ESSAYS ON POLITICAL ECONOMY OF ECONOMIC GROWTH, INSTITUTIONS AND THE BUSINESS ENVIRONMENT IN THE INDUSTRIAL SECTOR

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Abstract

This research aims to study the relationship between economic performance, economic reforms, corruption, ethnic diversity and business environment.

In chapter two, meta-analysis and meta-regression analysis methods are applied to study the relationship between economic growth and corruption. This shows that despite severe publication bias, there seems to be a genuine negative effect of corruption on growth. This impact is systematically affected by whether the authors are academics and whether the study controls for endogeneity and heterogeneity. As for mechanisms, the findings show that corruption significantly undermines the positive influence of institutions and trade openness on economic growth.

Chapter three investigates the effect of dynamic ethnic diversity as endogenous variable on economic growth in the transition context. For this purpose, a unique data set is constructed based mostly on primary data (national censuses). Once diversity is instrumented; it shows a significant negative impact on economic growth which is robust to different specifications, polarization measures, econometric estimators, as well as to the use of an index of ethnic-religious-linguistic fractionalization.

Chapter four provides evidence of the role of economic reforms on economic performance in developing countries measured by economic growth and industrial growth. This research focuses on, and constructs individual indicators for the following reforms: external stability, macroeconomic stability, financial development, trade liberalization and institutional quality. The main finding is that economic reforms strongly support growth in the long-run. They mostly have mixed effects in the short-run. Moreover, institutions are imperative to boost economic performance over the long run.

Finally, chapter five demonstrates the relationship between firm performance and business environment, ownership, competition and exports in Syrian industrial private sector. Performance is measured in level and growth variables. The main findings show that firm performance is positively boosted by finance and technology and hindered by poor investment climate, in particular, corruption. However, competition and foreign ownership seem to not have first-order effects.

Keywords: Economic growth, Institutions, Industrial Sector, Diversity, Corruption, Economic Reform, Business Environment.

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Declaration of Co-Authorship

I hereby declare that this thesis incorporates material that is result of joint research, as follows:

Chapter two is done by collaboration with Prof. Nauro Campos and Dr. Ralitza Dimove. Chapter three is a result of collaboration with Prof. Nauro Campos and Vitaliy Kuzeyev. Chapter five also is done in collaboration with Prof. Nauro Campos.

I am aware of the Brunel University Senate Policy on Authorship and I certify that I have properly acknowledged the contribution of other researchers to my thesis, and have obtained written permission from each of the co-author(s) to include the above material(s) in my thesis.

I certify that, with the above qualification, this thesis, and the research to which it refers, is the product of my own work.

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Chapter One

Introduction

1.1 Motivations

Investigating economic growth and its determinants is at the heart of economics and other social science disciplines. The determination of economic growth, as an indicator of economic performance, is a sophisticated and continuous process. Most economists devote economic growth studies to demonstrate the sources of that growth and to explain its variation between countries.

However, agreement in the literature has not been reached about the main issues regarding economic growth. Bosworth and Collins (2003), for example, mention some unsolved issues: the role of capital accumulation versus total factor productivity (TFP) in accounting for differences in economic growth and increased education versus the importance of economic policy as determinants of economic growth. In the same context, Durlauf et al. (2008) state that there is no unique growth strategy; they find little evidence of the importance of fundamental growth theories. However, they state that macroeconomic policies and regional heterogeneity have an important role.

Recently, the role of institutions in driving economic change and growth has come back to the debate (Nelson, 2008). In particular, economists study the effect of institutions on the variation of development between nations and determine the factors behind economic growth. The research suggests that there is a strong positive role for institutions in economic organizations and systems (Gagliardi, 2008). Also, economic reforms and improvements in business environments are considered vital to boost economic performance, particularly in developing countries.

This thesis follows the path of other researches by applying new methods, datasets and econometric estimators, to determine to what extent corruption, ethnic diversity, economic reforms and business environment impact economic performance.

In analyzing the relationship between economic growth and corruption, one of the dominant debates in the literature is whether corruption *greases* or *sands* the wheels

of economic development and growth. In this research, we quantitatively evaluate the empirical literature on the effects of corruption on economic growth using meta-analysis techniques. We first construct a unique data set comprising 460 estimated effects of corruption on growth from 41 studies. We then carry out an econometric survey, focusing on whether there is a genuine effect, as well as the existence and severity of reporting bias, and on whether differences in estimation method, measurement issues and specification features affect the magnitude and significance of the corruption effect.

As to effects of ethnic diversity on economic growth, Alesina and La Ferrara (2005) identify two main directions for future research. One is to improve the measurement of diversity and the other is to treat diversity as an endogenous variable. This research tries to address these two issues by investigating the effects of ethnic diversity on economic growth across countries using unique time-varying measures.

We first replicate the finding of a weak effect of exogenous diversity on growth and then we show that accounting for how diversity changes over time and treating it as an endogenous variable makes a difference. Diversity is instrumented (with lagged diversity and latitude), and different estimators are applied.

As to the influence of economic reforms, one important question that remains in the debate is how these reforms impact economic performance. This research uses a panel of 56 intermediate income level developing countries, over the period 1980-2006, to investigate the effect of reforms on economic performance; in particular, economic growth and industrial growth. This research focuses on, and constructs individual indicators for the following reforms: external stability, macroeconomic stability, financial development, trade liberalization and institutional quality. Moreover, Pooled Mean Group estimator is applied to study short- and long- run effects and to take advantage of panel data.

In the last chapter, we analyse the relationship between firm performance and investment climate, competition, ownership and exports in Syria. The newly available micro level datasets encourage further research to link business environment to firm performance, which would lead to a better understanding of economic growth. This research also investigates the main factors driving firm performance in Syria.

For this purpose, we use 2009 survey data from 508 firms to try to provide a detailed picture of the main constraints faced by the Syrian private sector. We also use an investment climate assessment survey data (ICA) to assess the effect on performance of ownership, competition, exports, technology and business environment. The analysis shows that firm performance is measured in levels and growth of sales and productivity. Moreover, the instrumental variable method is applied to overcome the endogeneity problem.

1.2 The aim and the objectives of this research

This aim of this research is to study the relationship between economic performance, measured mainly by economic growth, and the role of economic reforms, institutions, diversification and fractionalization, and investment climate. Various methods using different datasets are applied to investigate the interdependence between these relationships. Corruption and ethnic diversity are good examples to deeply understand the role of institutions and their impact on economic growth.

The objectives of this research are firstly to provide an econometric survey of the relationship between economic growth and corruption using meta-analysis and meta-regression analysis. The second objective is to investigate the effect of dynamic ethnic diversity on economic growth. The third objective is to understand the impact of different economic reforms on economic performance. The last one is to investigate the role of different business environment themes on firm performance.

1.3 Contributions of the research

The main contributions of this research are summarized as follows:

1. We apply meta-analysis and meta-regression analysis methods to study the relationship between economic growth and corruption. This allows uncovering the publication bias and the existence of genuine effect and the most important factors that drive the large heterogeneity of results available in the literature.
2. We use panel data to study the effect of dynamic ethnic diversity as endogenous variable on economic growth in the transition context. Moreover, we construct a unique data set based mostly on primary data (national censuses).
3. We use panel data to provide evidence of the role of economic reforms on

economic performance in developing countries measured by economic growth and industrial growth. This research concentrates on the analysis of long-run and short-run effects.

4. We demonstrate the relationship between business environment and firm performance in the Syrian industrial private sector. Performance is measured in level and growth variables.

1.4 Chapters outline

This research is organised into six chapters as follows:

Following this introduction, chapter two provides an econometric survey of the relationship between economic growth and corruption. This chapter uses meta-analysis and meta-regression techniques to find out whether that relationship is genuine and/or whether it is tainted by publication bias. Moreover, we try to disentangle the most important factors that drive the large heterogeneity of results available in the literature.

Chapter three investigates the relationship between economic growth and ethnic diversity in transition economies in the period of 1989-2007. The main focus is to consider ethnic variables as endogenous and also to use panel data. Moreover, this research constructs a unique data set based mostly on primary data (national censuses) to measure ethnic diversity over time for a sample of countries in transition.

Chapter four shows the effect of economic reform on economic performance in developing countries. The reform areas are external stability, macroeconomic stability, financial development, trade liberalization and institutional quality. Moreover, we apply short and long- run analyses using Pooled Mean Group estimations to take advantage of panel data of 56 countries.

Chapter five explores which factors impact Syrian industrial private firm performance. This research uses firm-level data survey taken in 2009. The main focus is on investment climate, competition, exports and ownership. Firm performance is measured by level and growth of sales and productivity.

Chapter six summarises the main findings of this research and highlights the main contributions. Also, the chapter shows the limitations of the research and ends with further suggestions for future research.

Chapter Two

An Econometric Survey of the Literature on Corruption and Growth

2.1 Introduction

Corruption happens. It occurs in all countries and over time. Although corruption is more common in poorer countries, it does exist everywhere. It is now widely appreciated that corruption is not restricted to specific regions or levels of economic development (Abed and Gupta, 2002) and that the most pressing questions are which mechanisms it employs and how severe it actually is as a constraint on economic and political activities (Basu, 2006).

One of the defining debates in the literature on the macroeconomic consequences of corruption has been whether it *greases* or *sands* the wheels of economic growth and development. Those in favour of the greasing hypothesis argue that corruption facilitates trade that would not have happened otherwise and promotes efficiency by allowing private sector agents to circumvent cumbersome regulations (Leff, 1964; Huntington, 1968). Numerous examples support this view, showing that in highly restrictive regulatory environments, corruption can enhance economic growth by stimulating entrepreneurship and efficiency (De Soto, 1990; Egger and Winner, 2005; Levy, 2007).

Opponents of this view have constructed a solid theoretical rebuttal to these arguments by arguing that the *greasing* effect of corruption is only possible as a second best option in a malfunctioning institutional setting. Thus, in order to properly evaluate the effects of corruption one has to recognize its endogeneity with respect to institutions (Aidt, 2009). Theoretical analyses and empirical evidence supporting the alternative view is abound, showing that corruption works *sands* the wheels of growth. Rock and Bonnett (2004) argue that corruption reduces investment in most developing countries and particularly in small open economies. Reinikka and Svensson (2004; 2005) find that it has detrimental effects on human capital

accumulation. Concerning its magnitude, Fisman and Svensson (2001) estimate that a one percent increase in corruption leads to a three percent reduction in firm growth. This body of evidence informs the position of key international policy actors like the IMF, World Bank and the OECD and the ever increasing number of anti-corruption agencies and campaigns at both national and international fora (Méon and Weill, 2010).

Yet the body of empirical evidence on the economic consequences of corruption is still far from conclusive (Svensson, 2005; Aidt, 2009). For example, the literature continues to provide support to phenomena such as the Asian paradox (a positive correlation between corruption and growth in a number of fairly successful Asian economies, including China) even after accounting for the crucial intermediate effect of institutions that shape the more recent versions of the greasing the wheels hypothesis (Wedeman, 2002; Rock and Bonnett, 2004; Li and Wu, 2007 & Vial and Hanoteau, 2010).

The inconclusiveness of the evidence on the relationship between corruption and growth can be driven by several factors. Econometrically, regressions that attempt to infer a causal relationship between corruption and growth are often fraught with reverse causality and omitted variable problems, which have so far not found a satisfactory resolution (Aidt, 2009). In addition, the most popular measures of corruption in the empirical literature are based on expert opinions, which are often loaded with ideological bias and generate a corruption ranking of countries biased towards general perceptions of current or past politico-economic performance (Razafindrakoto and Roubaud, 2010). The inconclusiveness can also be driven by reporting bias: although it is understandable that not all econometric results are reported, their very selection for reporting purposes may be affected by either the preferences of journal editors or the agenda of the various international development institutions (interestingly, we find in this paper that such biases are significantly smaller in peer-reviewed publications). Finally, as well known for instance from the empirical literature on inequality and growth, cross-country correlations in the growth-related literature are generally clouded in data quality and other problems that tend to hide the welfare implications of any economic phenomena or policy (Ravallion, 2001).

The objective of this chapter is to provide a rigorous and systematic survey of the empirical literature of the effects of corruption on economic growth.[1] Here we try to (a) uncover whether there is a genuine relationship between corruption and growth, (b) evaluate the direction of this relationship and (c) identify the main factors or determinants that may help explain the variance in the observed effects of corruption on growth. For these purposes, we put together a unique data set comprising a total of 460 empirical estimates of the effect of corruption on growth from 41 different studies. Figure 1 shows that about 32 percent of these estimates support a significant and negative impact of corruption on growth, 62 percent suggest a statistically insignificant relationship, while approximately only 6 percent support a positive and significant relation. On this account alone, one may be tempted to argue that the support for the sanding hypothesis is greater larger than that for the greasing hypothesis, yet the vast majority of the results lead us to argue that the evidence is not conclusive. Why? This chapter uses meta-analysis and meta-regression techniques to establish the depth, extent and the reasons behind this inconclusiveness.

Our main conclusions refer to the identification of the main factors that explain the variation we observe in Figure 1. We find that these principal factors are authors' affiliation (academics systematically report smaller and less negative effects), the use of fixed-effects (which interestingly tend to increase the negative effect of corruption on growth), the type of corruption measure, the presence of MENA countries in the sample (which also tends to increase the overall negative effect) and the inclusion in the model of trade and institutions which both tend to deflate the negative effect of corruption on economic growth. We also find that although publication bias seems to be severe in the corruption-growth literature, there is plenty of evidence supporting a genuine negative effect of corruption on growth.

The rest of the chapter is organized as follows. In Section 2 we examine whether there is evidence for a genuine relation between corruption and growth, as well as the existence and severity of reporting bias. In Section 3 we present the data set we

[1] There are various excellent surveys of the literature on the causes and effects of corruption, for example Bardhan (1997), Svensson (2005), Pande (2008), Aidt (2009) and Treisman (2007). Yet ours is, to the best of our knowledge, the first quantitative survey of the econometric evidence on the corruption-growth nexus.

constructed covering a large number of factors that can potentially explain the variation in results on this relationship available in the literature. In Section 4, we use meta-regression analysis tools to investigate the main determinants of the variation of the results in the literature. Section 5 concludes.

