutions and governance. Canonical correlation analysis supplies us with a number of such summaries (eigenvectors, also called loading vectors) that give us the maximally attainable correlations that exist in the data. We will therefore proceed to run a series of canonical correlation analyses, using one dataset on institutions and governance, and one dataset on economic development. The latter will be the dataset that consists of the 7 indicators in Table 1, and which have been used before in Table 2.

As could be expected from the similarity between PCA and CCA, the two methodologies suffer from the same type of drawbacks. Perhaps the most important one is that the outcomes of the analysis have nothing to offer in terms of identifying causality. In the context of our research question, which asks for associations or correlations instead of causal mechanisms, this is not a main problem.

4. Institutions and Governance in the IPD database

We now proceed to analyze the IPD database in conjunction with the economic development dataset. The main advantage of this database over the WGI dataset is that it is available in the most disaggregated format, which enables us to go beyond the maximum of 6 dimensions that are available in the public version of the WGI database.

However, the canonical correlation analysis that we use, requires us, like most other statistical techniques, to use (significantly) less variables than observations. This is why we opted for the highest aggregation level of the elementary items, which gives 93 variables. However, with 123 countries, this is still too much, so we reduced the number of variables in the final canonical correlation analysis even more. This was done by principal components analysis (PCA), which was performed on all variables within each of the four sectors in IPD: A) public institutions and civil society; B) the market for goods and services; C) the capital market; D) the labour market and social relations. This yields a set of principal components for each of the four sectors of IPD. We selected, mechanically, all principal components with eigenvalues above 1, which yields 22 new variables (8 in sector A, 7 in sector B, 3 in sector C and 4 in sector D). De Crombrugghe and Farla (2011) present an aggregation method of the IPD variables that is broadly similar to the approach that we follow here.

Table 3. Summary of the most important IPD variables resulting from the principal components analysis

	Public institutions and civil society	Market for goods and services		Capital market	Labour market and social relations
Function	A1 – Efficient democracy	B1 – Positive market attitude	B2 – Market steering	C1 – Development of the financial system	D1 – Development of social relations
Political institutions	Stable democracies with decentralized governance	--	--	--	Freedom of association, autonomous trade unions
Security, Law and order	Control of violence	--	--	--	--
Public administration	Efficient governance, limited lobby influence	Easy to start a business, public support for firms and natural resource management oriented towards public interests	Special economic zones, public support for firms oriented towards public interests	--	--
Free operation of markets	--	Efficient public organizations, transparent and open privatizations, freedom of prices	Some price control	Free loan market	Re-training and re-skilling important
Coordination of Stakeholders and Strategic vision	Effective political systems, long-run political vision	Innovation and innovation policy important	Some innovation policy	Competent bankers, venture capital important	Strong relationship between education system and labour market, adult vocational training
Security of transactions and contracts	Property right and contracts well ensured	Transparent markets, intellectual property protected, little collective land ownership	Land in high demand, involvement of large investors in land markets	Strong financial information	Respect for workers' rights

	Public institutions and civil society	Market for goods and services		Capital market	Labour market and social relations
Market regulation & social dialogue	--	Weak barriers of entry, anti-trust policy, little public shareholding	Public shareholding important, land policies important	Competition in banking sector, financial regulation and monitoring	Mostly central wage bargaining, well-developed labour-employers relations
Openness to outside world	Western oriented (USA and Europe)	Free trade, free flow of capital	Some trade restrictions, some free flow of capital	Financial openness	Open employment for non-nationals
Social cohesion	Large national cohesion and social inclusion	--	--	Micro credit not important	High quality public education and health care systems, weak segmentation in labour markets, absence of child labour, high social mobility, policies regarding income distribution exist

(**Table 3 continued**)

The full details (loadings on all 93 variables and eigenvalues) are available in the appendix. Here we discuss a subset of the six principal components that will appear to be most prominent in the next section, where we relate the IPD data to economic development. These are summarized in Table 3, where a breakdown has been made in terms of the nine functions that the IPD database features. In the "Public institutions and civil society" sector, we discuss the first principal component (PC), which we summarize as the archetype of efficient democracy (here, "democracy" is used in a broad sense). It stresses the importance of democratic institutions, property rights, openness to the world and control of (state) violence. But this PC also includes a strategic vision of the government, and efficient public administration.

We find two important PCs in sector B) the market for goods and services. The first PC here measures a generally positive attitude towards markets. It stresses the ease of starting new businesses, freedom of prices, transparent privatizations, anti-trust policies, absence of public shareholders in business, etc. Interestingly, it also captures efficient public organizations, and the intention to serve public interests by policies aimed at firms. The second PC in this sector captures the intention to manipulate and steer markets, for example by special economic zones, price controls, public shareholding, and some restrictions on free trade. This PC also loads high on the importance of land policies in development.

In the last two sectors, we find only one important PC per sector. For the C) capital markets sector, the first PC measures the overall development of the financial system. It stresses the free operation and international openness of the financial system, but also the competence of bankers, and the extent of regulation. The first PC in the D) labour market and social relations sector measures the general level of development of social relations between employers, workers and the government. It does not stress very much the free operation of labour markets, but instead focuses on training and education opportunities for workers, workers' rights, freedom of association, and a health care system.

5. Empirical analysis

5.1. Economic Development

We start by looking at the correlation coefficients between the variables in the economic development dataset (as in Table 1) on the one hand, and the IPD dataset (as reduced by the procedure described above) on the other hand. These correlation coefficients are displayed in Table 4. The bottom row summarizes the maxima of the absolute values of the correlation coefficients for an individual variable. This is very high for the level of GDP per capita (LY00), which correlates very strongly with each of the first PCs of the four sections in IPD (i.e., AF1, BF1, CF1 and DF1). The other correlations in the table are much lower than this. Even though all of the economic development variables correlate significantly with at least one of the IPD variables, it is clear that the correlation between institutions on the one hand, and the level of GDP per capita on the other hand, is not representative for the full range of economic variables in our dataset. Obviously, this is consistent with the results in Table 2. Hence, we can confirm that, broadly speaking, the IPD dataset is similar to the WGI dataset in terms of the correlations that it offers with the variables in our dataset on economic development.

Table 4. Correlation coefficients between the economic variables and the IPD variables

	LY00	GR	C	I	G	OPEN	GRVAR	Max(abs.)
AF1*	**0.76**	-0.01	0.15	-0.15	***0.24***	-0.07	***-0.48***	***0.76***
AF2	***0.23***	**0.19**	***0.28***	0.10	0.17	-0.03	0.06	***0.28***
AF3	-0.08	0.01	-0.02	-0.05	-0.06	***0.38***	0.08	***0.38***
AF4	0.08	**0.22**	***0.30***	-0.16	**0.19**	-0.08	-0.13	***0.30***
AF5	-0.09	0.01	-0.03	0.13	-0.09	-0.13	0.01	0.13
AF6	-0.04	***0.30***	0.06	0.00	**-0.20**	**0.19**	0.05	***0.30***
AF7	-0.09	0.17	**-0.20**	-0.05	-0.11	0.13	0.01	**0.20**
AF8	-0.04	***-0.27***	0.01	-0.17	0.02	0.05	-0.03	***0.27***
BF1*	***0.80***	0.01	0.16	**-0.18**	***0.27***	-0.08	***-0.43***	***0.80***
BF2*	0.14	0.17	***0.23***	-0.11	0.12	***0.26***	0.01	***0.26***
BF3	0.16	-0.14	-0.09	0.00	-0.17	-0.01	0.06	**0.16**
BF4	0.04	0.15	0.06	0.07	**0.20**	-0.17	0.13	**0.20**
BF5	**-0.20**	-0.16	-0.10	0.02	-0.06	-0.02	-0.05	**0.20**
BF6	0.00	-0.02	-0.06	0.05	0.03	-0.10	0.05	0.10
BF7	0.11	0.16	0.14	-0.11	0.12	-0.11	-0.12	0.16
CF1*	***0.69***	-0.12	0.08	***-0.27***	**0.19**	-0.10	***-0.45***	***0.69***
CF2	***0.35***	0.15	0.14	0.05	0.14	0.15	-0.04	**0.35**
CF3	**-0.21**	0.09	-0.06	-0.01	**-0.19**	***0.32***	-0.06	**0.32**
DF1*	***0.71***	-0.03	0.02	-0.12	**0.21**	-0.05	***-0.37***	***0.71***
DF2	**0.22**	0.11	**0.22**	-0.01	***0.30***	-0.18	-0.03	***0.30***
DF3	***-0.36***	0.01	-0.19	-0.05	-0.06	0.09	0.08	***0.36***
DF4	0.07	0.13	**0.20**	-0.01	0.09	0.10	0.03	**0.20**
Max(abs.)	***0.80***	***0.30***	***0.30***	***0.27***	***0.27***	***0.38***	***0.48***	

Notes: * These variables were discussed in Table 4.
Values printed in bold are significant (p-value<0.05), values printed in bold and italics are significant (p<0.01).