2.2 Is there a genuine relationship between corruption and growth?

For this chapter, we put together a data set comprising 460 estimated effects (that is, coefficients) of corruption on economic growth from 41 different empirical studies (the studies are listed in Appendix 1). The selection criteria we used are as follows. In order to be included, a paper has to investigate econometrically the relationship between corruption and economic growth across countries and it has to report regression coefficients and their t-values or standard errors. In addition, it has to report the number of observations and/or degrees of freedom and to report sufficient information that allows us to create the explanatory variables we require (listed in Appendix 2). We also include in the data set all reported regression results from each study as opposed to selecting one set of results as representative or preferred. This is because very few authors single out a set of preferred results. Notice that among the excluded studies are those that deal with only one country ("case studies") and those focusing on the effect of corruption on various macroeconomic variables other than economic growth (such as FDI, investment, inflation, government expenditures, aid and income inequality).

One explanation for the existence of bias in the literature is the alleged tendency for the evidence in academic papers to lean towards statistically significant results. The simplest and most commonly used method to detect such bias is the informal examination of a funnel graph, which is a scatter plot of the treatment effect size (e.g. the coefficient in a regression analysis) against a measure of the precision (Stanley, 2005; Doucouliagos and Ulubaşoǵlu, 2008). Since in the absence of publication selection, estimates will vary randomly (or symmetrically) around the "true" effect, the funnel plot's asymmetry is the key for identifying publication bias.[2] Figure 2 shows the funnel plot for our data, which is clearly asymmetric, pointing to the existence of bias. Given that visual inspections are subjective and hence

[2] The intuition is that studies with a smaller sample size should have larger sampling error, while studies with a larger sample size should have lower sampling errors.

potentially misleading, we next use meta-regression analysis to answer whether there is a genuine association between corruption and growth in a more rigorous fashion.

Stanley (2001; 2005) argues that if there is a genuine association between two variables, there should be a positive relationship between the natural logarithm of the absolute value of the t-statistic and the natural logarithm of the degrees of freedom in the regression:

$$\ln|t_i| = \alpha_0 + \alpha_1 \ln df_i + \varepsilon_i \qquad (1)$$

where t_i and df_i denote the t-statistics and degrees of freedom in study i, respectively.[3] Stanley (2005) also develops a meta-significance test (MST) and shows that the value of the slope coefficient in equation (1) contains information on the extent of a publication bias and on the existence of a genuine effect. If the slope coefficient is less than zero, the evidence is said to be contaminated by publication bias and there is no genuine association between the two variables. If the slope coefficient is larger than zero, it is said that there is a genuine empirical effect. Finally, if $0 < \alpha_1 < 0.5$ there is a genuine association, as well as a publication bias in the underlying body of evidence.

Given that random, large-sample misspecification biases may cause MST to identify a genuine effect too frequently, Stanley (2008) recommends complementing MST with FAT (funnel asymmetry test) and PET (precision effect test). This amounts to regressing the t-statistics of the estimated effects on the inverse of their standard errors (Egger et al., 1997):

$$t_i = \beta_0 + \beta_1 1/Se_i + u_i \qquad (2)$$

where Se_i denotes the standard error of the estimated coefficients. Testing for the statistical significance of the intercept coefficient represents a test of publication bias. Note that this is a direct and more rigorous test of funnel plot asymmetry Moreover, Egger et al. (1997) argue that the sign of the intercept indicates the

[3] The intuition is that as the sample size rises, the precision of the coefficient rises as well and hence the standard error falls.

direction of the bias. A significant slope coefficient, on the other hand, points to the existence of a genuine effect, irrespective of the possible publication bias (Stanley, 2008).

Table 1 shows the results from the MST and FAT-PET (equations 1 and 2, respectively). The coefficient of the degrees of freedom variable in the MST regression is statistically significant, with a value which lies between zero and 0.5, indicating that despite the presence of a publication bias, there is evidence for a genuine relationship between corruption and growth. The intercept coefficient in the FAT-PET regression is also statistically significant, thus confirming the presence of a publication bias. Moreover, the negative sign of this coefficient suggests that the bias is negative, indicating that the "true" corruption-growth relationship is less negative than that commonly reported in the literature.

Yet, the MST estimates deliver a non significant slope coefficient in the FAT-PET regression (Table 1, columns 3 and 4) this failing to confirm the existence of a genuine effect in the corruption-growth literature. In order to explore this relationship further, we separate the sample in published and unpublished research and re-estimate the FAT-PET equation. Notice that out of the 41 studies in our data set, 20 are published in peer-reviewed academic journals, while 21 are working and/or policy papers/reports. The results, reported in Table 2, indicate that the slope coefficient is not statistically significant only in the unpublished research sample and it is significant at the 1% level in the published research sample. This suggests a genuine relationship between corruption and growth in published research as well as the absence of such genuine relationship in unpublished studies. This is a very important result because it suggests the possibility that unpublished studies (which may be more policy oriented) tend to tolerate, substantially more than published studies, a lenience towards a negative and significant link between corruption and growth. Put it differently, our data shows that peer-reviewed papers are systematically more likely to report a genuine yet less negative effect of corruption on growth than that of the literature as a whole. In what follows, we investigate this issue further, but first we must present the full data base we put together to try to understand the variance we find in these corruption-growth effects.

2.3 How does the average corruption-growth study look like?

The preceding analysis suggests that the body of evidence exploring the relationship between corruption and economic growth may be biased and that this bias may be negative. Existing studies are systematically more likely to report negative and statistically significant estimates. We do find some evidence that despite the bias, the message that the broad literature on corruption and growth conveys is genuine. If anything, there seems to be greater prejudice among peer-reviewed published studies against reporting negative results than among unpublished papers and reports.

While our results are fairly instructive, a more rigorous view on the quality of the message conveyed by the existing literature on corruption and growth is needed. In keeping with the MRA literature, we attribute the potential differences in these results to either differences in the research process (e.g. differences in specification, measurement and methodology) or differences in real-world factors (e.g. regional and time differences) (Babetskii and Campos, 2010; Doucouliagos and Ulubasoglu 2008). The variables we construct to capture these differences are described in Appendix 2, their basic statistics are reported in Appendix 3.

In order to describe the differences in econometric methodology we construct dummy variables, taking the value of 1 if the coefficients originate from a cross-sectional model (0 if from panel), if fixed effects are used (0 otherwise), if there is an attempt to correct for endogeneity (0 otherwise), if the focus of the paper is exclusively on one region (0 otherwise) and if the paper has been published in an academic journal (0 otherwise)[4]. Given that the approach and potential ideological bias may differ across researchers belonging to academic and non-academic environments, we also include a dummy variable that takes the value of zero if there is at least one author's affiliation is not academia.

We find that academic authors wrote 25 of the papers in our sample providing 378 estimates, thus representing 82% of the total. The regressions for only one region represent just 36 observations and 7.74% of the total. Slightly more than half of the estimates in our data set were obtained using cross sectional (54%) while the

[4] One of the problems, encountered in the MRA literature is that many of the observations used in a regression analysis are not statistically independent. In meta-analysis, empirical estimates are considered statistically independent if they are reported by different authors, or if the same author reporting them uses different samples. Doucouliagos (2005) recommends the use of bootstrap to address the statistical dependence problem (reported below).

remaining use panel data. In 151 regressions, accounting for 32.47% of the total, there is an explicit attempt to correct for endogeneity through the use of IV, 2SLS, 3SLS or GMM techniques. Moreover, fixed effects were used in 160 regressions, that is, in 34.41% of the total. About half of the estimates are reported in journal articles and the other half in working papers, 43% of these being working papers of policy oriented institutions such as the World Bank and the IMF.

Measurement is an important issue, especially in light of the growing literature that questions the validity of global corruption indicators based on the perceptions of so-called experts (Razafindrakoto and Roubaud, 2010). In order to assess whether the impact of corruption on growth is significantly driven by the choice among measures of corruption, we construct dummy variables that take into account the differences in corruption indexes used in each study/model. The most widely used measure is from Transparency International (the Corruption Perception Index, CPI)[5] which has been used in about 36 percent of the cases (or for 165 estimates). The index is available since 1995 and covers approximately 150 countries. The CPI score is an "expert perception" measure, reflecting the degree of corruption perceived by business people and country analysts. It ranges from 10 ("highly clean") to 0 ("highly corrupt"). The second most popular measure of corruption is from the International Country Risk Guide (ICRG) of the Political Risk Group, which is used in about 28% of the regressions in our sample (130 cases). This index gives lower values for higher levels of corruption. It has monthly frequency and is available since 1984. The CTC (Control for Corruption) index of the World Bank is used in 43 cases (9.68% of the total) and ranges from -2.5 (high corruption) to 2.5 (low corruption).[6] The COMB variable captures the use of a mixture of different measures constructed by different organizations (WB, ICRG, and TI).[7] It was used in 16 cases representing 3.44% of total. The CPC variable captures whether or not corruption is measured by a composite indicator, constructed by principal component analysis. The remaining

[5] One difficult issue is that the Transparency International index has been improved over time. In other words, there have been various changes in the underlying methodology and although these changes are vastly and carefully documented, they do generate difficulties in terms of comparing studies that use different "vintages" or "cohorts" of the CPI. We have explored this matter through interactions with time trends and it does not qualitatively affect our main results. For more details see http://www.transparency.org/policy_research/surveys_indices/cpi

6 See Kaufmann, Kraay, and Mastruzzi (2006).

7 This measure is used, for instance by Rock and Bonnett (2004) and Fitzsimons (2003).

measurement variable OTHER[8] proxies measures not covered by the above categories. It was used in 94 cases accounting for 20% of our sample.[9]

In so far as econometric specification issues are concerned, our choice is driven by the importance of controlling for a robust set of growth determinants so that the corruption effects are not unduly affected by omitted variable problems. This also allows us to investigate the relative importance of various potential channels. To this end, dummy variables were constructed taking the value of 1 if trade or trade openness is presented in the model (0 otherwise), if institutional variables are included in the model (0 otherwise) and similarly for human capital, investment, political institutions (or democracy) and government expenditures or consumption. Trade or openness variables are included in 32 percent of the cases (i.e., in 149 regressions) while different institutional quality variables are used in 43 estimations accounting for only 9.25% of the total. Human capital or population variables are used in 337 estimations of the corruption effect, which represents 72.63% of our sample. Investment is included in 155 estimations (33.3%) while political institutions (or democracy) are included 84 times, that is, in 18% of our sample. Government spending or consumption is included 185 times (40% of our sample). Finally, we also create a dummy variable for whether initial conditions are included in the model specification and find that they are included in 361 regressions representing 77.63% of the sample.

In order to capture the geographical focus of these corruption effects on growth, a series of dummy variables are constructed that take the value of 1 if the coefficient comes from a regression which contains transition countries (0 otherwise), and similarly for Latin America (LAC), Middle East and North Africa (MENA), Asia (ASIA) and Sub-Saharan Africa (AFR). Note that these variables are to capture sample composition, and not whether a study is based on a single region. Transition countries were included in 401 regressions accounting for 86% of the total. Latin American countries were included 430 times representing 92.5% of the total. Middle East and North African countries were included in 401 regressions representing 86% of the total. Asian countries were included 431 times (92.7%) and African countries

8 See for example, Li et al. (2000) which uses corruption data from IRIS.
9 For example, Ehrlich and Lui (1999) and Mauro (1995) use measures from Business International (BI), now incorporated into *The Economist Intelligence Unit.*

were included in 424 estimations (91% of the total). The variable OTHERS is used for estimations containing other country groupings (or different ways of splitting samples) such as OECD countries (which is used 403 times or in 86.7% of the cases). Finally, a mid- point of the time period covered by each study is calculated to try to capture time effects.[10]

We observe that the simple pair-wise correlation between corruption and growth, reported in the literature, is negative both in itself and across different types of methodologies, specifications, measurement choices, regions and time periods included in the underlying econometric studies. There is also a positive correlation between the length of the time window of the study and the growth-corruption relationship.

How would a typical piece of empirical research on the effect of corruption on economic growth look like using our data set? Firstly, the typical study is likely to be written by authors in academia. The time window it covers is somewhat short, with an average of nine and a half years. The typical paper does not control for endogeneity nor include country dummy variables or fixed effects. There is an almost equal chance to use panel or cross-sectional data. Yet the typical paper would favor Transparency International as its main corruption measure. It is also likely to use a large multi-region sample and have human capital among its explanatory variables. Variables controlling for institutional quality are among those least likely to be found in a typical study, which is a serious omission in light of the attention this factor receives in attempts to assess the grease versus sand debate in the corruption and growth literature (Méon and Weill, 2010).

2.4 Meta regression analysis

Many believe that the empirical literature on the effects of corruption on growth is inconclusive. Indeed Figure 1 seems to support such views: there is an awful lot of variation within the set of empirical estimates the literature has made available. Yet standard meta-analysis tests discussed above show that although the underlying

[10] We have also tried to deal with the difficult issue of paper quality. We collected data on the number of Google Scholar citations (excluding self-citations). It ranges from zero to 3816 (for Mauro, 1995) as in 2007. We used it in our empirical analysis below as the yearly average number of citations and found that it is not robust (that is, our set of explanatory variables does a good job at capturing the key elements of paper quality). See the results at appendix 4 which repeats the regressions in tables 3 &4 by adding cite variable.

relationship seems to be genuine, the available empirical evidence seems biased towards reporting negative effects of corruption on growth. This makes it even more pressing to try to pinpoint the factors that are most important in explaining the variation in the underlying corruption-growth effects. In order to do so, we estimate the following baseline equation:

$$Y_i = \delta_0 + \delta_1 X_i + \varepsilon_i \qquad (3)$$

where Y_i is the partial correlation between corruption and economic growth and X_i is a vector of explanatory variables, which were described in section 3 above.[11]

In keeping with the MRA literature, we estimate both a fixed effects and a random effects version of equation (3). The fixed effects model assumes that the heterogeneity in results is due to systematic differences across studies and to sampling error, while the random effects model assumes, in addition, that there are unobserved factors which cannot be captured by the set of explanatory variables.[12] We also estimate a Weighted Least Square model (WLS), attaching greater weights to observations with higher precision.[13] Finally, as indicated earlier, we use standard error bootstrapping to account for the interdependence between observations in each study (Dougouliagous, 2005). The main results from our empirical analysis are reported in Table 3 (and Table 4 provides further confirmation of these main results). Column (1) shows the fixed effects estimates, column (2) has the OLS Bootstrap estimates, the WLS estimates are reported in column (3) and the random effects (RE) estimates are in column (4). Results using the general to specific method on the WLS and RE estimators are reported in columns (5) and (6).

Table 3 identifies that the main factors that help explain the observable variation in the corruption-growth effects are the following (in parentheses are the respective coefficients taken from Table 3, column 6): the affiliation of the authors (0.14), control for endogeneity (0.07), the use of fixed-effects (-0.21), the source/type of corruption measure, the presence of MENA countries in the sample (-0.25), the

[11] For the advantages of using partial correlation as dependent variable in meta-regression analysis, see Rosenthal (1991) and Meyer and Sinani (2005).
[12] The tests developed in Higgins and Thompson (2002) point to the appropriateness of the random- over the fixed-effects model in this case. For sensitivity purposes, we report both models.
[13] See Longhi et al. (2005).

inclusion of trade variables in the model (0.16) and controlling for institutions in the econometric specification (0.23). Let us now interpret these findings.

The positive and significant coefficient of the authors' affiliation variable across the different specifications indicates that non-academic authors tend to find the impact of corruption on growth to be more harmful than that found by academic authors, all else the same. This is an important result and is consistent with our finding that unpublished papers, about half of which are policy papers, tend to be more averse to report non-negative corruption-growth estimates. Also notice that although the coefficient on publication type carries the expected sign (the reported effects of corruption on growth are systematically smaller, or more negative, than those reported in peer-reviewed publications), differently from authors' affiliation, these are not robust across the different estimators

We also find that econometric models that try to control for the endogeneity of corruption with respect to economic growth tend to report more positive results than studies that do not take endogeneity into account. This suggests that the negative bias in this literature may be indeed driven by confusing correlation and causality. By contrast, studies that control for unobserved heterogeneity with the use of fixed-effects tend to report more negative effects than studies that do not account for these. Wherever significant, the signs of the measures of corruption variables are negative, which may be explained by expert perceptions being unduly driven by ideological biases (Razafindrakoto and Roubaud, 2010), translating into a larger negative reported correlation between corruption and growth.

Possibly one of the most interesting effects meta-analysis allows one to explore is that of the "channel" variables, in this case trade or trade openness, institutional quality, human capital, investment, political/democracy effects and government consumption. The inclusion of these variables produces coefficients of corruption that measure its direct effect on growth. On the other hand, the exclusion of these variables results in the corruption variable measuring its total effect on growth. In other words, if the channel variable has a negative (positive) sign, the direct effect of corruption on growth would be smaller (larger) than the total effect (Doucouliagos and Paldam, 2006; Doucouliagos and Ulubasoglu, 2008.) The coefficients of the trade openness and institutions variables are consistently positive and significant

indicating that if trade openness and institutions are positively related to growth, corruption affects these two channels negatively, thus undermining their positive growth effect.[14] This latter finding provides some support for the latest versions of the grease the wheels hypothesis, whereby corruption may have a positive impact on growth predominantly in the context of malfunctioning institutions (Méon and Weill, 2010).

Finally, we examine the impact of the regional variables in our MRA analysis of the effects of corruption on growth effects. The most consistent result across specifications is that of a negative and significant impact of the MENA region on the relationship between corruption and growth and, to a somewhat lesser extent, that of a positive and significant impact of the ASIA region. This implies that corruption has a more negative impact on growth in MENA and a more positive impact on growth in ASIA. The latter result is consistent with the Asia paradox in the corruption-growth literature.

For sensitivity purposes, we re-estimate all four MRA models for each group of variables separately (Table 4). The results are mostly consistent with those in Table 3, except that the presence of a government expenditures variable is now significant and that the coefficients on controlling for endogeneity and the Asian variable are no longer significant.

2.5 Conclusions

This chapter tried to provide a rigorous assessment of the relationship between corruption and economic growth, using a data set comprising 460 estimates of this effect from 41 different econometric studies. We use this unique data set to carry out an econometric survey and try to throw light on the role of differences in estimation methods, econometric specification, measurement issues, and factors like regional focus and time periods, on the distribution of overall effect of corruption on economic growth.

Maybe unsurprisingly to some, we detect a bias in the literature towards reporting negative and significant effects of corruption on growth. However, we also find evidence of a genuine effect of corruption on growth, which seems to be stronger in

[14] Note that the opposite is true for the democracy variable. However, this variable is negative and significant in only two specifications. Our results for all other channels are even less conclusive.

academic than in non-academic studies. Further, the large degree of heterogeneity in the available corruption-growth results seems to be driven by whether the authors are affiliated to academic institutions and whether the underlying econometric model controls for potential endogeneity and uses fixed-effects. There seems to be support to the "sanding the wheels of growth" view of corruption, in that we do find evidence that corruption undermines the positive effect of institutions and trade openness on growth. Finally, we do find some evidence in favour of the Asian paradox (although it does not survive further sensitivity tests) and that countries in the Middle East and North Africa region are likely to experience more negative impacts of corruption on growth than countries elsewhere.

Our results have important implications for future research. Firstly, we can not find enough convincing evidence supporting the view that corruption, on its own, is capable of greasing the wheels of economic growth and development. While the "true" relationship between corruption and growth may be less negative than that prevailing in the literature, non-academic authors seem systematically more likely to report a negative effect than academic authors. This effect seems to go beyond whether or not the study is published in a peer-reviewed journal and, unfortunately, generates a powerful bias in this body of empirical evidence. We also conclude that the application of more rigorous econometric methodologies may be needed to sort out the debate in this literature. In particular, we would much welcome studies that combine controls for endogeneity and fixed-effects with specifications encompassing various institutional and structural reforms dimensions. If these become the norm in the future, we think that this will contribute substantially to improve our understanding of the broad economic implications of corruption.

Chapter Three

Dynamic Ethnic Diversity and Economic Growth in the Transition Economies from 1989 to 2007

3.1 Introduction

There are three fundamental dimensions to any process of change. One is timing. When change starts and when it ends matters. Detecting the first signs that the status quo is sliding away is as difficult as identifying the moment when the previous status quo ceased to exist and the new one has fully established itself. The second fundamental dimension is extent. It refers to how much change was actually accomplished, whether the change itself was deliberate or unintended. The ratio between these first two dimensions is the speed of change. The third fundamental dimension is depth. This refers to how deep the effects of change turn out to be, whether or not the original change itself was intentional. There is no reason to think of these three dimensions as independent from each other. A case in point is that deep causes of change are often the most difficult ones to time, measure and attribute. Of course, this does not make them less important (the opposite is true, if anything). Institutions are a good example. They change slowly, over long periods of time, but their effects are widespread, long-lasting, and deep. We argue that the degree of fractionalization of a society along ethnic, religious or linguistic lines is in the same category. Fractionalization changes very slowly but this does not mean it does not change. It is also very difficult to measure but this does not mean they are short-lived. And diversity is often an extraordinarily deep phenomenon, but this does not mean we can afford to ignore it.

It was only in the last decade or so that ethnic fractionalization entered mainstream economics. There is now a burgeoning theoretical literature (see, e.g., Esteban and Ray, 1994, 1999 and Nehring and Puppe, 2002) and a very active empirical agenda. Although the seminal papers of Mauro (1995) and Easterly and Levine (1997) offer econometric evidence showing that greater levels of ethno-linguistic fractionalization

hinder economic performance, there has been less success in sustaining the evidence for such negative, direct effect. Easterly (2001) argues that the effect of ethnic fractionalization is conditional: it slows down economic activity only in countries with "sufficiently bad" institutions. Bluedorn (2001) and Alesina et al. (2003) show that the negative impact of diversity on growth is particularly strong in less democratic countries. Posner (2004) argues that the negative effect is supported only by a restricted polarization index: restricted in that it includes only "politically relevant" ethnic groups. Montalvo and Reynal-Querol (2005) argue that the direct effect of fractionalization on economic performance is weak and suggest focusing on polarization instead. In summary, the initial negative first-order effect of ethnic diversity on economic growth has been challenged and the literature seems to have turned to identifying the main channels through which diversity may affect the economy (i.e., indirect effects).

This large body of econometric evidence has two main features in common: diversity is measured using secondary data and diversity is often treated as a non-time varying, exogenous variable.[15] Alesina and La Ferrara (2005) provide an authoritative and thorough review of this empirical evidence and identify two main directions for future research: one is the need to improve the measurement of diversity and the other is the desirability of modelling diversity as an endogenous variable. The objective of this chapter is to try to address these two issues. In this chapter, we put together a data set that contains mostly primary, census-based, data. In terms of treating diversity as an endogenous variable, we make use of the genuine time variation shown by these indexes that, to the best of our knowledge, is unique to our data set. We propose lagged diversity and latitude as the instrument set and subject these to a comprehensive series of diagnostic tests (which they pass).

In what follows we report on the construction of a unique data set based mostly on primary data (national censuses) to measure ethnic diversity over time for a sample of countries that closely resemble a "natural experiment" (the 26 former centrally-

[15] These two features are related as the secondary data used to measure diversity refers to the early 1960s. The huge popularity of the index constructed by Soviet researchers and published in the *Atlas Narodov Mira* (Bruk and Apenchenko, 1964) is due in large part to its inclusion in Taylor and Hudson's *World Handbook of Political and Social Indicators (1972)*. For studies that use this index, see Mauro (1995), Easterly and Levine (1997), Collier (2001), *La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999) and* Woo (2003a, 2003b).

planned economies, from 1989 to 2007).[16] These are said to resemble a "natural experiment" because until 1989 they shared a very similar set of economic and political institutions (central planning under socialism), but have since followed radically different economic and political trajectories. Using these data, we are able to replicate the most recent results from the literature and show that static (exogenous) diversity is indeed not robustly correlated with economic growth. However, when we capture empirically how ethnic diversity changes over time and model it as an endogenous variable, we conclude that ethnic fractionalization is negatively related to growth and this is robust to the use of different econometric estimators, specifications, polarization measures as well as to an index of ethnic-linguistic-religious fractionalization.

The rest of the chapter is organized as follows. Section 2 discusses the data collection effort and the measurement methods used. Section 3 discusses the econometric methodology, presents the main results and subjects them to various robustness tests. Section 4 concludes with some brief suggestions for future research.

3.2 Measurement

In this chapter, we collect primary data (census-based) to measure ethnic diversity (fractionalization and polarization) over time (from 1989 to 2007) for a sample of 26 former centrally-planned economies.[17] National censuses are the preferred and most reliable source of ethnic diversity data. Unfortunately they are only conducted once a decade, at best. Micro-censuses and demographic surveys, which are arguably the second best sources of primary diversity data, tend to be conducted at five-year intervals. With this in mind, we assess what would be the maximum number of time periods for which we could obtain a balanced panel data set on the demographic (ethnic) composition of these 26 transition countries. We identify four time periods: 1989-1993, 1994-1998, 1999-2002, and 2003-2007. This means we use primary data

[16] Campos and Kuzeyev (2007) examine the relationship between growth and diversity between 1989 and 2002 within an endogenous growth framework, while this chapter uses the traditional Solow model to study the growth-diversity nexus between 1989 and 2007.

[17] We divided the sample in five groups for exposition purposes (Figure 1). The transition countries in ASIA are Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyztan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan. The BALKAN countries are Albania, Bulgaria, Croatia, Macedonia, Moldova and Romania. The BALTIC countries are Estonia, Latvia and Lithuania. The group called BUR comprises Belarus, Ukraine and Russia. The VISEGRAD countries are the Czech Republic, Hungary, Poland, Slovakia and Slovenia. CEEB stands for Central and Eastern European and Baltic countries and which is the sum of the BALTIC, BALKAN and VISEGRAD sub-groups.

from national censuses for the first and third period and data from micro-censuses and demographic surveys for the second and fourth period.[18]

We collect data on the percentage of the population belonging to each ethnic group in each country for each of these four periods. This generates a panel with 104 observations. Census data are available for about half of the observations. Once all the data were collected, we note that for some countries there were more than one estimate for a given time period, so a decision rule was needed. If two or more sources gave identical information up to the third decimal place, we first single out these sources. From them, we chose the combination that gave the most balanced distance among the indices over time. This was done to have the largest possible time span within the sample periods.[19] If we still have a tie, that is, if the remaining sources diverged up to the second decimal place, we used the one that caused less variability of the indices for the country in question over time. This rule of most balanced distance attempts to minimize source-variability bias as much as possible.

For the computation of the fractionalization indices, we apply the commonly used formula capturing the probability that two randomly selected individuals belong to different ethnic groups (e.g., Alesina et al., 2003):

$$F = 1 - \sum_{i}^{n} s_i^2 \qquad (1)$$

where s_i is the share of total population belonging to ethnic group *i*. The index takes values between zero (for a perfectly ethnically homogeneous country) and one (highly heterogeneous country).