The correlations in Table 4 set a benchmark for the canonical correlation analysis, because we would expect that, if (more) coherent patterns exist between the two datasets, including a broader set of correlations in the analysis, would lead to higher correlations. We start by running canonical correlations between the IPD dataset on the one hand, and each of the variables in Table 1 separately. This means that one of the two datasets in the analysis, the economic indicators, has only a single variable. In this case, the canonical correlation coefficient is identical to the square root of the R^2 of a multiple regression with the economic indicator as the dependent variable, and the 22 IPD indicators as explanatory variables. The loadings on the IPD indicators are equal to the regression coefficients. This exercise is intended to explore the simplest type of stylized fact, i.e., how indicators of governance and institutions are jointly correlated with single dimensions of economic development. The results are displayed in Figure 2. Although the canonical correlation analysis that underlies Figure 2 included 22 IPD indicators, as in Table 4, we only display the results for the 5 indicators that were discussed earlier (the appendix gives the full set of loadings). The reason for this selection is twofold: on the one hand we want to simplify interpretation by *looking* at a limited number of indicators (even though a much larger number of indicators were

included in the analysis), and on the other hand these 5 indicators are the ones that yield sizable absolute values of the loadings.[4,5]

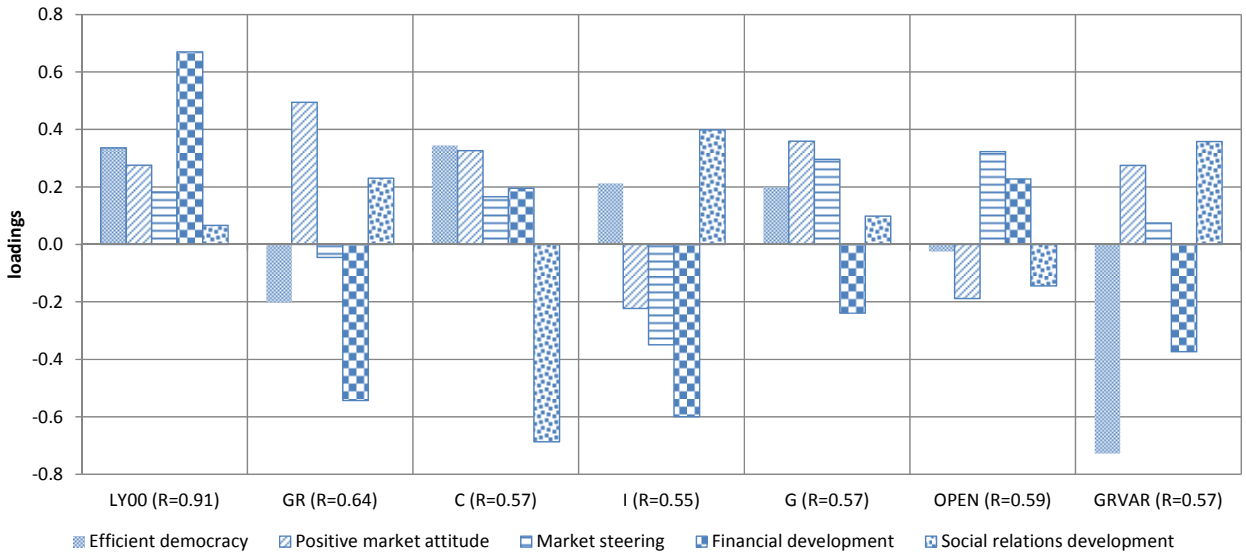

Figure 2. Loadings obtained in the canonical correlation analysis, one economic variable, all IPD variables

The canonical correlation coefficients range from 0.55 (for investment) to 0.91 (for GDP per capita). This confirms the impression from the univariate correlation coefficients in Tables 2 and 4. The level of GDP per capita is the variable from our economic development dataset that correlates most strongly with institutions and governance indicators. But interestingly, growth now has the second-highest canonical correlation coefficient, equal to 0.64.

In the figure, we see that the loadings of the IPD indicators differ substantially between the economic indicators. Most of the correlations are dominated by a single, or a few, IPD indicator(s). For GDP per capita (LY00), the highest loading is on Financial development, but all other loadings are positive too, and those on Efficient democracy and Positive market attitude are also sizable. For Growth (GR), the combination of IPD indicators more than doubles the correlation, relative to a case of univariate correlations with only a single IPD indicator (Table 4). Thus, growth seems to be correlated to complex set of institutional/governance indicators. In this case, Positive market attitude stands out with a high and positive loading, while Financial development stands out with a strongly negative loading.

The other five economic development indicators all have canonical correlation coefficients that are in a narrow range of 0.55 – 0.59. Consumption as a share of GDP has positive loadings on all IPD indicators, except Social relations development, which is strongly negative. Investment, on the other

[4] The selection was done on the basis of the results of the canonical correlation analysis that will be presented below, in which all economic indicators are correlated to all IPD indicators. In this case, the maximum absolute value of loadings for the 17 IPD indicators that are not displayed was 0.34, while none of the 5 selected IPD indicators had a maximum absolute value of the loadings that was less than 0.47.

[5] All loadings are scaled in such a way that the sum of squares of all loadings in a "factor" is equal to 1.

hand, has negative loadings for 3 out of the 5 IPD indicators, and, surprisingly, especially Financial development stands out with a strongly negative loading. The share of government in GDP has only moderately-sized loading, which are all positive, except the one for Financial development. Openness also has only moderately-sized loadings, but this is not true for the variability of growth. This last variable loads strongly negative on Efficient democracy, and Financial development, and positively on Development of social relations.

While these correlations are insightful, there is no particular reason why we should have only a single variable on the side of the economic indicators dataset. The power of the canonical correlations framework lies in being able to summarize both datasets in terms of loadings, while maximizing the correlations. Thus, we proceed to an analysis in which all 22 IPD indicators and all 7 economic development indicators are included. This is displayed in Figure 3. Since we have 22 variables in the IPD dataset and 7 in the economic development dataset, we get 7 "factors," which are correlated with each other between the datasets in a decreasing order. In our specific case, the highest canonical correlation is 0.93, the lowest is 0.39.

We can use the loadings to characterize these factors. For the first one (correlation = 0.93), we have positive loadings on most variables in the economic development dataset, except GRVAR (the loadings for C and I are positive but very close to zero). Especially LY00 has high positive loadings, the other loadings are of moderate proportion. In summary, countries that score high on the first economic development factor are developed countries with low variation in their growth rate over time. On the IPD side, all loadings are positive, and the ones for Efficient democracy, positive market attitude and Financial development are highest.

Compared to the first, the canonical correlation for the pair of second factors is significantly less, i.e., 0.64, although this is still fairly high, especially as compared to the correlation coefficients in Table 4. On the economic development side, growth of per capita GDP (GR) dominates the loadings. The level of GDP per capita has a slightly negative loading, which is consistent with a catching-up pattern (poor countries grow faster), although this is relatively weak, because the loading on GDP per capita does not have a high absolute value. The other loadings on the economic development side for this factor all have low absolute values. On the IPD side of the second factor, two loadings stand out: the one for Positive market attitude, with a high positive loading, and the one for Financial development, with a relatively strongly negative loading. High growth rates are correlated with embracing markets, but also with a low level of development of the financial sector.

The third pair of factors only has a marginally lower correlation coefficient (0.63) and must therefore be considered on an equal footing with the second pair of factors. On the economic dataset side, this one is dominated by a high and positive loading on openness, a positive but moderate loading on GRVAR, as well as a relatively strongly negative loading on investment. On the IPD side, the positive loadings on Market steering and Financial development are most striking.

Although the remaining 4 correlations are still fairly high, the specific loading patterns that they are associated with are also harder to interpret, because they include a mixture of high absolute values that are not easy to link together in a clear-cut interpretation. Therefore, we do not discuss these factors in detail, but instead focus on the factors that have been discussed so far.