One shortcoming of this measure is that the same value of the index can correspond to different distributions (Fearon, 2003). This sensitivity of the index to the total number of underlying groups requires attention. We compare two approaches. First,

[18] Although it is difficult to objectively judge the quality of these different sources of data, note that in each country collection of these data was done by the same agency, with comparable methodologies. They differ in that censuses cover the entire population and micro-censuses cover a representative sample. These figures were checked against various additional sources, including Rosenko (1999) *Nasii I Etnosi V Sovremennom Mire* (*Nations and Ethnicity in Today's World*) and *Natsionalniy Sostav Naseleniya SSSR* (*Ethnic Composition in The USSR*, Finansi I Statistika, 1991).

[19] For example, we found data on the ethnic composition of the population in Latvia for the years 1994, 1995 and 1996 from different sources, whose indices were identical up to third decimal place. Hence, according to our rule, the time series 1989-1994-2000 was preferred to 1989-1996-2000.

we use an unrestricted set with all disaggregated data allowing the number of ethnic groups for each country to vary over time. In the second approach, we restrict the number of groups for each country to be the same over time.[20] We find the differences are small.[21]

Figure 1 shows that these countries end up much more ethnically homogenous than they started with over a short period of time. This suggests that there may be value in re-thinking the assumption of exogeneity. Why does diversity change over time? One general cause is, of course, migration flows. These may be driven by better economic performance and opportunities in the destination country as well as by inferior economic performance and/or civil war and ethnic cleansing in the origin country. In developing countries, such a process should surely take decades to unfold. However, there are special circumstances in our sample of transition countries which allow for this process to take place in a much shorter period of time. Firstly, with the collapse of communism, workers become free to move to other countries (while under communism mobility restrictions often referred to the city, let alone country) in search of better economic opportunities (Campos and Coricelli, 2002). Secondly, the ubiquitous Russian minorities seem to have been made to feel unwelcome and the new economic and political situation after 1991 results in return migration, causing the share of Russians to fall in every country in our sample, with the exception of Moldova. It is only after 1945 that Russians become the second largest ethnic group in most of the Republics (one example is Kazakhstan, where the national census of 1989 shows that the shares in total population are 37.8% to 39.7% for Russians and for Kazakhs, respectively.) A third important factor is violent conflict, for example, the wars in the Caucasus and former Yugoslavia. Because of

[20] The average number of ethnic groups in the restricted sample was 5.19 and in the unrestricted sample 7.04. Alesina et al.'s and Fearon's analogous figures for Eastern Europe and former Soviet Union countries are 6.48 (27 observations) and 4.55 (31 observations), respectively. The lowest number of groups in our data, including "others", is 3 (in several cases), while the largest is 8 (12 for Mongolia in the unrestricted sample). In addition to data quality, we must also be concerned with data comparability. In this respect, there are few dimensions over which researchers can exert some control. One of the few, however, refers to the number of groups used in the computation of the diversity indexes. Here we explore different ways of using this information across countries and over time. We find that these variations do not affect our main conclusions.

[21] For instance, the mean of this ethnic fractionalization index declines from 0.3726 (0.3768) in the first period to 0.345 (0.3538) in the second period to 0.3147 (0.3154) in third period to 0.30145 (0.30314) in the fourth period (values using the unrestricted number of groups are in parenthesis). For comparison, Alesina et al.'s value for the early 1990s is 0.3696, while Fearon's is 0.3723.

the latter, for example, the share of Serbs in Croatia declines from 12.2% in 1991 to 4.54% in 2001.

Another concern about the existing ethnic fractionalization indices is that the definition of ethnic groups may change for political reasons. Alesina et al. (2003) remark that Somalia was counted as a homogeneous country prior to the civil war in 1991 with the notion of linking clans to ethnic groups coming into being only after that. Note that there are no disputes about group definitions in our data. Census questionnaires enumerate a fixed number of ethnic groups and let the respondent indicate to which she belongs. The residual option of "others" or "none of the above" is provided and taken into account (as one single group) when computing our diversity measures.

The emerging consensus is that polarization is the theoretically appropriate concept for measuring diversity.[22] The family of polarization measures developed by Esteban and Ray (1994; 1999) has been implemented in various ways. The one proposed by Alesina et al. (2003) is as follows:

$$ADEKW \quad Polarization = K\sum_{i=1}^{n}\sum_{j=1}^{n} s_i^{1+\alpha} s_j \left| y_i - y_j \right| \qquad (3)$$

where K is a scaling factor and α is a constant between 0 and 1.6. Note that this formulation requires a measure of distance between groups (the last term in the right-hand side). Conceptually, distance can be thought of, for instance, as differences in median incomes. Because of data constraints, distance is often assumed to be constant.[23]

An alternative, yet related, implementation is the one proposed by Montalvo and Reynal-Querol (2003):

$$MRQ \quad Polarization = 1 - \sum_{i=1}^{n}\left(\frac{0.5 - s_i}{0.5}\right)^2 s_i \qquad (3)$$

[22]Fractionalization measures increase in the number of groups, while polarization maximum is reached with two groups of equal size.

[23]To be more precise, the ADEKW index of polarization is the original index of polarization of Esteban and Ray (1994). The Alesina et al. (2003) index are obtained using different values of α and under the assumption that distance is constant and equal to 1.

Notice that although Esteban and Ray (1994) and Montalvo and Reynal-Querol (2003) may look similar they are rather different. Esteban and Ray deal with the calculation of polarization when distances are continuous while Montalvo and Reynal-Querol provide an index to calculate polarization when distances are discrete.

We use equations (1), (2), and (3) to calculate various measures of fractionalization and polarization. Appendix 1 shows that the pair-wise correlations between our measures, on the one hand, and investment, human capital and labor growth rates, on the other, is small (the largest is 0.11). Notice that the simple correlation among our measures of fractionalization and polarization is high (the smallest is 0.83). It is also worth noting that while the correlation coefficients between our diversity measures and human capital tend to be positive, the same with respect to investment and population growth tend to be negative (although in both cases they are not statistically significant). In between these extremes, the negative correlation between growth and all our measures of fractionalization and polarization is milder, ranging from -0.24 to -0.37.

3.3 Results

The objective of this section is to revisit the effect of ethnic diversity on economic growth. To do so, we estimate the standard augmented Solow model proposed by Mankiw, Romer and Weil (1992).[24] MRW's econometric specification is as follows:

$$\ln(\frac{Y}{L}) = \beta_0 + \beta_1 \ln s_k + \beta_2 \ln s_h - \beta_3 \ln(n + g + \delta) + u \qquad (4)$$

where Y/L is output per capita, s_k is the rate of investment in physical capital, s_h is the rate of investment in human capital, n is the population growth rate, g is the rate of technological change and δ is the depreciation rate.[25] Subscripts for countries and (the four) time periods are omitted[26]. Notice that although the estimation in the original MRW paper was done by OLS, we here follow the more recent literature (e.g., McCleary and Barro, 2006) and first estimate (4) using SUR.

[24] In the fractionalization and growth literature, this approach is used by, for instance, Montalvo and Reynal-Queyrol (2003).

[25] We follow MRW in assuming that the sum of g and δ is constant. Although they assume it is constant at 5%, here we report results assuming that the sum of rates is 7.5% so as to reflect the larger depreciation observed in the capital stocks inherited from the socialist period.

[26] See appendix 2 for definitions of variables

Table 1 has our results treating polarization and fractionalization in a manner similar to that of the literature, that is, as exogenous variables. The specifications in Table 1 all include initial income while all of those in Table 2 exclude it. Column 1 in Table 1 shows that the coefficients on investment, human capital, and population carry their expected signs (positive, positive and negative, respectively). Initial income is negative, but insignificant.[27] Exogenous ethnic fractionalization, however, has an almost negligible effect on growth.[28] Column 2 shows that the ethnic fractionalization index has no effect on growth, while columns 3 and 4 show that diversity is also not significant when proxied by any of the two versions of the Alesina et al.'s polarization measure. The same conclusion holds for the Montalvo and Reynal-Querol measure (column 5). These results may well be driven, for example, by ethnicity not being the appropriate dimension for conflict in these countries. In order to address this possibility, we computed two additional indexes. First, a principal components index of ethnic, linguistic and religious fractionalization dimensions was constructed. Column 6 reports these results and shows that this broader index is also not statistically significant. Second, we constructed an average index of these three fractionalization dimensions. Column 7 confirms that diversity is still statistically insignificant.

Table 2 repeats the estimations of Table 1 but excluding initial income. Column 1 shows that the coefficients on investment, human capital, and population are now all significant and carry their expected signs (positive, positive, and negative, respectively). However, the coefficients of all diversity indexes are still not significant, except column 4 which shows that the ethnic polarization index with α=1.6 is negative and statistically significant.

In sum, these findings on diversity are in line with most of the recent literature in that these estimates show that its direct effect on economic performance is weak. One possibility that the literature has not yet explored is that diversity changes over time and may also be endogenous (see, e.g., Alesina and La Ferrara, 2005). Fast growing economies will attract migrants, while newly independent states may try to

[27] There are important data quality issues that should be kept in mind when interpreting these results (for a discussion see Campos and Coricelli, 2002).

[28] The results from a standard Granger-causality test show that there is no evidence supporting the notion that growth (Granger-) causes diversity.

expel formerly dominant ethnic minorities (say, Russians). We now turn to econometric results that try to take these possibilities into account.

Instrument selection is always a difficult matter. It is made more severe in this case by the fact that there has been little effort to explain theoretically or empirically the evolution of ethnic diversity over time. In this light, we tried a number of variables and combinations of variables and settled on the lagged diversity index and latitude (the absolute value of distance from the equator). We subject this choice to extensive testing and conclude that these two variables perform satisfactorily.

We start by examining the Sargan-Hansen test of overidentifying restrictions. The objective of this test is to help establish the validity of the instruments, that is, that the instruments are uncorrelated with the residuals and that their selection is justified. A rejection of the null hypothesis would suggest that the instruments are not valid. As it can be seen in the "diagnostics" panels of Tables 3 and 4, the null is not rejected in all cases at conventional (95%) confidence levels suggesting that these instruments are indeed valid.

In terms of identification, next we report on tests for the relevance of the instrument set, that is, whether the instruments are correlated with the endogenous regressors. We report the Shea Partial R-squared (with only one endogenous regressor, this statistic is equivalent to the more common partial R-square) and the F-test of the excluded instruments in the corresponding first-stage regression. The results from these two tests support the validity of our set of instruments. The R-square figures are very high and the value of the F-statistic is above 10 in all specifications of tables 3 and 4. The Anderson canonical correlation likelihood-ratio test (CCLR) corroborates these conclusions.

Finally, we also report the Pagan-Hall and RESET tests. The Pagan-Hall tests for heteroskedasticity in the IV context. Given the extraordinary variation in growth performance across these transition economies over time, some may worry that this can be an important source of bias. None of the results in tables 3 and 4 suggest heteroskedasticity problems in the estimated equations' disturbance process. The RESET test we report is the Ramsey's regression error specification test as proposed by Pesaran and Taylor (1999). It shows all models in tables 3 and 4 are correctly specified in that omitted variables bias does not seem to be severe.

In Table 3, we report our estimates of the augmented Solow model using instrumental variables techniques. These allow us to treat ethnic diversity as an endogenous variable. With initial income in the specification, we find that the coefficients on investment, population, and initial income are not significant, although the one for human capital is positive and statistically significant. Column 1 shows our results using dynamic (endogenous) diversity: the coefficient on ethnic fractionalization is now negative and significant. Columns 2 and 3 show that for the two versions of the Alesina et al.'s polarization measure and for the Montalvo and Reynal-Querol's index (column 4), the coefficients on ethnic fractionalization are also negative and now statistically significant. Column 5 shows that our principal components' ethnic-linguistic-religious fractionalization index generates similar conclusions, namely that dynamic and endogenous fractionalization seem to have a negative and robust first-order effect on economic growth. Column 6 presents similar results for the average of the three diversity dimensions (ethnic, religious and linguistic).

Table 4 presents similar results but excluding initial income from all specifications. As it can be seen, the only standard explanatory variable that remains significant is human capital. For the set of diversity indexes, we can see that all of the relevant coefficients are still negative and all except one (out of six) are statistically significant.

For the sake of sensitivity analysis, we also apply the Blundell and Bond's (1998) System GMM estimator. Table 5 presents GMM estimations for our augmented Solow model. The coefficients on investment, population, and human capital are statistically insignificant in all specifications (Table 5). The diversity indices are treated as exogenous and it can be seen that none of the various versions of the index is significant (the fractionalization index in Column 1, the Alesina et al. polarization index in column 2, the MRQ index in Column 3, and in columns 4 and 5, our two ethnic-linguistic-religious fractionalization indices). Notice that we were not able to generate results for the Alesina et al. 1.6 polarization index. Overall, these results in table 5 are similar to the one we discussed above in that exogenous diversity has no discernible first-order impact on economic growth.

Table 6 reports System GMM results when diversity is treated as endogenous. In this case, the coefficients on human capital are positive and now statistically significant. Population and investment are insignificant. Once the diversity indexes are treated as endogenous, the coefficients all carry the hypothesized negative sign and are statistically significant. The instruments applied are the lagged dependent variable and the latitude variable. The system GMM estimator uses as instruments for the original equation, the first difference of all variables, while for the differenced equation, instruments are the lagged variables of the original model. In our case, investment, human capital, and population are considered as predetermined explanatory variables which are expected to be not correlated with the past and present value of the errors, while latitude is considered strictly exogenous. Notice that the test for the first-order residual serial correlation suggests that the model does not suffer from serial correlation.[29] Moreover, the validity of the instruments in the system GMM results is supported by the Hansen test. Note also that we use the two-step estimation, where the standard errors are corrected for panel specific auto-correlation and heteroscedasticity and we also apply the Windmeijer correction (Roodman, 2006). In our view, we prefer the results in tables 3-4 to those in Tables 5-6 (that is, we prefer the IV estimates to the System GMM ones) because our panel is very short both in terms of countries and especially in terms of time periods. Despite the potential problems with the GMM results, it is comforting to see that the main conclusions change little compared to the IV results, namely, that exogenous and static diversity seem to have little effect on growth while the same effect is much more statistically robust and economically meaningful from a model that takes into account the dynamics of diversity as well as of its exogenous component.