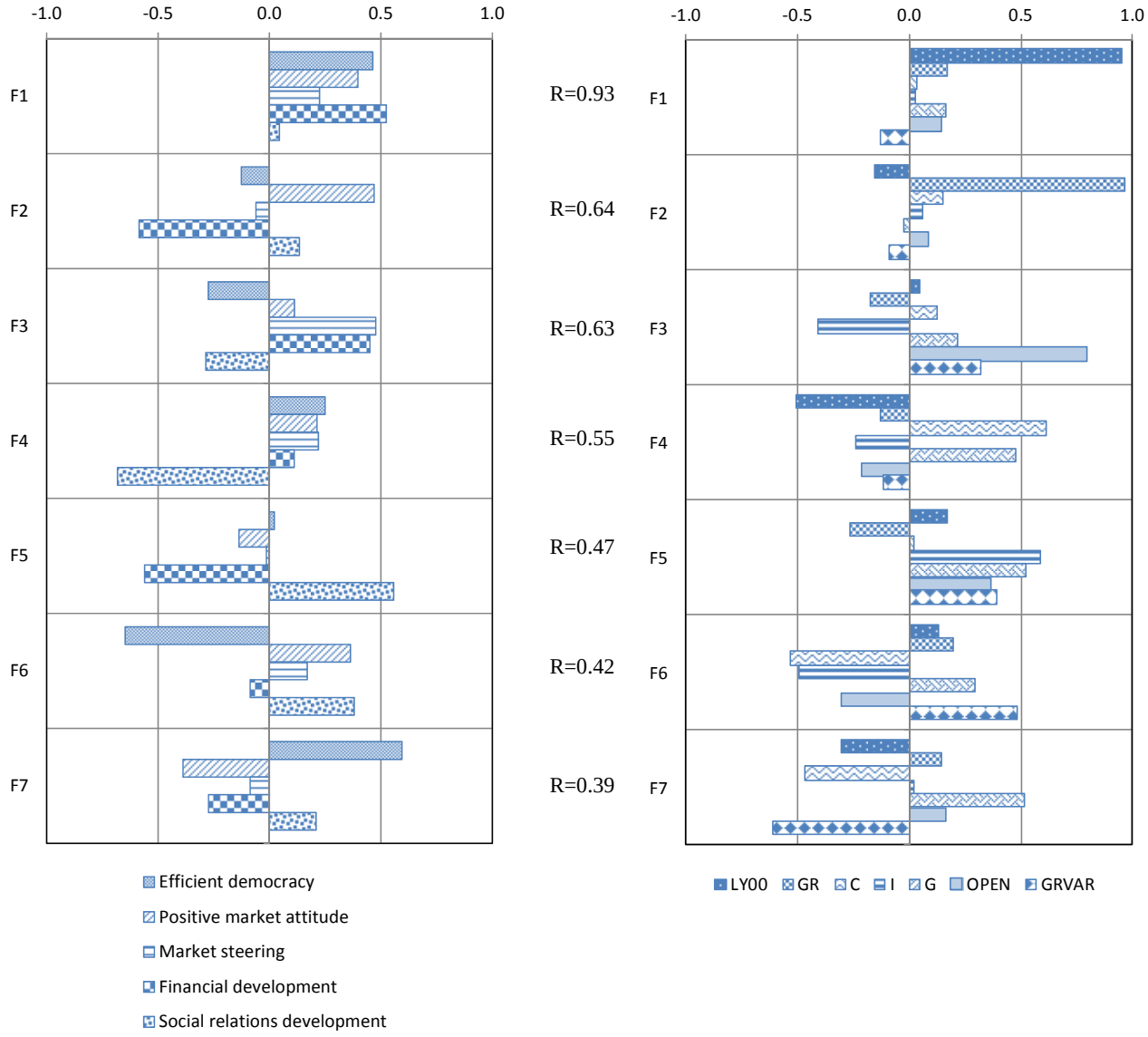

Figure 3. Loadings obtained in the canonical correlation analysis, all economic variables, all IPD variables (loadings on IPD variables on the left, loadings on economic variables on the right)

We continue this discussion by looking at the scatterplots of the correlations of the first three canonical factors. These plots are in Figure 4. In the first plot, we see the tight (0.93) correlation between the level of economic development (vertical axis) and institutional development (horizontal axis). This is the correlation that is essentially captured by the standard stylized fact about institutions/governance and economic development (e.g., Figure 1). It is a familiar picture, with the Western countries (North- and West-Europe, North America) in the upper-right corner. They are joined there by some of the high-income Asian countries, such as Singapore and Hongkong, and some countries from the Middle East (United Arab Emirates, Kuwait). In the lower-left part of the figure, we find many African countries (with Zimbabwe and the Democratic Republic of Congo as negative outliers).

The second plot is rather different. This captures the high-growth (catching-up) factor from the economic development dataset, and a positive market attitude and low level of financial development on the IPD side. The countries in the upper-right part of the plot are a heterogeneous geographical group, including China, Angola, Azerbaijan, Kazakhstan, Ukraine, Israel, Romania, Qatar and Vietnam. Once again, many African countries are in the lower-left part, but now they are joined by some of the developed countries, such as Australia, Austria, Belgium and the Netherlands.

The last plot captures the openness factor on the economic side, and market steering and financial development on the IPD side. In the right-upper corner of the graph, we see a group of very large countries: USA, China, India, Philippines, Mexico and Indonesia. We do not see a particular bias towards Africa in the lower-left part of the figure, but also see some other countries there (in particular, a mixture of European countries such as Finland and Estonia). In this figure, like the previous, we do not see any particular clustering of developed countries.

Summarizing, we can say that our first pair of factors from the canonical correlation analysis captures the well-known stylized fact about the relationship between economic development, institutions and governance, which is that the general level of institutional development is correlated strongly with the general level of economic development (GDP per capita). This pair of factors ranks countries by their level of development, in particular the economic dimension and the institutional/governance dimension, and nothing else.

The second and third pairs of factors represent a new set of stylized facts. On the economic side, growth (of GDP per capita) and openness (in terms of trade) are the defining variables in these new stylized facts. On the side of institutions and governance, the attitude towards markets (for goods and services) and the level of financial development appear as the important variables. In particular, we find a strong correlation between catching-up based growth (high growth in countries that are somewhat less developed) on the one hand, and a positive attitude to markets and low level of financial development on the other hand. The second new stylized fact that we identify is between openness (and a low investment rate) on the one hand, and market steering combined with a high level of financial development on the other hand.

Together, this provides a rather interesting mixture of different roles of finance and markets in economic development. On the one hand, free markets seem to go together with high growth rates, but market steering seems to go together with high involvement in trade. On the other hand, financial development seems to come and/or go with a high involvement in trade, but does not seem to combine very well with a high growth rate. Of course, these stylized facts are specific for the period that we investigate (i.e., the pre-crisis 2000s), and are based on multivariate rather than univariate correlations.

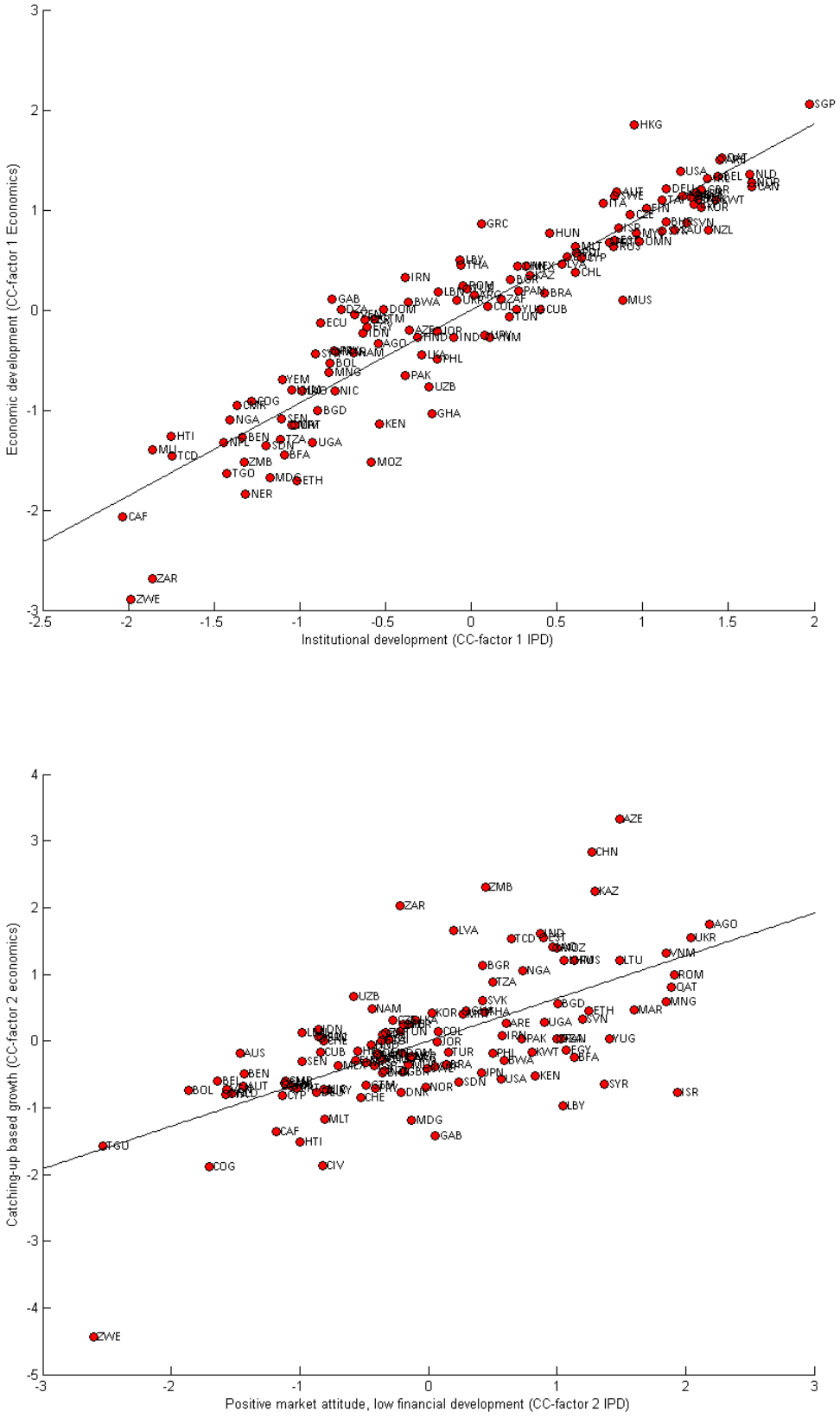

Figure 3. Scatterplots of the first 3 factors estimated by canonical correlation analysis

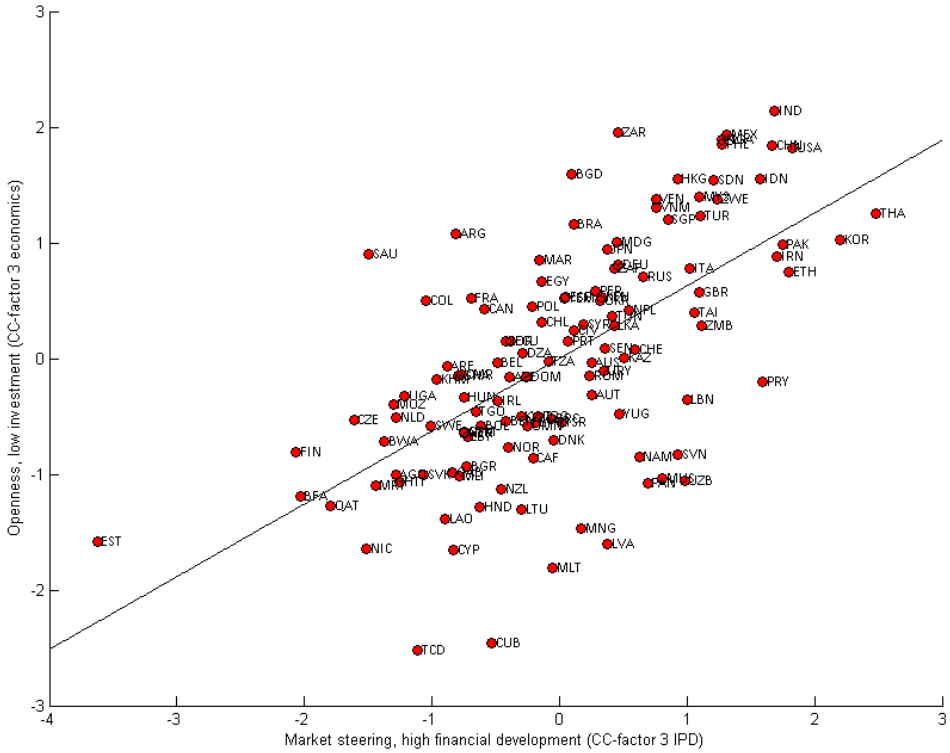

Figure 3. Scatterplots of the first 3 factors estimated by canonical correlation analysis (continued)

5.2. Geography

Geography is often seen as an ultimate causal factor behind institutions and governance (Acemoglu and Robinson, 2001; Engerman and Sokoloff, 1997), and is therefore often used as an instrument for institutions in growth regressions. Like institutions themselves, geography is a multi-faceted phenomenon, including such diverse factors as climate, access to waterways, fertility of land, the disease environment, elevation, etc. Thus, when choosing the particular instrument to use in a regression, researchers have had to make a particular choice from this broad set of indicators.

We conclude our analysis by using the canonical correlation analysis to look for correlations between, on the one hand, the three dimensions of institutions and governance that we have identified so far, and geography on the other hand. To do this, we make use of a dataset on geographical factors that has often been applied in the empirical analysis of economic growth and development (Gallup et al., 1999). This dataset contains a large amount of variables, from which we select 54 basic indicators that broadly cover 3 groups of geographical phenomena: (i) climate and soil conditions (15 indicators), (ii) occurrence of a number of (tropical) diseases (29 indicators), and (iii) physical geography, including access to waterways and elevation (10 indicators).

We apply the same procedure as was applied earlier for the IPD dataset, i.e., we run principal components analysis within each of the three subgroups of indicators in the geography dataset, and maintain only the principal components with eigenvalues above 1. In this way, we obtain 17 new

indicators: 8 for the disease environment, 7 for the climate group, and 2 for the physical environment. These 17 new indicators are used in the canonical correlation analysis. The details of the PCA analysis that led to the reducing of the geography dataset are provided in the appendix.

Following the idea from the literature that geography can be seen as an ultimate determinant of institutions and governance, we are primarily interested in the relation between each of the IPD dimensions that we obtained before, and the geographical variables in our dataset. In other words, we want to know about the geographical context of the three IPD dimensions that we extracted in combination with economic development patterns (previous section). Therefore, we only look at canonical correlations with one of the IPD dimensions, and all 17 geographical indicators (rather than using all IPD dimensions, or even all IPD indicators) in combination with the 17 geographical indicators.

In order to save space, we do not document the details of the principal components analysis within the geography dataset, nor the detailed loadings of the canonical correlation analysis (these are provided in the appendix). Instead, we jump immediately to the scatterplots describing the canonical correlations that were obtained. These are in Figure 4.

The strongest canonical correlation (0.80) is obtained for the first IPD dimension, i.e., the one that describes the general level of institutional development, and which correlates strongly with the level of economic development. On the geographical side, the loadings in this correlation point to a low occurrence of tropical diseases, a steppe climate, and (moderately) easy access to waterways (oceans and large rivers). In general, this factor can be interpreted as a set of favourable geographic conditions. In the scatterplot, we see the developed nations of Europe and North America, along with some Middle East and Asian countries emerging on top of the distribution (upper-right part of the graph). Once again, the lower-left corner is full of African countries, indicating that this continent is plagued by unfavourable geographical and institutional conditions.

As before, this geographical factor captures the well-known stylized facts about geography, development and institutions. Countries that core low on a general scale of institutional and economic development are characterized by particular geographical conditions, including a bad disease environment, unfavourable climate, and difficult access to waterways. This result confirms existing results in the literature.

The next two IPD dimensions introduce new stylized facts, as described above. In terms of their correlation with geography (in the canonical correlation analysis), we obtain significantly lower correlations, i.e., 0.44 and 0.47, respectively, for the second (growth) and third (openness) dimensions. For the second IPD dimension, which has been described as a combination of a positive market attitude and low financial development, the loadings on the geographical indicators first of all point negatively to a tropical climate. Thus, countries outside the tropics will score relatively high on this factor. Otherwise, a steppe climate has moderately positive loading, and a combination of specific diseases, including malaria and yellow fever, also has a moderately positive loading. Overall, this geographical dimension is less clear than the first one, as is also evident from the graph. We find a mixture of countries including Ukraine, Vietnam and Mongolia on top of the ranking (and hence in the top-right part of the graph). Many African countries score low in this geographical dimension, but also Singapore and Hongkong have low scores.