3.4 Conclusions

This chapter investigates a number of questions related to the behavior of ethnic diversity over time and across countries and its effects in terms of economic performance. We studied how much weight should be attached to the assumption that ethnic diversity does not change over time. We noted that this assumption is used widely. Paradoxically, the index of ethnic fractionalization that is commonly used in the literature was developed by researchers from former communist

[29] As our panel covers only four periods and we use the one-period lagged diversity as an instrument, we are unable to run the AR(2) test.

countries, that turn out to experience most dramatic changes in ethnic diversity in a very short period of time. We use census or micro-census data to create such indices for four points in time for a sample of 26 transition economies. Using these measures, and in line with the recent literature, we find weak evidence of a direct effect of diversity in the standard augmented Solow growth model. On the other hand, our panel estimates show that dynamic (endogenous) ethnic fractionalization is negatively related to growth, with equally robust results obtaining for measures of ethnic polarization.

As mentioned above, there are a number of issues that make the situation of ethnic groups in the transition countries somewhat special. In our view, those reasons support the dramatic changes in the ethnic composition we observe in such a short period of time. Although we do not think it is reasonable to expect that changes of this magnitude could be observed for other groups of developing countries over ten years or so, data may be available that would allow future research to relax the assumption that since 1960, that is over the last half-century, the degree of ethnic homogeneity has not change meaningfully in poorer countries. Such test can be accomplished, for instance, using decade averages of available ethnic diversity measures. This will be useful in re-assessing the recent discussion about the channels through which diversity (indirectly) affect growth. It is clear, however, that the construction of census-based measures for larger samples of developing countries over longer periods of time is still a rather demanding task.

Chapter Four

Are Recent Reforms Enough for a Prosperous Performance? Developing Countries in Progress

4.1 Introduction

The growing literature on reform and growth aims to determine the ultimate factors that affect raising the prosperity and the achievements of higher economic development. Theoretically, reforms that lead to changes in economic structures are almost always accompanied by political and social shifts[30]. Reform targets are set to create appropriate rules and institutions for more effective economic systems. They do not just focus on specific variables that are supposed to be correlated with growth, or explain it, such as technology, FDI, public expenditure, and human capital which may yield a wrong or incomplete understanding of the growth process. Moreover, there is a consensus in the literature that reform is dynamic and changeable. Many studies distinguish between developing and developed countries in terms of reforms effects and policies, and divide them into regions. Most developing countries require better economic environments and more investments in both institutions and infrastructure. Forstner and Isaksson (2002) state that the growth differences between countries are obvious; particularly for manufacturing growth in both developed and developing countries. Also, technological developments form the main sources of productivity growth in the developed countries while in developing ones they are a minor factor. They also show that capital accumulation is very important at any stage for development, but productivity still accounts for the differences between countries. Furthermore, there is a continuous divergence between developed and developing economies in reforms and growth. Sachs and Warner (1995) explain a number of causes: firstly technology is more productive in the advanced countries; secondly convergence occurs between countries which have advanced human capital; thirdly poor countries have low long-run income levels. Moreover, liberalization, openness, and institutions are considered to be, to a large degree, the main channels to global

[30] For example; See Acemuglu et al. (2001) and Fanelli and Popov (2003).

integration, higher growth and more development; the South East Asia experience is an attractive example. This section concentrates on developing countries which have had intermediate income level in the last two decades[31].

The objective of this study is to provide evidence on the relationship between economic performance indicators, in particular economic growth and industrial growth, and on the other hand economic reforms by concentrating on the following aspects: external stability, macroeconomic stability, trade liberalization, financial development and institutional quality. More specifically, this study intends to test (1) the effect of structural reform on economic and industrial growth, (2) the effect of institutions on economic performance, and (3) to determine the most influential factors fostering economic growth and industry in developing countries. This chapter uses a panel dataset over the period 1980-2006.

This chapter is organized as follows: Section two presents a literature review of economic reform and the determinants of economic growth in developing countries; Section three provides the data and construction of the reform indicators; Section four explains the econometric methodology; Section five provides the results. Various economic reform aspects are measured and analysed. The last section is summary and conclusion.

4.2 Literature background on reforms and growth

This section concentrates on the literature related to developing countries' reforms and growth. The main objective of reforms is to achieve high and sustainable growth (economic performance). This requires understanding the determinants of growth. According to the Solow model (1956), the steady-state of equilibrium will be reached by technology and exogenous saving rates and population growth. The determination of economic growth, as an indicator of economic performance, is a sophisticated and continuous process. Bosworth and Collins (2003), for example, mention that there is no consensus about the explanations of growth differences and whether capital accumulation or total factor productivity (TFP) accounts for such differences and also whether increased education versus the importance of economic policy as determinants of economic growth. In the same context; Durlauf et al. (2008) state that there is no unique growth strategy. On other words, they found that

31 World Bank classification in 2009 is considered here.

fundamental growth theories are not very important. However, macroeconomic policies and regional heterogeneity have an important role.

The empirical studies also yield various and different results. Mankiw et al. (1992) show that the share of both physical and human capital with population growth account for 80 percent of international variation in per capita incomes, while Klenow and Andrés (1997) find that TFP accounts for 90 percent of cross national variation in growth rates. Studies about growth aim to determine the channels that influence economic growth. Bosworth and Collins (2003) argue that the differences in conclusions in the previous studies can be explained by measurement errors, differences of data or definitions, and misspecifications of regressions. Moreover, the rate of capital depreciation is more relevant as a proxy of change of capital than the rate of investment. The differences in initial conditions and governmental institutions account for the large variation of economic growth across countries. Also, the macroeconomic policies and S-W indicators of openness, used in many studies, are not typically associated with economic growth. Similarly, Easterly (2001) concludes that there are several possible explanations for the stagnant growth of developing countries in the 80s and 90s: (1) OECD slowdown growth may lead to LDC slowdown. (2) A common shock for both OECD and LDC has occurred. (3) Mis-specification regression during 80s, 90s yields the misleading results. He argues that the 60s-70s periods were exceptional and the 80s-90s is a continuation of the tendency of divergence between developed and developing countries. As for the last two decades, Easterly (2001) claims that most reforms have not been efficient.

Economists and governments think of reforms as a solution to economic stagnation and to the divergence between developed and developing countries. The first insight of economic reform was in the 70s on liberalization of financial and trade sectors. After that, the Washington consensus was established in the 80s to include also industry, capital flows, exchange rates, privatization, and the like. In the 90s the packages of reform were expanded; the Washington consensus became part of a multi-reform agenda. The URP (Understanding Reform Project) extends such reforms as “movements towards more market oriented economic systems, usually in the context of more open political institutions”. Loayza and Soto (2003) define the market-oriented reform as a “policy measure that allows and induces the competitive participation of private agents in a sector, activity, or market”. The definition of

reform however, is still ambiguous and has been understood differently. Moreover, reform programs are varied and diversified broadly across countries, time, and circumstances. With regard to the Washington consensus, it is considered as a framework for reforms in the developing countries, launched firstly for the LAC countries in the 80s. Williamson (2004) develop his 1991 agenda taking into account the criticisms and he present a new strategy as follows: (1) Government intervention to enhance macrocosmic stabilisation especially regards inflation; (2) the complementarily of reforms and the continuity of privatisation programs that the more effective and better institutions, the more productive policies; (3) paying more attention for social sides and improving income distribution.

The original suggested prescription of Washington consensus is as follows: fiscal discipline; reorientation of public expenditure; tax reform; financial liberalization; unified and competitive exchange rates; trade liberalization; openness to FDI; privatization; deregulation; and security property rights (Rodrik 2002 cited in Williamson 2004). However, Krugman (1995) cited in Easterly (2001) states that "the real economic performance of countries that had recently implemented Washington consensus policies was distinctly disappointing".

On the other hand, Rodrick (2008a; 2008b) argues that these recipes are not enough. They require a better and more organized environment allowing for active market mechanism (i.e. institutions) which Rodrick called "second best institutions". Moreover, Fanelli and Popov (2003) show that global concerns, particularly the crises in Mexican economy and East Asia caused by the financial and macroeconomic liberalization, require a Second Generation of Reforms (SGR), as a response to the shortcomings of the First Generations of Reforms (FGR), aiming to enhance the institutions' quality and to secure sustainable growth. They try in their paper to provide a clear picture of the reform process by answering why, what, and how reforms were launched. It is important to know the incentives and goals of reforms, polices and resources, and technical and political evaluations.

Another criticism for Washington consensus reforms is made by Liew et al. (2003). They conclude that reforms should not be standardized, but should differ across countries because structures and initial conditions are crucial. The success of reform depends mainly on local efforts of the concerned country. Moreover they mention

some factors that boost or hinder decisions to reform: ethnic and religious diversity in the country, international influences, influence of crises, political institutions. However, Staehr (2005) argues that initial conditions play an important role just in the first years of reforms and transitions.

Moreover, the adoption of long-term reform plans depends on their targets; Dewatripont and Roland (1995) build a model of large-scale economic reforms based on Eastern Europe's transition. They compare a gradualist with a big-bang strategy and found gradualist reform is more politically acceptable because the big-bang strategy depends on raising "high reversal costs".

Transition to liberalization and integration into the global economy forces developing countries to adopt an effective property rights system especially for those who followed socialism before. As one of the solutions suggested to the maximization of national welfare is changing ownership structure (Currie, 2005). The private sector is considered more efficient than the public one for the following reasons as mentioned in (Helik, 1997): private ownership produces more efficiency, as it gives more incentives to managers leading to reduced costs and increased productivity; privatization allows for more competitions and less monopolism which leads to more gains; privatization encourages more efficiency by allowing firms to access capital markets; privatization reduces public sector domination of productive resources.

Critics of reform raise some significant issues. It is true reforms could negatively affect the interest of public employees, privatization could negatively affect the employees of public enterprises, reform of public sector pensions would reduce privileges of public employees, and trade liberalization would be detrimental to industrialists in the import substitution sectors. It is also true that the removal of public goods subsidies in the name of fiscal prudence, the adoption of cost recovery of social services to make them self-financing and lowering corporate taxation to promote investment could be detrimental to the poor and benefit the rich. But all reforms are costly to someone. Therefore, their merit should be judged by whether they make society better off or not, and whether the winners are made to compensate the losers.

On measuring and evaluating reforms, it is a difficult and sophisticated course of action. Loayza and Soto (2003) present ‘‘policy and outcome based ways’’ to measure market-oriented reforms in first and second generation reforms; the policies involve domestic financial systems, international financial markets, international trade, labour markets, tax systems, public infrastructure and public firms, legal and regulatory frameworks, and governance. Fanelli and Popov (2003) mention some problems when measuring the reforms: black economy growth, declines in government revenues to GDP, financial weaknesses, increased inability of states to deliver public goods, and weak legal enforcement.

Furthermore, reforms depend on their components. Economists pay attention to structural reform, macroeconomic stability, external stability, and in turn these components depend on their sub-components. Structural reform aims to increase the economy market orientation through more trades, openness, and enhancing the private investment environment. On the other hand, macroeconomic stability aims to keep the macro variables out of shock and to control the government role through public expenditure reduction and lower inflation (Nabli and Véganzonès-Varoudakis, 2007).

Empirically, a flood of research has been streamed to discuss the reform-growth nexus. Hausmann et al. (2005) define growth acceleration as “an increase in per capita growth of 2 percentage points or more”. Furthermore, the growth should be continuous for at least eight years and its rate after that is more than 3.5 percent per year. They conclude that the growth acceleration is not predictable and not related to economic reforms and political shifts. Also, reform does not lead to that acceleration.

In the following part of this section, some evidence is presented about the main reform areas which determine economic performance: financial development, trade liberalization and institutional quality.

First of all, accumulation of capital in the industrial sector is still of high importance for growth in developing countries. Dewan and Hussein (2001) conclude that the central government saving rate as a proportion of GDP is positively correlated with economic growth. They also find evidence between government spending on health and education and per capita growth. Moreover, the fluctuations in the agriculture

production sector in developing countries in which it forms a significant percentage, cause slowdown in growth.

Many studies have focused on the relationship between growth and the financial sector. On a seminal work, Loayza and Ranciere (2006) employ short and long- run analyses using Pooled Mean Group estimations and state that there is a positive relationship between financial development and growth in the long-run with mostly negative effects in the short run. On the same line and using the same estimator, Demetriades and Law (2006) find that financial development also affect economic performance (GDP per capita) within a strong institutional environment. They apply panel data for 72 countries over 1978-2000, distinguishing between regions according to their income levels.

Boulila and Trabelsi (2004) summarize the literature concerning the relation between financial development and economic growth; they state that there is a positive relationship but no causality determination was found. Furthermore, the time series approach used to support the causality between financial development and growth varies across countries and depends on the financial liberalization. Although there is weak evidence that finance boosts the economy, they support the causality from real to financial sector in MENA. Moreover, according to Achy (2005), there is a positive relationship between financial liberalisation and growth, but he find that there is a negative effect of financial depth on private investment because of the relationship between financial development and the development of mortgage and consumer credit markets.

In theory, the second main reform area discussed here, trade liberalization has the virtue of increasing the degree of competition faced by domestic producers. Competition leads to improved products (as domestic product will have to compete with the inflow of imported goods), discipline of monopolistic or oligopolistic behaviour of domestic producers and thereby cheaper consumption. Thus it will increase welfare in the longer term. The reality is different in the sense that when competition becomes aggressive the tendency is that large foreign companies eliminate domestic rivals even when these companies are efficient. Apart from the theoretical arguments for trade liberalization, some benefits have also been identified such as access to new ideas and technology, political trade-offs. Experience has

shown that theories are always different from realities. Many developing countries that have adopted trade liberalization have started complaining that trade liberalization has had a negative impact on their economies. This argument is understandable when these countries practise only one of many forms of trade restriction/intervention in order to correct the imbalance noticed in their economies. Besides all the countries of the world practise trade intervention but the degree of intervention varies from one economy to the other. Trade restriction is carried out through the implementation of trade policies which are peculiar to a specific nation. Loayza and Soto (2003) conclude that government intervention is necessary when the market fails because of "asymmetries of information, moral hazards, or natural monopoly".

Dollar and Kraay (2003) argue those countries which trade more, grow faster. Moreover, they find a strong relationship between rapid growth in the very long run, high level of trade and relevant institutions. Moreover, Shachmurove (2004) says that trade openness is vital both for increases in per capita income and achieving economic progress. It has been indicated that trade liberalization is positively related to economic growth (Sachs and Warner 1995); Kneller (2007) also argues against positive benefits by concluding that trade liberalization may be a necessary but not a sufficient condition for development. Trade liberalization effects growth indirectly through fiscal policy changes.

Fanelli and Popov (2003) likewise, argue that there is no evidence that more trade, as a part of reforms, leads to more growth. However, the protection benefits are dependent on achieved technological advances. In addition, the wider the gap between the countries applying protection, and advanced countries, the greater the benefits obtained from restricted trade.

Shafaeddin (2005) discusses the performance of a sample of developing countries that adopted trade liberalization and economic reform from 1980. Trade policy alone is not sufficient for rapid growth. Instead, institutional factors are important for success or failure of trade policies. Thus, it is important to draw policies whish raise productivity, especially through education and infrastructures.

The role of institutions in driving economic change and growth has again come back to the debate in the recent years (Nelson, 2008). In particular, economists would like

to study the effect of institutions on variation in development between nations and to determine factors behind growth.

The research, which has mostly been theoretically researched, suggests that there is a strong positive role for institutions in economic organizations and systems (Gagliardi, 2008). However, the increased available data and the tendency to measure the institutions' effect via proxy variables allow empirical investigation of the role of institutions. Acemoglu et al. (2001) show, using different estimations, that the effects of institutions on economic performance are significant and robust. They also provide evidence that improving initiations is essential to better economic gains. Moreover, Acemoglu et al. (2005) prove that economic institutions encouraging economic growth when there are political power allocation to groups with interests. They illustrate their framework using a number of historical examples.

Knack and keefer (1995) use an average ICRG index of five variables32 in their economic growth model over 1986-1995 periods. They demonstrate that institutions have positive effects on economic performance.

In a seminal work, Hall and Jones (1999) show the effects of institutions on economic performance. They show that differences in economic performances indicators such as productivity and output per worker can be explained by the differences in institutions and government policies which they called "social infrastructure". They use instrumental variables, such as latitude and language to measure the institutional effect on sample of 127 countries. Another important conclusion is the need to distinguish between the proximate and the fundamental variables which determine economic performance.

Interestingly, Rodrik et al. (2004) find that institution's role defeats geographic and trade variables in explaining income levels all over the world. They use instrumental techniques to explore the role of initiations. However, geography and trade were no longer significant and held wrong signs when all those three variables run together. Recently, Bhattacharyya (2004) find the same results when changing the dependent variable form level to growth.

[32] (rules of law, bureaucratic quality, corruption, risk of expropriation and government repudiation of contracts)

Moreover, Law and Habibullah (2006) study the effect of institutional quality and financial development on economic performance in East Asian countries and they also found that the main results were that financial development is more influential when applied in a sound institutional environment. In addition, they stated that institutions are essential to boost economic performance.

In a survey paper, Gagliardi (2008) concludes that the role of institutions is unavoidable for economic change and therefore for better economic prosperity.

Nabli and Véganzonès-Varoudakis (2007) use a panel of 44 developing countries over the period 1970-1999 to generate reform indicators by principal components analysis to study the relationship between economic reform and growth. The analysis shows: (1) Macroeconomic reforms achieved a small advance in the 1990s, as compared to 1980s, inflation and public deficit. (2) External stability: there was little improvement in the global sense, especially with the increasing foreign debt in the 1980s. (3) Structural reform: a notable performance was achieved, but that does not mean active financial institutions existed. Also, trade openness was not sufficient. The estimation was consistent with theory; the more improvements and increases in investment, macroeconomic stability, external stability, structural reforms and the physical, human capital, the higher the growth rates achieved.

Sekkat and Véganzonès-Varoudakis (2004) determine that weak global integration is a major cause for the insufficient growth. The authors discuss the relationship between trade policy and FDI; types of investment incentives are mentioned. They conclude that trade and foreign exchange liberalization are very important for increasing FDI inflows both for the economy in general and the manufacturing sector.

In their study on the relationship between industrial growth and quality of institutions, Grigorian and Martinez (2000) find a robust impact of institutions on industrial growth via either investment or TFP.

Finally, in terms of the importance of measuring the effect of reform on industrial growth, few studies demonstrate this relationship in developing countries. Industries in developing countries are important because these countries still have potential for higher growth in this sector. This will enable them to solve some structural economic

problems such as unemployment, low growth rates, and also to exploit available natural resources.

Rodrik (2009) states industrial activity and economic growth are highly correlated. Furthermore, Luken and Castellanos-Silveria (2009) find that those developing countries have adopted industrial transformation have ripped more industrial output, employment and reduction in energy intensity. Moreover, Grigorian and martinez (2000) show, in transition context, that institutional quality positively impacts industrial growth, in particular through investment and total factor productivity. They measure industrial growth by growth rate of industrial value added over the period 1997-1982 in 27 transition countries. Also, Dutta and ahmed (2004) apply cointegration and error correction model for Pakistan over the period 1973-1995. They find that there is a long-run relationship between the industrial value added growth and capital stock, labour force, real exports, import tariff collection rate human capital.

4.3 Data and reform indicators

The methodology widely used in previous literature is generating aggregated reform indexes by principal components analysis, normalization indexes or averaging related variables (Nabli and Véganzonès-Varoudakis, 2007). Oleh et al. (1998) cited in Staehr (2005) find that the aggregate reform index generally is more useful than any specific (individual) element. Otherwise, by substituting the variables with the associated components, the results would be poor.

Following the classifications of Nabli and Véganzonès-Varoudakis (2007) and Campos and Kinoshita (2009) and taking into consideration data availability, the aggregate economic reforms are defined as follows; external stability, macroeconomic stability, financial development, trade liberalization, and institutional quality.

The main sources for data used in this chapter are: the World Bank dataset which is available from ESDS [Economic and Social Data Service], the updated version of the financial structure metrics with data through 2007, The Lost-decades-macro-time-services dataset is also used, as well as Heritage Foundation, Economic Freedom of the World (EFW) and ICRG databases. However, many variables' values are not available for the whole sample of 56 countries (see appendix 1) such

as human and physical capital indicators, military expenditure, and stock market capitalization. This limits the work in constructing and running the indicators and variables, especially in the cases of privatization and stock market development.

This chapter attempts to construct external stability, macroeconomic stability and financial development by principal component analysis. The criterion is to keep all components which have an Eigenvalue equal to or bigger than one and to explain as much as possible the variance. On the other hand, trade liberalization and institutional quality indicators are constructed as averages of other variables as the data sets of these measures could provide averages indicators.

All reform indicators manipulated to be that are the positively signed coefficients refer to a better effect on the economy. i.e. we convert the negative indicators which have positive effect to positive values.

All reform indicators are defined as follows:

The External Stability Indicator (ES) is a weighted index of the first two principal components which explain 85% of the variance. It consists of current account balance as a percentage of GDP, external debt as a percentage of GDP and total debt service as a percentage of GNI. This measure shows the external balance of the economy, its voluntarity to external shock, and dependence on foreign finances. The indicator shows that the higher the value, the better the situation of the economy.

The Macroeconomic Stability Indicator (MS) is also a weighted index of the first two components which explain 78% of the variance. This index is a combination of log of inflation, log of black market premium, and log of general government final consumption expenditure as percentage of GDP. This indicator shows the macroeconomic balances. Controlling inflation and exchange markets are essential for a stable business environment and encouraging more investment. Moreover, government intervention is still vital in guiding the economy and providing the public goods for both individuals and business, especially in education, health care and infrastructure.

The Financial Development Indicator (FD) is constructed as the first component that achieves an Eigenvalue bigger than 1 and explains 65% of variation. The composed variables are liquid liability as a percentage of GDP and the ratio of domestic credit

issued to the private sector by banks and other intermediaries as a percentage of GDP[33]. This measure shows to what extent the country has developed financially.

The Trade Liberalization Indicator is constructed from the Economic Freedom of the World (EFW) database[34] published by the Fraser Institution. It is only the component of Freedom to Trade Internationally database which is composed of many variables[35]of different trade aspects; barriers, regulations, taxes and the size effects of the countries. The higher the measure, the more the trade of a country is free.

The Institutional Quality Indicator; ICRG political risk variables are used. To generate this indicator the average of 12 variables are calculated. This indicator measures to what extent institutions improved the country. The higher the value the better the institutions effects exist. This indicator is available for 130 countries since 1984.

Economic performance is measured by two variables; GDP growth rate and industrial value added growth rate. The association between the two variables is very high with a correlation of 0.6257. (See figure 1).

4.4 Methodology

Following the neoclassical model of economic growth[36], human capital, investment, population and initial income variables in logarithm are included, in addition to the reform indicator variable. Different econometric approaches are applied to investigate and study this model.

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[33] A commercial bank asset to the sum of both central and commercial bank assets is also tried.

[34] http://www.freetheworld.com/index.html

35 Variables of trade liberalization index as average.
area 4: freedom to trade internationally component:

aa taxes on international trade
i. revenues from trade taxes (% of trade sector)
ii mean tariff rate
iii standard deviation of tariff rates
b regulatory trade barriers
i non-tariff trade barriers (gcr)
ii compliance cost of importing and exporting (db)
c size of the trade sector relative to expected
d black-market exchange rates
e international capital market controls
i foreign ownership/investment restrictions (gcr)
ii capital controls

[36] See Nabli and Véganzonès-Varoudakis (2007).

First, the Between Estimator is applied to show the long run effect of reforms on economic growth. This estimator takes the average of variables over time removing the trend effect of data. These kinds of estimations are widely used in growth literature[37] to catch the steady-state relationship between the dependent and independent variables (Demetriades and Law, 2006). However, cross-section estimations suffer from some limitations. They do not take the advantage of panel data by allowing time series variation to increase the efficiency and they also hinder the information that could be obtained by either applying dynamic panel data or which is a result for the heterogeneity across countries and regions. Moreover, averaging data may not completely remove the trend and cyclical effects (Loayza and Ranciere, 2006).

Second, to overcome these limitations and to gain panel data advantages, estimations are done by using a panel error correction model (Loayza and Ranciere, 2006) allowing the short-run and long-run effects to be derived from ARDL (Autoregressive distributed lag) model.

Following Pesaran and Smith (1995), Pesaran (1997) and Pesaran and Shin (1999) methodology we can keep away from requirements of cointegration tests and the validity of stationarity between the variables. This method allows estimations of different variables with different order of stationarity[38]; I(1) and I(0). Moreover, this model is appropriate for the panel with large N and T dimensions of data.

Based on Pesaran et al. (1999), the panel regression model can be incorporated into error correction ARDL (p, q) and stated as following (Loayza and Ranciere, 2006):

$$\Delta(y_{it}) = \sum_{j=1}^{p-1} \varphi_j^i \Delta(y_{it-j}) + \sum_{j=0}^{q-1} \partial_j^i \Delta(X_{it-j}) + \delta^i\left[(y_{it-1}) - \{\beta_0^i + \beta_1^i(X_{it-1})\}\right] + \epsilon_{it}$$

where, y is growth rate of economic performance, X is a set of independent variables including reform indicators, φ and ∂ represent the short-run coefficients of

[37] For example, see Barro and Sala-i-Martin (1992) and Mankiew et al. (1992).
[38] All our data are either I(0) or I(1). When some variables are I(2) the estimations are not consistent. See Asteriou and Monastiriotis (2004)

dependent and independent variables respectively, β for long-run coefficients, δ the coefficient of speed of adjustment to the long run status.

The above model can be estimated by the pooled mean group (PMG) or the mean group (MG) estimators which both consider the long-run equilibrium and the heterogeneity of dynamic adjustment processes (Demetriades and Law, 2006). Also, these estimators computed by maximum likelihood estimations. The first estimator allows the intercepts, short-run and error correction coefficients to differ across countries. The long-run coefficients are restricted to be the same. Moreover, PMG yields a consistent mean short-run coefficient when N is large. The second estimator (MG) allows for all coefficients to vary in the long-run and short-run. However, this estimator is consistent in the long-run in the case of homogeneity which can only be tested after estimation using the Hausman test. The null of this test is that the difference between PMG and MG estimations is not significant, hence PMG is preferable (see table 5).

The PMG estimator provides more efficient and consistent estimates in the long-run when homogeneity across countries is applied and short-run corrections differ regarding country specific characteristics such as shocks and stabilization policies. Moreover, as the time span in this study was only 27 years, the MG estimator had no enough degrees of freedom. Therefore, PMG estimations are more relevant for our analysis.

Another important issue is that ARDL lag structure can be determined either by tests, such as Schwartz-Bayesian, or it might be imposed according to the data limitation, as is the case here in that the time dimension is not long enough to overextend the lags (Loayza and Ranciere, 2006).

Third, for the sensitivity analysis, the panel instrumental variables estimator is applied. This allowed dealing with the possibility of endogeneity between growth measures and the targeted economic reforms.

4.5 Results

The data set consists of 56 countries over the period 1980-2006. All included countries are classified as “intermediate income level” according to the World Bank’s classification in 2009. The objective of this section is to understand how

different economic reforms would affect economic performance in developing countries. As a measure of economic performance, GDP growth rate is used following the main body in economic growth literature. Moreover, for industrial growth, the most used variables are growth rate of industrial value added to GDP and the share of industrial employment to the total employment (Rodrik, 2009).