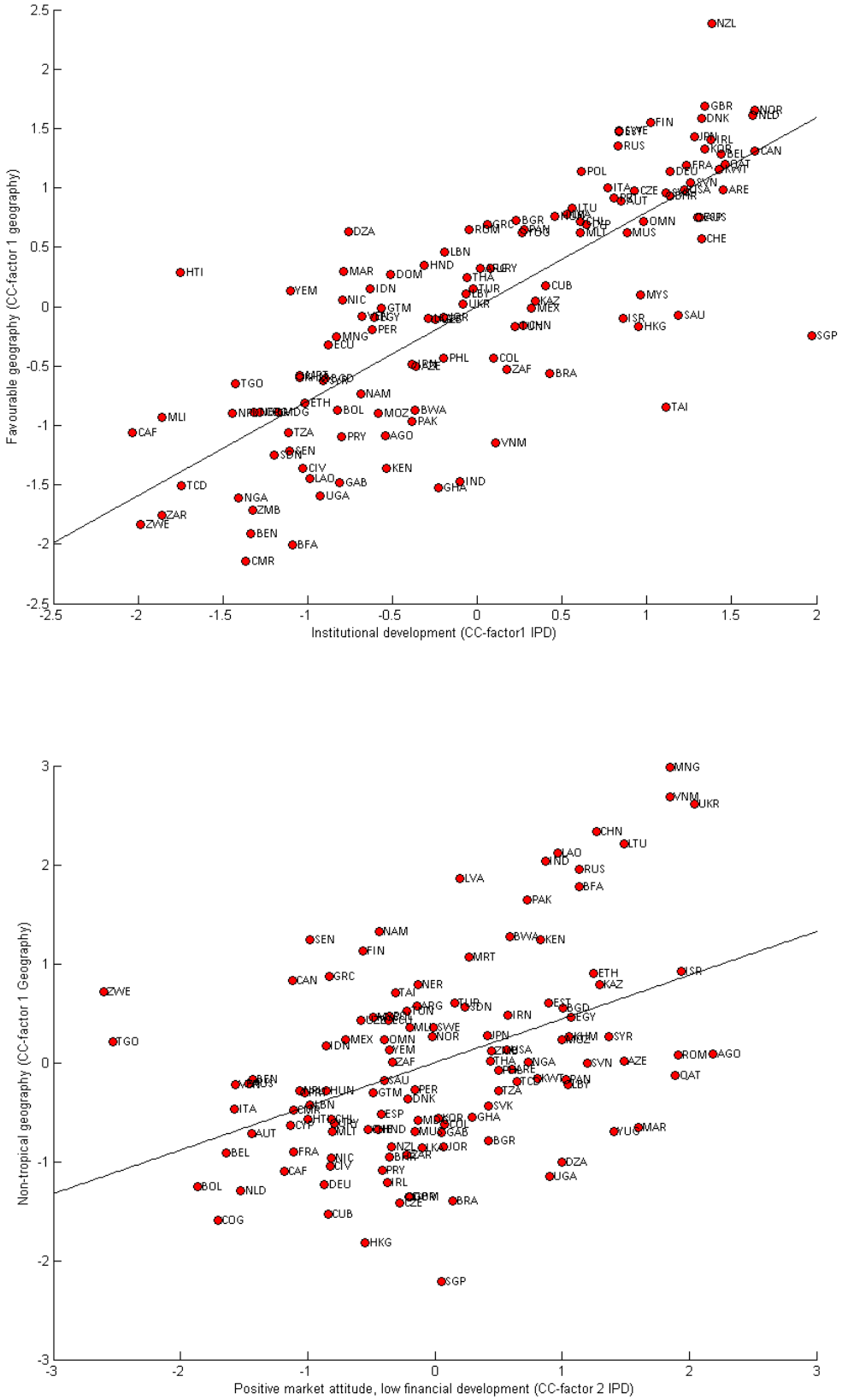

Figure 4. Scatterplots of the factors estimated by canonical correlation analysis between IPD dimensions and geography

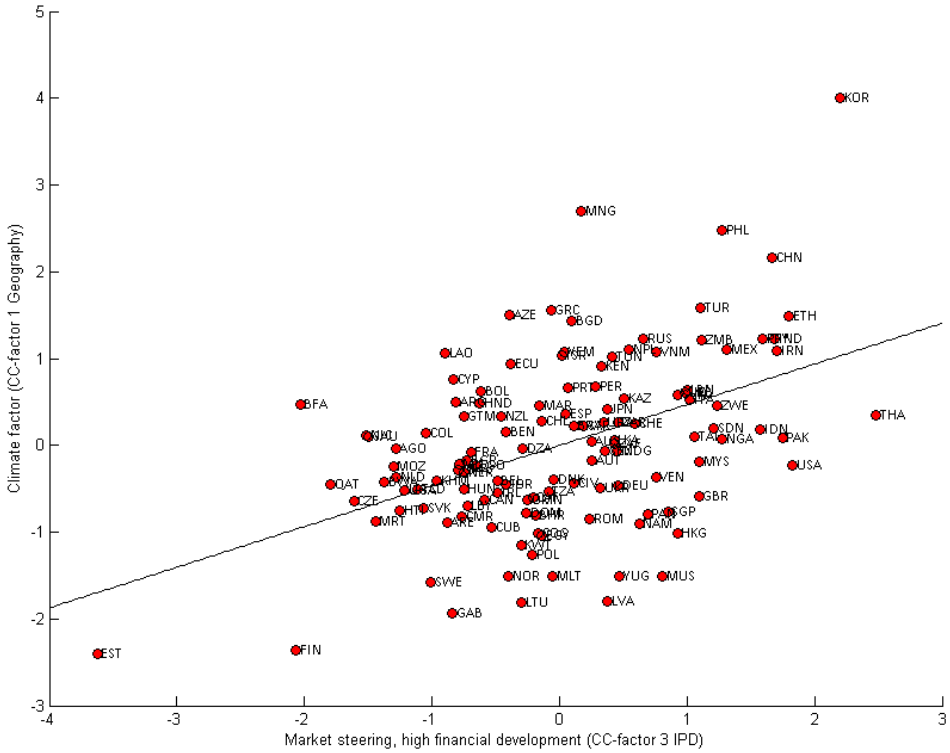

Figure 4. Scatterplots of the factors estimated by canonical correlation analysis between IPD dimensions and geography (continued)

The third IPD factor covers market steering a high level of financial development. In the geographical context, a maritime or alpine climate loads high. Asian countries such as China, Korea and Philippines score high on this geography factor, Northern European countries such as Finland and Estonia negatively.

6. Summary, conclusions, discussion and outlook

Our canonical correlation analysis has identified a number of stylized facts on the relationship between institutions, governance and economic development. The first one of these confirms the one stylized fact that dominates the literature, i.e., that the level of development, as indicated by per capita GDP, is positively correlated with the level of development of institutions and governance. Richer countries tend to be more democratic, have more efficient governments, have better and more active policies, more open markets, more developed financial systems, and more developed social relations. This correlation is generally interpreted as a causal relation from institutions to economic growth, although more advanced econometric methods are necessary to establish the direction of causality

In addition to this stylized fact, we find two additional stylized facts. These involve specific aspects of the governance and institutions environment. One additional stylized fact is that catching-up

based growth, i.e., high growth rates in countries with a low initial GDP per capita, is correlated with a positive attitude towards markets, and a low level of financial development. The other stylized fact is that countries that are very open in terms of trade, and which have relatively low investment rates, tend to also be countries that have relatively strongly developed financial systems, but also elaborate policy mechanisms that are aimed at influencing or steering markets.

Even though the direction causality is not established in these correlations, they provide an interesting perspective on the relationship between institutions, governance and economic development. One the one hand, they confirm conventional wisdom about the efficiency of market economies in generating economic growth (e.g., Williamson, 1990), but on the other hand, they also stress the importance of policy mechanisms that influence and steer markets. Especially in economies that open up to the outside world, this type of governance seems to be important.

With regard to the financial system, our results stress the importance of a broad perspective. Financial systems are not assessed alone on the basis of how open and liberal they are, but also on the competence of their actors (bankers) and the regulation mechanisms that are in place. Viewed in this way, our results stress the importance of a well-developed financial system for countries that are integrated in the world economy. However, and perhaps somewhat unexpected on the basis of conventional wisdom, such integrated countries with well-developed financial systems also tend to have relatively low investment rates. Overall, then, the role that finance that emerges from our analysis seems to be one of balanced and gradual growth, where financial development gradually expands together with economic development in a broader sense. Financial development does not seem to be leading economic development in the broader sense.

Does this modify our existing impression of the broad correlations between economic development, institutions and governance? It does to the extent that we have shown that there are also correlations with other economic variables than the level of GDP per capita, for example a direct measure of the growth rate, and the shares of spending categories in GDP. This opens up possibilities for applying econometric models in which these variables, first of all the growth rate, are the dependent variable. In this way, the topic of institutions and governance may be integrated into the other empirical growth literature in a more direct way. In doing so, our analysis suggests that the primary focus in terms of explanatory variables should not be on the broad average of institutional development (because this correlates well with the level of development, not the growth rate), but on specific aspects of institutions and governance. In particular the policy attitude towards markets and the financial systems seem to be important variables for explaining growth.