As discussed in the methodology section, empirical work starts by estimating panel data in the long-run model to show the effects of cross country approach when applying Between Estimator.

Table 1 shows the regression results in the between effects model. The dependent variable is the growth rate of GDP. All regressions include human capital, investment, population and initial income variables. Columns 1 through 5 include reform indicators (external stability, macroeconomic stability, financial development and trade liberalization). All would impact economic growth positively and statistically significant, except the institutional quality which is positive but statistically insignificant. It seems that economic reforms are matter for better economic growth.

To investigate the difference between developing regions and how reforms could impact change; table 1A repeats the estimations in table 1 with dummy regions (MENA, LAC, ASIA and AFR)[39]. As shown, all dummy regions have insignificant effects and the results do not change that all reforms still positively affect the economic growth even institutions.

Table 2 provides also the results of applying Between Estimator. The dependent variable is the growth rate of industrial value added to GDP. Column 1 shows that external stability has positive and significant effect on industrial activity in developing countries. Moreover, column 2 shows that macroeconomic stability is also important for growing the industry. Column 4 reports the positive and significant effect of trade liberalization index. However, columns 3 and 5 show that financial development, and institutional quality even though positive, but insignificant.

[39] MENA: Middle East and North Africa, LAC: Latin America and Caribbean, ASIA: Asian countries and AFR: African countries.

Table 2A repeats the estimations of table 2 adding dummy regions. The results are positive and significant for all reform indicators and statistically significant.

As the main task is to show the influence of reforms on economic performance in both long-run and short-run we turn to apply error correction panel model.

Table 3 shows the estimations as GDP growth rate is the dependent variable. In the right hand side of the model, we include the neoclassical determinants of growth. For our estimations PMG estimator is applied which is more efficient and consistent as discussed earlier. Moreover, Hausman test states that the null of homogeneity is not rejected which means that there is no systematic difference between PMG and MG estimators and PMG is preferable as reported in table 5. The first panel reports long run effects, the second panel reports the error correction coefficients and the short run effects. Column 1 shows the results of external stability indicator, which is positive but insignificant in the long-run; the magnitude is very small. However, it affects growth positively and significantly in the short-run and the error correction coefficient is negative and statistically significant applying that there is a long-run relationship. Column 2 shows that macroeconomic stability is positive and statistically significant in the long run as a condition for launching further reforms. However, in the short run it seems insignificant. It can be noticed that there is a long-run relationship as the error coefficient adjustment is negative and statistically significant. Column 3 states financial development affects economic growth positively in the long run and negatively in the short run. This result is consistent with other empirical research for example Loayza and Ranciere (2006). Moreover, the error correction coefficient is negative and statistically significant. Column 4 shows the same results for trade liberalization. Finally, column 5 reports positive and significant effect of institutional quality on economic growth in long-run and short-run. Also, the adjustment error is negative and significant. As noted that sometimes the short-run effects differ from those in the long run as a result of whether the effect is temporary or permanent and for the fluctuations and cyclical effects in the short-run. In particular, it is clear for financial development and trade liberalization reform indicators. Also, it could be explained that on the short run, countries are not homogenous and not restricted to be the same, but it could be calculated by taking the average of the pooled mean. Furthermore, all reforms show convergence over time to catch up the developed courtiers' path of growth as all adjustment

coefficients are negative and statistically significant. The error correction coefficients are relatively similar for all reforms.

Table 4 repeats the regressions in table 3 replacing the industrial value added growth rate as dependent variable. Columns 1, 2, 4 and 5 show the effect of reform indicators (external stability, macroeconomic stability, trade liberalization and institutional quality) on industrial progress. They have positive and statistically significant effect on the long-run. The exception is the financial development which seems to have adverse effect on industrial growth. This may be due to that more resources would be allocated to other activities in the economy. In addition, many industries in developing countries are state-owned and financed by government credit channels which mean more financial development will not affect them. However, macroeconomic stability and institutions only impact industrial growth positively in the short-run. Other reforms show insignificant effects. In spite of the strong correlation between GDP growth rate and industrial value added growth rate (0.62), they have been affected differently in the short run. Moreover, all reform indicators' adjustment coefficients show negative and statistically significant confirm the long-run relationship.

In sum, the finding of applying error correction panel data analysis of economic reform effects on economic performance is most consistent with the literature. In the long-run most of reforms support growth in GDP and industrial value added measures (Rodrick, 2009 and Nabli and Véganzonès-Varoudakis, 2007). However, in the short-run, the reforms are affected by the cyclical and trend changes in the economy. The role of better institutions is highly significant in both long and short-run.

For robust analysis, instrumental variable techniques were applied. This concern is emerged to show reforms as indirect channel would affect growth and to check to what extent the quality of institutions and other reforms would enhance the reform impact over the economy.

In table 6, estimations of the panel augmented Solow model applying 2SLS are presented. Reforms treated as endogenous variables. The dependent variable is GDP growth rate. Investment variable has a positive effect on growth which is consistent with theory. However, human capital and population growth show mixed results.

The main concern is the reform influence and when they are accompanied with institutional drive. Column 1 shows results for external stability: the coefficient is positive and statistically significant. Column 2 reports also positive statistically significant effect of macroeconomic stability reform. Moreover, interestingly, column 3 states the financial development impact growth positively in the long run as endogenous variable; better institutions would enable economy to benefit from financial improvements. Column 4 shows that trade liberalization enhances growth as the coefficient is positive and statistically significant. Institutions, as measured by institutional quality indicator, are considered the main instrument. In addition, the lagged reform indicator is also considered as a good instrument which explains the incremental and continual effect of past reform on boosting and driving the current traces of reforms. Various reform indicators and variables, and other variables were treated such as infrastructure (fixed telephone lines per 1000). The selection of instruments is restricted to those pass a battery of diagnostic tests.

Table 7 presents the instrumental variable results when dependent variable is the growth rate of industrial vale added to GDP as a measure of industrial performance. All columns from 1 to 4 show that different economic reforms (external stability, macroeconomic stability, financial development and trade liberalization) affect industry positively when these reforms are channelled through institutions and trade liberalization indicators. These results show the importance of building up better institutions to raise the industrial growth in developing countries. Moreover, more openness and reforming trade sector would increase the industrial output via exports and trade. This also shows the importance of integrating in the global economy and work within better institutional environment.

Regarding the instruments tests, it is essential to check the validity and relevance of the instruments. First, all instruments reported in the regressions at tables 5 and 6 passed Hansen test of overidentification. This test shows the validity of the instruments which are uncorrelated with the residuals so their selection is econometrically accepted. A rejection of the null hypothesis would suggest that the instruments are not valid. As it can be seen in the "diagnostics" panels of Tables 3 and 4, the null is not rejected suggesting that the instruments we use are valid. Second, to investigate the relevance of the instruments, that the excluded instruments are correlated with the endogenous variables. F-test results are significant and bigger

than 10 (as a rule of thumb). Moreover, The Anderson canonical correlation likelihood-ratio test (CCLR) corroborates these conclusions. Its null hypothesis is that the model is underidentified so a rejection of the null would suggest that the estimated models are identified. As it can be seen, this turns out to be the case for all columns in Tables 6 and 7.

Table 6A & 7A repeat the regressions in table 6 & 7 respectively by adding the regional dummies to show the difference in different regions. The tables show the same results as previous and confirm that the reforms still important for better economic prosperity.

In sum, the economic reforms would boost the economic performance in the long-run indirectly, especially when institutions are well established and activated.

4.6 Conclusions

This section has discussed economic reforms, their impact on economic performance as measured by GDP growth rate and industrial value added growth rate, and the most influential reforms in developing countries. The economic reforms target to build appropriate rules and institutions for more effective economic systems. However, there are a lot of remarkable growth differences between developed countries and developing countries. Furthermore, the literature stresses that the long-term growth is dependent on three main groups: human capital and its quality, the availability of physical resources and their efficient usages, and technological advancement. Moreover, the effect of reforms is considered as a main support for growth

The main objective of this chapter is to study the inter-relationship between developing economies, reforms, and growth. The economic reform indicators show that most developing countries have reform programmes since the beginning of the 80s; the reforms have had essential role as they positively impact growth in developing countries especially in the long-run.

This study uses a panel of 56 developing countries, over the period of 1980-2006 in order to examine the effects of economic reforms as determinants of economic performance. The main reforms investigated are external stability, macroeconomic stability, financial development, trade liberalization and institutional quality.

The main contribution in this chapter is to analyse the short-run and long-run effect of reforms on economic performance. It has been shown that in the long-run, economic reform drives the economy and also boosts industry in developing countries. Moreover, the analysis shows that developing countries converge into developed countries paths in the long run equilibrium. Also, institutions play an essential role in driving reforms and enhancing the economic output either in total or in industrial sectors. Trade liberalization and global integration both encourage the industrial growth in developing countries.

In sum, reforms are important for economic growth and industrial growth. They need to be more comprehensive, rapid, and accompanied with more institutional support.

Chapter Five

Firm Performance and Business Environment, Competition, Ownership and Exports in Syrian Industrial Private Sector

5.1 Introduction

Although Syria is one of the most discussed economies of the Middle East, very little empirical evidence exists to inform this topic. The objective of this chapter is to help fill this gap. We tried to provide one of the first empirical assessments[40] of an important aspect of the Syrian economy, namely the relationship between overall business conditions (the so-called "investment climate") and various measures of economic performance. In order to do so, we use a survey administered in 2009 which contains information on 508 firms (World Bank's Investment Climate Assessment, ICA hereafter). This survey provides a detailed picture of the Syrian industrial private sector as most of the firms in our sample are privately-owned[41] (36.42 % are owned by individuals) and have on average of about 90 full-time employees (according to 2008 data at ICA survey data).

Syria is an interesting country that has an attractive geographical location in the heart of the Middle East, suitable potentially for investment and trade. Its economy recently has been transited towards market-oriented reforms. Its economy is based on agriculture, which accounts for 20.63% of GDP in 2007[42] while industry (manufacturing, construction and electricity and water) accounts for 23% of GDP. Manufacturing sector accounts for only 7.9% of GDP. After the independence in 1947, and the Baath party leadership in 1970, there was strong government interference in economy with large state engagement in most of economic activities; in particular, infrastructure, education and manufacturing. However, private sector and public private partnership sectors were allowed to work under some laws and regulations. The need to boost the economy and to catch up with developed countries and also to overcome the poor productivity led to the adoption of more open economic policies and market-oriented reforms in 1990. The government issued a

[40] We did the first trail using 2003 survey data. We choose to update the analysis and to overcome the poor data quality.
[41] 10 firms are public state-owned over the whole sample (508).
[42] Central Bureau of Statistics, Syria (2007)

new law (law no. 10 in 1990, improved in 2003 and in 2007) which allows more private sector involvement in the economy. Despite the new investment law, the participation of industry in GDP did not rise.

The role of investment climate has increasingly become fashionable in the economic debate. Many studies have been devoted to show its relationship with firm performance especially in developing countries. The new available micro level datasets, collected mainly by World Bank surveys, encourage further research to link business environment to firm performance which would lead to better understanding of economic growth. Investment climate can be defined as "the location-specific factors that shape the opportunities and incentives for firms to invest productively, create jobs, and expand" (WBR, 2005).

The objective of this chapter is to address the relationship between firm performance and business environment in Syrian industrial private sector. In addition, ownership, exports and competition are considered in this study.

Our main finding is that in terms of sales as well as productivity in levels, firm performance is positively boosted by finance, technology and hindered by poor investment climate, particularly corruption. However, competition and ownership seem to have no first-order effect. On the other hand, firm performance as measured in terms of growth of sales, employment and productivity is seemed to be inspired by technology and finance.

This chapter is organized as follows: section two reviews related literature. Section three explains ICA data. Section four provides a detailed picture on business environment in Syrian industrial private sector. Section five shows the econometric analysis. Section six provides the results. Finally, section seven concludes and summarises the main findings.

5.2 Literature review

Most of studies have analysed, econometrically, the main factors impact firm performance by using firm level data and concentrating on industrial sector especially on the manufacturing sector. These studies concentrate on business environment themes. In addition, they investigate the role of the characteristics of the

firm which could affect its performance, such as ownership, size, age and export orientation.

Hallward-Dreimer et al. (2006) use a survey of 1500 Chinese firms in five different locations. They showed that firm performance, measured by sales growth, employment growth, investment growth and TFP, is affected by foreign and domestic private ownership, regulatory burden, corruption, labour-market policies and technological factors. However, infrastructure and access to finance play a minor role. They assure the importance of using firm level data to better understand firm growth requirements.

Banerji and Mcliesh (2002) use a survey of 947 Yemeni firms to study governance and investment climate. They found corruption and economic policy uncertainty were major problems for firm growth. However, the severity of these problems differs between locations. Large firms tend to suffer more than other firms.

Focusing on manufacturing sector, Fernandes (2008) studies the correlation between firm total factor productivity and business environment. She finds that managerial quality and global integration impact TFP positively.

In studying the transition economies, Commander and Svejnar (2010) use data from BEEPS[43] to investigate the effect of ownership, competition, export orientation and business environment on firm performance. They conclude that foreign ownership and competition affect firm performance measured by level of firm sales. When controlling for ownership, exports have no effect. Investment climate indicators are found to have a minor effect on firm performance when controlling for country fixed effects. Moreover, they claim that investment climate effects have been exaggerated.

Dollar et al. (2005) show that investment climate matters for firm performance (TFP) in developing countries. They use data in some manufacturing sectors (garment and similar industries) in five economies. One contribution of this work is confirming that institutional impact differs over locations, so local governance is important. Power outage and customs delays hinder productivity and profitability, while financial services are positively related to growth.

[43] Business Environment and Enterprise Performance Survey. Data collected in 2002 and 2005.

Dollar et al. (2006) study the relationship between investment climate and international integration. They use firm-level data from eight developing countries[44] to show that better investment climate enhances exports and foreign investments. Moreover, they find that constraints to growth are lower in china than South Asia or Latin America.