It is interesting to see that the variables that capture the democratic nature of a society, and the nature of social and labour relations do not figure prominently in the canonical correlations for growth. The former of these variables, democracy, only seems to play a large role in the correlation with the general development level, while the latter, labour and social relations, seems to be mostly important for explaining consumption. This result suggests that institutions and governance should not be looked upon as a single-dimensional phenomenon, in which countries can only travel forward or backward. Instead, there are specific institutional arrangements and policies that stimulate specific aspects of economic development. Although not everything goes, governments have choices.

These results are hardly final conclusions, for at least two reasons. First, they refer to a limited period in time, the pre-crisis 2000s. Because the global economy has undergone important changes over the past few decades, it is to be expected that institutional and governance setups that "worked" 25 years ago, might no longer work in today's global economy. It therefore seems important to extend the analysis here both forward and backward in time. Looking forward, the question as to how institutions and governance are important in determining the impact of the 2008-crisis imposes itself. Looking backward, we might ask whether during times when the world economy was less "globalized", institutions and governance had a different relation to development. More data, especially on institutions and governance, will have to be found in order to look at these issues.

The second reason why the current results cannot be viewed as final conclusions is that they do not establish any direction of causality. Econometric work is necessary to develop causality. Methods for this exist in the literature, and these can be readily applied to the IPD database. Our findings here suggest that this work can take the growth rate of an economy as the dependent variable, but in this case the institutional and governance indicators need to be sufficiently disaggregated to expect significant results.

Last, but not least, we must point to the need for further theoretical work on the role of institutions and governance in explaining economic growth. Our exercise was aimed at finding stylized facts that can guide theoretical explorations, and we have uncovered these stylized facts. Thus, we can ask to the theoreticians why especially the attitude towards markets and market steering, as well as the development level of the financial system, would be correlated to growth, and why other aspects of institutions and governance are less directly correlated to the growth rate.

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Appendices

I. Loadings obtained in the PCA for IPD sectors

All loadings in Appendix I have been scaled to make the sum of squared loadings within a principal component equal to 1.

I.A. Sector "Public institutions and civil society"

IPD code	IPD description	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
a10	Democracy, Legality and Freedom	0.819	-0.452	-0.027	-0.013	-0.030	0.066	-0.026	0.126
a11	Political stability and Legitimacy	0.835	0.044	-0.038	0.163	0.022	0.025	0.017	0.021
a12	Decentralization	0.719	-0.356	0.177	-0.115	-0.195	0.074	0.069	0.062
a20	Domestic public security and Control of violence	0.700	0.326	-0.223	0.057	0.086	-0.083	0.096	0.172
a21	Control of State violence by NGOs	0.685	-0.431	0.081	-0.019	0.051	-0.078	0.138	-0.134
a22	External security	0.379	-0.032	-0.444	0.280	0.087	-0.338	0.136	0.268
a30	Governance of public administration and the justice system	0.954	-0.008	-0.012	0.008	-0.044	-0.022	-0.075	0.051
a31	Autonomy of public policies	0.214	0.292	-0.398	-0.479	0.343	0.027	-0.203	0.189
a32	Donors' influence	-0.565	-0.328	0.015	0.128	0.173	-0.083	0.141	0.090
a33	Autonomy in operation and creation of organizations	0.654	-0.639	-0.027	-0.064	0.108	0.087	0.037	0.084
a34	Government capacity to reform	0.795	0.266	-0.110	-0.131	-0.104	-0.028	0.089	0.097
a35	Fiscal exemptions	0.330	-0.357	-0.020	-0.370	-0.090	0.112	0.042	-0.226
a50	Capacity of the State to coordinate stakeholders	0.826	0.159	0.175	-0.145	-0.150	-0.026	-0.085	0.033
a51	Strategic capacities	0.889	0.289	0.109	-0.060	-0.143	0.032	-0.065	-0.044
a52	Government's arbitration capacity	0.556	0.562	-0.034	-0.174	-0.008	-0.054	0.206	-0.038
a53	Institutional capacity	0.824	0.091	0.171	-0.002	-0.111	-0.098	0.005	-0.018
a54	Government political capacity	0.688	0.195	-0.334	0.012	0.078	-0.096	0.037	0.052
a55	Change, Innovation	0.874	-0.053	0.048	0.021	-0.205	0.079	-0.013	0.006
a56	Cooperative behaviour in society	0.614	-0.219	0.294	-0.015	-0.110	0.095	-0.208	-0.001
a57	Outlook of young people	0.530	0.156	0.077	0.065	0.421	-0.035	0.126	-0.404
a60	Security of transactions and contracts	0.934	-0.073	-0.001	-0.001	-0.017	-0.029	-0.070	0.056
a61	Government respect for contracts	0.594	0.079	-0.177	0.267	0.105	0.054	-0.327	-0.014
a62	Frequency of bankruptcy	0.046	-0.127	0.356	-0.014	0.094	-0.497	0.472	0.324
a63	Enforcement of bankruptcy law	-0.041	-0.015	0.244	-0.332	0.367	0.411	0.372	0.070
a80	Free movement of people and information	0.357	-0.780	-0.096	0.092	0.045	0.191	0.041	0.017
A8010	Political proximity with the USA	0.358	-0.102	0.082	0.693	0.119	0.130	0.020	0.034
A8011	Political proximity with an European country or the EU	0.423	-0.072	-0.084	0.279	0.591	0.035	-0.153	-0.137
A8012	Political proximity with Japan	0.190	0.244	0.629	0.298	0.009	0.072	-0.029	0.142
A8013	Political proximity with China	-0.100	0.280	0.646	-0.133	0.270	0.050	-0.211	0.232
a82	Emulation with neighboring countries	0.364	0.136	0.291	0.201	-0.080	-0.364	-0.042	-0.307
a90	National sense of identity	0.353	0.357	-0.042	0.217	-0.019	0.486	0.267	0.286
a91	National cohesion	0.721	0.268	0.059	0.005	0.068	0.108	-0.122	-0.040
a92	Strenghening of middle classes	0.348	0.259	-0.090	0.095	-0.069	0.147	0.458	-0.450
a93	Social inclusion	0.868	0.140	-0.115	-0.102	-0.091	0.007	0.052	0.046

IPD code	IPD description	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
a94	Traditional solidarity	-0.535	0.089	-0.215	0.333	-0.326	0.250	0.073	0.112
a95f	Subsidies on commodities	-0.619	0.383	0.022	0.127	-0.062	0.118	-0.017	-0.042
	Eigenvalue	13.82	3.22	1.95	1.67	1.26	1.17	1.10	1.03
	Fraction of variance	38.38	8.95	5.42	4.65	3.49	3.24	3.04	2.85
	Cumulative fraction of variance	38.38	47.33	52.75	57.40	60.89	64.13	67.18	70.03

I.B. Sector "Goods and services markets"

IPD code	IPD description	PC1	PC2	PC3	PC4	PC5	PC6	PC7
b30	Ease of starting a business	0.815	0.032	-0.142	-0.129	0.056	-0.032	0.212
b31	Importance of the Economic zones	0.209	0.510	-0.181	-0.436	0.067	-0.101	-0.322
b32	Consideration of public interest in government-business relations	0.604	0.379	0.204	0.085	0.132	-0.006	-0.246
b33	Governance of natural resources	0.546	-0.097	0.432	-0.004	0.192	-0.105	0.214
b40	Privatizations	0.224	0.161	-0.380	0.480	0.122	-0.196	-0.042
b41	Nationalizations	-0.065	0.143	0.542	-0.251	0.033	0.333	0.210
b42	Governance of privatizations	0.549	-0.239	0.295	0.286	0.331	0.053	-0.004
b43	Performance of public organizations	0.585	-0.165	0.083	0.220	-0.193	-0.132	0.325
b44	Freedom of prices	0.645	-0.322	-0.270	-0.157	0.087	-0.004	0.111
b45	Single exchange rate	0.221	0.081	0.268	0.176	0.357	-0.524	0.061
b50	Technological environment	0.849	0.094	0.126	-0.129	-0.053	-0.050	-0.023
b51	Public aid for R&D	0.795	0.259	0.092	-0.196	-0.034	-0.014	-0.090
b52	Density of sub-contracting relations	0.810	0.126	0.001	-0.171	-0.012	-0.061	-0.209
b60	Information on G&S markets	0.925	-0.044	-0.019	-0.048	-0.057	0.047	-0.044
b61	Rural land tenure: traditional property	-0.621	-0.105	0.133	-0.181	0.461	0.064	0.068
b62	Rural land tenure: public property	-0.265	0.209	-0.117	0.474	0.386	0.190	-0.351
b63	Diversity of land tenure rights systems	0.662	-0.174	-0.137	0.151	-0.413	-0.025	-0.196
b64	Government recognition of diversity of land tenure rights systems	0.649	-0.054	-0.117	0.182	-0.256	0.108	0.089
b65	Land tenure: security of ownership	0.876	-0.086	-0.012	0.082	-0.127	-0.093	0.060
b66	Land tenure: demand for land	-0.025	0.442	-0.461	-0.127	0.217	-0.255	0.493
b67	Land tenure and large investors	0.268	0.566	-0.224	-0.029	0.089	0.394	0.319
b70	Competition on G&S markets	0.902	-0.026	0.083	-0.077	0.025	0.061	-0.044
b71	Shareholders: weight of the government	-0.281	0.413	0.524	0.139	-0.232	-0.112	0.051
b72	Information on shareholders	0.727	-0.101	0.152	0.072	0.120	0.063	0.020
b73	Land tenure: development policies	0.559	0.493	0.050	0.078	0.136	-0.142	-0.102
b80	Openness to business	0.588	-0.356	-0.166	0.119	0.408	0.257	0.082
b81	Joint Ventures	0.250	0.366	0.025	0.307	-0.102	0.531	0.076
b82	Non-national access to land	0.435	-0.310	-0.097	-0.360	0.269	0.159	-0.226
	Eigenvalue	9.89	2.14	1.65	1.39	1.37	1.17	1.08
	Fraction of variance	35.31	7.64	5.91	4.97	4.90	4.18	3.85
	Cumulative fraction of variance	35.31	42.95	48.86	53.83	58.73	62.91	66.76

I.C. Sector “Capital markets”

IPD code	IPD description	PC1	PC2	PC3
c40	Privatizations in the financial sector	-0.006	-0.008	0.736
c41	Nationalizations in the financial sector	0.232	0.427	0.338
c42	Freedom in the allocation of loans	0.719	-0.473	-0.045
c50	Competence of bank executives	0.784	0.134	-0.184
c51	Importance of venture capital	0.687	0.340	0.113
c52	Sovereign wealth fund policy	-0.003	0.771	-0.292
c60	Financial information	0.900	-0.064	0.079
c70	Competition within the banking system	0.523	-0.414	0.061
c71	Regulation of competition in banking	0.784	0.114	0.060
c72	Monitoring and auditing in banking	0.843	-0.030	-0.042
c73	Reform of financial regulations	0.243	0.199	0.680
c80	Financial openness	0.714	-0.084	-0.145
c90	Micro lending	-0.509	-0.248	0.296
	Eigenvalue	4.89	1.43	1.38
	Fraction of variance	37.65	11.01	10.58
	Cumulative fraction of variance	37.65	48.66	59.24

I.D. Sector “Labour markets and labour relations”

IPD code	IPD description	PC1	PC2	PC3	PC4
d10	Freedom of association and trade union pluralism	0.582	-0.335	0.474	-0.336
d40	Flexibility in the labour market	0.315	0.208	0.680	-0.123
d41	Retraining and reskilling measures	0.634	-0.155	-0.117	0.210
d50	Adaptive education system	0.861	0.118	-0.150	0.056
d60	Respect for workers' rights	0.848	-0.175	0.026	-0.094
d61	Weak employment contrat rigidity	-0.030	0.012	0.321	0.760
d70	Wage bargaining at the individual level	-0.377	0.494	0.302	-0.047
d71	Strikes	0.250	0.622	0.062	0.167
d72	Management of labour	0.838	-0.244	0.067	-0.055
d80	Openness to employment of non-nationals	0.414	0.413	-0.074	-0.414
d90	Quality of the supply of public goods	0.796	0.176	-0.263	0.195
d91	Weak segmentation of the labour market	0.613	-0.143	0.408	0.250
d92	Low incidence of child labour	0.783	0.237	-0.242	0.111
d93	Social mobility	0.881	-0.069	0.049	-0.073
d94	Social mobility: young higher education graduates	0.629	0.454	0.000	-0.067
d95	Distribution of income	0.596	-0.207	-0.204	0.042
	Eigenvalue	6.53	1.45	1.27	1.09
	Fraction of variance	40.81	9.04	7.94	6.81
	Cumulative fraction of variance	40.81	49.85	57.79	64.60

II. Loadings obtained in the PCA for the geography database

II.1. Disease environment

code	description	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
	% of country area with malaria, for a given year								
Mal46a	1946	0.690	0.401	-0.091	-0.137	0.051	0.069	0.025	-0.112
Mal66a	1966	0.784	0.167	-0.222	-0.005	-0.001	-0.228	-0.134	-0.200
Mal82a	1982	0.799	0.133	-0.256	0.014	-0.087	-0.318	-0.005	0.005
Mal94a	1994	0.826	0.122	-0.201	0.037	-0.092	-0.258	0.015	0.058
	land area with given disease (% country area)								
disa1	yellow fever, 1952	0.813	-0.325	-0.206	-0.132	-0.006	0.132	0.194	-0.077
disa2	plague, 1952	0.041	0.078	-0.093	-0.130	0.065	0.215	-0.420	0.596
disa3	leprosy, 1952	0.649	0.454	0.279	-0.020	-0.032	0.133	-0.033	0.019
disa4	oriental sore leishmaniasis, 1954	0.342	0.049	0.420	-0.279	-0.502	0.239	0.061	0.144
disa5	kala azar leishmaniasis, 1954	-0.002	0.400	0.369	-0.501	0.349	-0.005	0.297	-0.141
disa6	american leishmaniasis, 1954	0.006	0.083	-0.598	-0.112	0.157	0.389	0.152	0.180
disa7	helminthiasis schistosoma haematobium, 1952	0.733	-0.270	0.295	-0.186	-0.177	-0.006	-0.076	0.060
disa8	helminthiasis schistosoma mansoni, 1952	0.701	-0.250	0.077	-0.098	-0.255	0.041	-0.044	-0.008
disa9	helminthiasis filariid mansonella ozzard, 1952	0.031	-0.008	-0.551	-0.110	0.108	0.365	0.225	0.081
disa10	helminthiasis paragoniumus westermani, 1952	0.387	0.517	-0.055	0.483	0.129	0.260	0.029	0.016
disa11	helminthiasis fasciolapsis buski, 1952	0.137	0.632	-0.055	0.278	0.127	-0.401	0.019	0.060
disa12	helminthiasis opisthorchis felineus, 1952	-0.143	-0.103	0.088	0.293	-0.142	-0.004	0.594	0.048
disa13	helminthiasis diphyllobothrium latum, 1952	-0.351	-0.130	0.242	0.413	-0.173	0.096	0.514	0.022
disa14	helminthiasis clonorchis sinensis, 1952	0.013	0.193	0.091	0.378	0.056	0.479	-0.322	-0.589
disa15	helminthiasis hookworm group, 1952	0.597	0.300	0.228	0.152	-0.062	0.296	-0.051	0.209
disa16	helminthiasis filarid loa loa, 1952	0.586	-0.396	0.213	0.239	0.511	0.008	0.015	0.116
disa17	helminthiasis filariid wucheria bancrofti & malayii, 1952	0.780	0.122	0.177	0.187	-0.048	0.188	-0.069	-0.073
disa18	helminthiasis filariid onchocerca volvulus, 1952	0.763	-0.401	0.158	0.095	0.279	0.022	0.034	0.067
disa19	helminthiasis filariid acanthocherlonema perstons, 1952	0.808	-0.359	0.205	0.010	-0.103	0.058	0.025	-0.004
disa20	dengue fever, 1951	0.098	0.754	0.349	0.078	-0.009	-0.035	0.159	0.260
disa21	schistosomiasis, 1987	0.291	-0.285	0.189	0.204	0.613	-0.060	0.030	0.149
disa22	yellow fever, 1996	0.806	-0.313	-0.237	-0.135	-0.005	0.129	0.196	-0.083
disa23	dengue fever, 1975 to 1995	0.535	0.445	-0.480	-0.037	-0.088	-0.021	0.193	-0.005
disa24	lymphatic filiariases, 1984	0.857	-0.055	0.018	0.011	-0.002	-0.235	0.028	-0.078
disa25	visceral leishmaniasis, 1984	-0.054	0.287	0.244	-0.693	0.343	0.090	0.135	-0.172
	Eigenvalue	9.26	3.16	2.14	1.83	1.47	1.33	1.26	1.05
	Fraction of variance	31.94	10.89	7.38	6.33	5.08	4.58	4.34	3.63
	Cum. fraction of variance	31.94	42.84	50.21	56.54	61.62	66.20	70.54	74.17

II.2. Climate and land quality

code	description	PC1	PC2	PC3	PC4	PC5	PC6	PC7
	Land in Köppen-Geiger climate zone weighted by cultivated land (revised Matthews classification)							
wcultcaf	Af zone	0.537	-0.188	-0.119	-0.452	0.123	0.002	-0.308
wcultcaw	Aw zone	0.727	-0.243	-0.028	0.087	-0.100	-0.204	0.152
wcultcam	Am zone	0.049	-0.047	-0.232	0.190	-0.122	0.255	0.315
wcultcbs	Bs zone	-0.226	-0.245	0.682	0.297	0.056	-0.122	0.056
wcultcbw	Bw zone	-0.281	-0.299	0.268	-0.077	0.201	-0.197	0.543
wcultccf	Cf zone	-0.218	0.655	-0.363	-0.028	-0.099	0.095	0.206
wcultccs	Cs zone	-0.351	-0.119	0.177	-0.239	-0.661	0.352	-0.266
wcultccw	Cw zone	0.200	-0.085	-0.099	0.650	0.127	0.425	-0.025
wcultcdf	Df zone	-0.183	0.422	-0.012	0.114	0.089	-0.604	-0.387
wcultcdw	Dw zone	-0.195	-0.029	-0.084	0.337	0.475	0.221	-0.427
wcultch	H zone	-0.045	-0.014	0.121	-0.541	0.606	0.342	0.063
	Mean irrigation suitability (%)							
irrsuit1	very suitable	0.641	0.381	-0.244	0.013	0.048	-0.061	0.205
irrsuit2	moderately suitable	0.488	0.589	0.508	0.117	-0.003	0.066	-0.022
	Mean soil suitability (%)							
soilsui1	very suitable	-0.233	0.779	0.343	-0.104	0.036	0.186	0.108
soilsui2	moderately suitable	0.734	-0.027	0.412	-0.043	-0.113	0.149	-0.117
	Eigenvalue	2.47	1.98	1.41	1.27	1.16	1.07	1.03
	Fraction of variance	16.50	13.17	9.37	8.46	7.75	7.13	6.88
	Cumulative fraction of variance	16.50	29.67	39.04	47.50	55.25	62.38	69.26

II.3. Physical characteristics

code	description	PC1	PC2
elev	mean elevation (meters above sea level)	-0.397	-0.109
distc	mean distance to nearest coastline (km)	-0.874	0.368
distr	mean distance to nearest inland navigable river (km)	-0.143	0.684
lc100km	% Land area within 100 km of ice-free coast	0.851	0.381
lcr100km	% Land area within 100 km of ice-free coast/navigable river	0.877	0.220
pdenpavg	Typical population density experienced by an individual (persons/km2)	0.299	0.265
pop100km	Ratio of population within 100 km of ice-free coast to total population	0.842	0.389
pop100cr	Ratio of population within 100 km of ice-free coast/navigable river to total population	0.871	0.268
cen_c	distance from centroid of country to nearest coast (km)	-0.829	0.491
cen_cr	distance from centroid of country to nearest coast or sea-navigable river (km)	-0.827	0.452
	Eigenvalue	5.36	1.55
	Fraction of variance	53.62	15.48
	Cumulative fraction of variance	53.62	69.10

III. Loadings obtained in the canonical correlation analysis between single economic development indicators and all IPD variables

IPD variable	LY00 (R=0.91)	GR (R=0.64)	C (R=0.57)	I (R=0.55)	G (R=0.57)	OPEN (R=0.59)	GRVAR (R=0.57)
AF1	0.34	-0.20	0.34	0.21	0.20	-0.02	-0.73
AF2	-0.01	0.21	0.15	0.25	0.04	-0.18	0.05
AF3	-0.06	-0.01	-0.04	-0.08	-0.04	0.52	0.08
AF4	0.04	0.27	0.18	-0.06	0.17	-0.22	0.02
AF5	0.02	0.04	0.03	0.07	-0.08	-0.18	0.05
AF6	0.03	0.27	0.09	0.01	-0.34	0.28	0.06
AF7	-0.06	0.13	-0.26	-0.06	-0.19	0.11	0.02
AF8	0.00	-0.21	0.05	-0.17	0.15	0.04	-0.02
BF1	0.28	0.49	0.33	-0.22	0.36	-0.19	0.28
BF2	0.18	-0.04	0.17	-0.35	0.30	0.32	0.07
BF3	0.14	-0.02	-0.14	-0.15	-0.33	0.02	0.11
BF4	0.03	0.09	-0.03	-0.06	0.36	-0.08	0.12
BF5	-0.27	-0.13	-0.03	0.15	0.06	-0.16	-0.03
BF6	0.00	0.04	0.04	0.16	0.03	-0.29	0.03
BF7	0.05	0.09	0.01	-0.11	0.14	-0.12	-0.05
CF1	0.67	-0.54	0.20	-0.60	-0.24	0.23	-0.37
CF2	0.10	0.03	-0.07	0.12	0.09	0.24	-0.01
CF3	-0.21	0.04	-0.07	0.18	-0.35	0.24	-0.13
DF1	0.07	0.23	-0.69	0.40	0.10	-0.14	0.36
DF2	0.17	-0.05	0.11	0.06	0.18	-0.10	-0.06
DF3	-0.34	0.25	-0.05	-0.08	0.19	0.24	0.22
DF4	0.12	-0.08	0.24	-0.12	0.03	-0.01	-0.07

IV. Loadings obtained in the canonical correlation analysis between all economic development indicators and all IPD variables

IV.1. IPD side

	F1	F2	F3	F4	F5	F6	F7
AF1	0.46	-0.13	-0.27	0.25	0.02	-0.65	0.60
AF2	0.05	0.24	-0.24	0.01	0.16	-0.10	-0.12
AF3	-0.02	0.00	0.34	-0.08	0.12	-0.01	0.02
AF4	0.13	0.28	-0.10	0.17	-0.17	0.10	-0.03
AF5	-0.01	0.03	-0.13	-0.03	-0.01	0.00	-0.16
AF6	0.09	0.30	0.07	-0.19	-0.16	-0.06	-0.24
AF7	-0.05	0.11	0.00	-0.25	-0.20	0.13	0.15
AF8	-0.04	-0.21	0.19	0.19	0.00	0.04	0.01
BF1	0.40	0.47	0.11	0.21	-0.14	0.36	-0.39
BF2	0.23	-0.06	0.48	0.22	-0.01	0.17	-0.09
BF3	0.04	-0.06	0.08	-0.24	-0.23	0.16	-0.32
BF4	0.07	0.06	0.07	0.10	0.13	0.22	0.10
BF5	-0.31	-0.11	-0.15	0.12	0.13	-0.10	0.14
BF6	-0.02	0.04	-0.23	0.02	0.10	-0.03	-0.09
BF7	0.09	0.08	-0.02	0.09	-0.16	0.11	0.12
CF1	0.52	-0.59	0.45	0.11	-0.56	-0.09	-0.27
CF2	0.16	0.03	0.06	-0.14	0.26	-0.06	0.15
CF3	-0.18	0.09	-0.09	-0.18	-0.04	-0.26	0.16
DF1	0.04	0.13	-0.29	-0.68	0.56	0.38	0.21
DF2	0.18	-0.06	-0.05	0.09	0.14	-0.07	0.00
DF3	-0.24	0.27	0.21	0.08	0.05	0.21	0.14
DF4	0.11	-0.07	0.10	0.20	-0.10	-0.08	-0.17

IV.2. Economic development side

	F1	F2	F3	F4	F5	F6	F7
LY00	0.95	-0.16	0.04	-0.51	0.17	0.13	-0.31
GR	0.17	0.97	-0.18	-0.13	-0.27	0.19	0.14
C	0.03	0.15	0.13	0.61	0.02	-0.54	-0.47
I	0.02	0.06	-0.41	-0.24	0.58	-0.49	0.02
G	0.16	-0.03	0.21	0.48	0.52	0.30	0.51
OPEN	0.14	0.08	0.80	-0.22	0.37	-0.31	0.16
GRVAR	-0.13	-0.09	0.32	-0.12	0.39	0.48	-0.61

V. Loadings obtained in the canonical correlation analysis between single IPD dimensions and all geographical variables

	F1	F2	F3
DIS1	-0.57	0.44	0.34
DIS2	-0.16	0.29	0.40
DIS3	-0.11	-0.16	0.09
DIS4	-0.03	0.04	-0.07
DIS5	-0.02	0.10	-0.02
DIS6	0.09	-0.09	0.21
DIS7	-0.05	0.19	0.09
DIS8	-0.12	0.14	-0.10
CLI1	-0.25	-0.64	-0.26
CLI2	0.28	0.16	0.15
CLI3	-0.44	0.23	-0.02
CLI4	-0.23	0.22	0.01
CLI5	-0.12	0.21	0.23
CLI6	-0.18	-0.11	0.61
CLI7	-0.14	-0.13	0.04
PHYS1	0.28	0.07	-0.26
PHYS2	0.27	0.01	0.27

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