To study the role of technology and business environment, Goedhuys et al. (2008) applied firm level data in Tanzania. They use survey of 275 manufacturing firms to evaluate the productivity drivers. The main findings are foreign ownership, ISO certification and higher education of management impact firm productivity. Howevere, constraints to access finance, governmental regulatory burden and deficiency of business services seem to circumvent firm productivity. Finally, they state that business association participation is correlated with higher productivity. Moreover, Commander et al. (2010) stated that ICT adoption and productivity are very strong in developing countries. They use data set of 1000 manufacturing firms in Brazil and India.

In detecting the effect of financial, legal, and corruption constrains of firm growth, Beck et al. (2005) use dataset of 54 countries and concluded that small firms suffer more of these problems. They claim that better financial and institutional development would limit the effect of these constrains especially for the small firms.

Batra et al. (2003) show that investment climate diversity over locations and firm characteristics would affect firm performance. They announce that policy, institutions and governance are correlated to firm outcomes taking into account whether firms work in informal economy or not. They use WBES data to confirm that growth and investment are connected to taxation, financing and corruption. Moreover, they show that universal generalization of policies is undesirable as differences between firms, locations and countries would reveal different results.

Carlin et al. (2006) use firm-level data of 20000 firms in 60 countries to examine firm growth constraints. They conclude that infrastructure (transport and telecommunications) is not very crucial for firm growth. However, electricity, corruption and crime are important for most of countries. Moreover, Ayyagari et al.

[44] Bangladesh, Brazil, China, Honduras, India, Nicaragua, Pakistan and Peru.

(2006) provide evidence that finance, crime and policy instability directly affect firm growth. They used WBES conducted in 1999 and 2000 in 80 countries.

As shown, a growing empirical research shows that investment climate matters for firm performance whether measured in growth or level. Moreover, other factors seem to affect firm performance, such as: foreign ownership, size, exports, competition and technology. In addition, location would impact performance crucially. Finally, according to the nature of investment climate surveys, very few attempts have been done to apply panel data. Most studies either use single country data or pooled data[45].

In light of these studies, we attempt to determine the main driving factors which would boost the firm performance in the Syrian industrial private sector. This investigation is done by using the new available survey data released from World Bank (2009) and by also using instrumental variable techniques in cross-section data.

5.3 ICA data

The data we used comes from the ICA survey carried out by World Bank and is aimed to assessing investment climate and productivity differences in various regions and countries. One main concern here is to examine Syrian business environment and the main factors driving the Syrian private industrial sector productivity. Syria is a good proxy for the developing countries in Middle East region. There are very few studies concentrate on this region and also on the intermediate income level economies (Fernandes, 2008).

The ICA survey is based on questionnaires applied through face to face interviews and encompasses three main blocks or types of questions: (a) those generating information for the overall profiling of businesses, (b) those used for profiling the investment climate in which businesses operate and (c) those generating indicators of firm performance. These contain quantitative as well as qualitative questions. ICA uses firm-level data to investigate the role of government and the market in improving the investment climate.

With cooperation between the World Bank and the Syrian government (specifically, the Ministry of Economy and Trade), data collection was carried out by researchers

[45] There are very few papers report poolability test.

from Damascus and Aleppo Universities. The Investment Climate Survey used a stratified random sample which encompassed 508 firms from the industrial sector in 5 locations (Mouhafadhats). "It significantly over-sampled exporters. Sectorally, the sample was composed mostly of manufacturing firms in diverse sectors, with the largest concentration was on food processing, textiles and garments. The sample frame was drawn within strata, using a statistically valid sample selection technique, from databases maintained by the Federation of the Chamber of Commerce and local Chambers of Industry." (World Bank, 2005. p. 67)

The typical ICA survey generates indicators of possible deficiency in various areas: the provision of physical infrastructure, the structure and functioning of factor and product markets, inter-business relations, the state of industrial regulation, law and order, tax and customs administration and other aspects of governance. As there are quite a lot of differences in terms of the various questionnaires that have been conducted throughout the world, it is worth mentioning that in the Syrian case, the questionnaire consists of 13 sections covering about 86 questions on general information, sales and supplies, investment climate constraints, infrastructure and services, finance, business-government relations, conflict resolution, capacity, production costs structure, labour relation and productivity.

The Syrian ICA survey focused on private sector firms especially the manufacturing sector that accounts for 68.70 % of surveyed firms (349 firms). The sample size is 508 firms which are geographically distributed over five provinces: Aleppo (95), Damascus[46] (270), Hama (41), Homs (57) and Lattakia (44). The majority of the Syrian population lives in these cities and they are the places where most economic and market activities take place. Medium sized firms dominate the sample: about 202 firms (39.84 %) have between 20-99 permanent workers; 184 (36.29 %) are small and have between 1-19 permanent workers and 121 (23.87 %) are large with more than 100 permanent workers. The individuals (sole proprietorship) count for 36.42 % of the sample and the cooperative firms count for 33.27 %, while Shareholding companies represent just 2.76 % of the sample. Only 16 firms (3.15 %) are foreign owned, as the majority are domestic.

[46] The survey incorporates the data for Damascus and Rural Damascus.

The sample is divided according to industry into 17 categories: 11 manufacturing, 5 services and 1 other (construction). Namely they are: chemicals 36 (7.09%), food processing 79 (15.55%), textiles 64 (12.6%), garment 53 (10.43%), plastic & rubber 17 (3.35 %), non metallic mineral products 11(2.17%), basic metals 6 (1.18%), fabricate metal products 5 (0.98 %), electronics 8 (1.57%), machinery and equipment 19 (3.74%), other manufacturing 51(10.04%), construction 11(2.17%), wholesale 37(7.28%), retail 10 (1.97%), other services 72 (14.17%), IT 8 (1.57%) and finally tourism 21(4.13%).

Table 1 shows the distribution of firms according to their legal status and economic activity. The majority of firms (sole proprietorship and cooperative) concentrate on garments, textiles and food processing and these are traditional types of business in Syria. It is noted that shareholding companies are not common in Syrian economy and they are just 14 (2.76% of the sample). Also, there are only two holding companies that are active, one in manufacturing and the other in tourism.

Table 2 shows the size and legal status distribution of the firms. Size is defined according to the survey classification. The firm is small if its total number of employees' ranges from 5 to 19, medium if the number ranges from 20 to 99 and the firm is large if the number of the total employees is 100 or more. 85 (46.19%) of the small firms are sole proprietorship, and 52 (28.26%) are cooperative. While 37.13% of medium firms are sole proprietorship and 32.18% are cooperative. Large firms are also dominated by cooperative type (43%) and sole proprietorship (20.66%). Industry is concentrated in Damascus (and Rural Damascus) and Aleppo, which produces 24.4% of GDP in 2008.

Table 3 states how firms are classified according to size and activity. While it is clear that small firms work mainly in services, 25 in wholesales and 38 in other services, medium-sized firms concentrate on manufacturing. 37 firms work in food processing, 29 in textiles and 25 in garments. Also large-sized firms invest mainly in manufacturing.

5.4 Business environment in Syria

The survey also provides details on the business environment (See appendix 1). In addition to subjective data by asking managers to scale the obstacles from 0 to 4, it provides objective data and quantitative measures of all aspects of investment

climate by asking for the real number of specific measures, (e.g. how many times have you experienced problems and delays in power outage, water, and telecommunications).

Table 4 provides information about costs, durations, and losses for various constraints and business components. Infrastructure and services are considered very important for running businesses and for cutting costs. The average time lost due to power outages last year was 2.7 hours each time causing an average of 9.85% loss of sales in firms that experienced power losses. Insufficient water supply, unavailable main line telephones and transport failures were responsible for 7.28%, 3.88% and 8% of losses in sales respectively.

The MENA (Middle East and North Africa) average for value lost of sales due to power outages is 5.59% and for all countries it is 4.90%. It is clear that Syrian infrastructure measures lag behind both regional and world averages[47].

Moreover, 71.46 % of firms said they had their own generators (or shared it) indicating that power supply is indeed one main problem. About 33.41% of the firms' consumption of electricity was generated by own generators. On average, the cost of a generator is S.P 545106.4 (approximately $11600) for small firms; S.P 1971327 ($ 42000) for medium firms; S.P 14500000 ($ 308500) for large firms. Regarding water supply, 45.43% comes from public resources, 41.87% from their own wells and 12.7% is purchased from private vendors.

Capacity innovation and learning is considered one of the productivity drivers. The Syrian ICA survey also collects information about technological activity and sourcing. This information show how the firm chooses to build up its capacity and develop production process either by bringing new product lines or by upgrading existing lines or products. Moreover, internet utilisation would express also to what extent the firm has developed its own communication and technological base.

ICA 2009 shows that 20.71% of firms have internationally-recognized certification and 7.30% are still in process to obtain the certification. In addition, 29.17% of firms say that they use at the present technology licensed from foreign-owned companies.

[47] See enterprise.survey.org for more information;
http://www.enterprisesurveys.org/ExploreEconomies/?economyid=183&year=2009

Regarding adopting new technology or upgrading existing lines or products, 55.75 % of firms developed important new product lines and 64.90% upgraded the existing ones.

Moreover, ICA 2009 shows data about using the internet, website and emails, to communicate with clients and suppliers. It reveals that website usage covers about 67% of firms in the sample. It seems most of the firms use email for their communications since 81.66% of firms reported that they have emails. These ratios rise to 83% and 92.5% respectively in the large-sized companies, which may be interpreted as large firms are more able to use modern communications.

Government-Business relations and regulations occupy an important part of ICA data. It tried to uncover these themes by asking about the time consumed to clear goods form customs, and how long the managers spent for inspections.

In terms of imports, it took on average 10 days from the time goods arrived in their points of entry until they could be claimed from customs, with a range from 1 to 90 days, while firms reported on average 30 days as the longest time in the previous year, with a range from 1 to 400 days. For exports, on average it took 5 days from the time the goods arrived at their points of exit until they cleared customs, with a range from 0-30 days. It also, took on average 11.67 days as the longest time in the previous year, with a range from 0 to 120 days. Senior management spent in a typical week an average of 13.2% of their time dealing with requirements imposed by government regulations.

On average, burden regulations seem to be higher in Syria than MENA and world indicators[48]. While in Syria it takes 5.14 and 9.16 days for export and import clearing respectively, it takes to 6.03 and 11.32 days in MENA and 6.15 to 10.85 in other countries.

As shown in table 5, firms also reported the actual delays they suffered when obtaining access to main infrastructure services and required permits as shown below. The longest delay was to gain operation and construction licences. It is also shown that the use of informal means to obtain such licenses is widespread.

[48] http://www.enterprisesurveys.org/ website.

In terms of how many days were spent on inspections and mandatory meetings with officials in the context of business regulation, table 6 states that the majority of firms used informal means to accelerate the process especially with the tax inspectorate, labour and social security, and the municipal police.

With regards to participation of a business association or a chamber of commerce or industry, 95.67 % of firms reported that they are members of an association or chamber of commerce or industry. However, 80.66% of firms said that it is mandatory to gain such membership. Moreover, 28.5 % of firms reported that the most important reason for participation is lobbying the government, whereas 23.66 % of firms consider these memberships important as they provide information on government regulations.

Moreover, the ICA shows that firms are sometimes required to make gifts or informal payment to public officials to get things done and accelerate it. On average firms paid 5.74 % of the total annual sales as informal payment. And, on average 9.95% of the contract value was paid informally or as gift to secure the contract.

5.5 Econometric analysis

In investigating the effect of investment climate, ownership, export orientation, and competition on firm performance, we use the following Cobb-Douglas production function specification (Hallward-Driemeier et al., 2006; Dethier et al., 2008 & Commander and Svejnar, 2010):

$$Y_i = B_0 + B_1 \boldsymbol{IC} + B_2 \boldsymbol{Z} + B_3 \boldsymbol{C} + B_4 \boldsymbol{D} + \varepsilon_i$$

where Y is the dependent variable, firm performance, which is measured in levels of sales and productivity (value added). All level variables were in logs. Total sales were considered as proxy for revenues. Value added was calculated as the difference between the value of total sales and the raw materials and fuel in that year. We also try to investigate the case of dependent variables as growth measures using sales growth, productivity growth and labor growth[49].

[49] Employment is the sum of permanent and temporary labor.

ICs represent investment climate indicators. Z is a vector of firm characteristics, such as age and ownership. C for labour, capital and other control variables and D is a set of dummy variables for industry and location.

ICA provides a broad list of measures for different aspects of investment climate. Many of these measures explain the same theme. The selection of measures was based on the available number of observations over locations and industries and also according to the most severe problem as reported by managers[50]. Moreover, data are classified either as subjective, based on Likert scales reflecting the high managements experience and their opinions of a given theme, or objective presenting a real number for investment climate aspect. Dollar et al. (2006) mention that subjective measures have the advantage to cover many countries and to link investment climate to growth, but they suffer from lacking the ability to measure specifically the investment climate effect on firms and to determine the paramount aspects. Hence, they prefer to use objective data to build clearer picture and to better understand business environment and firm performance relationship. Carlin et al. (2006) use subjective measures to rank the constraints and for the ease of comparison between firms which is more difficult in the case of objective measures. Although subjective and objective measures are positively correlated, subjective measures are more opt to bias (Dethier et al., 2008). In this work, objective measures were used to construct investment climate and other firm characteristic variables.

Firm-level data raise some econometrical concerns of multicolinearity[51] and endogeneity when assessing the relationship between firm performance and investment climate themes. To overcome the former, we choose just one or two variables for each investment climate theme depending on the available number of observations. For example, infrastructure was measured by many questions such as: the losses of sales due to deficiency in transportation, electricity, water, and telecommunication supply and also the cost of own generator or well. Most of these variables are correlated. It is very difficult to choose the highest important indicator as proxy for infrastructure. Some authors use aggregate indicators (Bastos and Nasir,

[50] The most severe problems are electricity, corruption and workforce skills and education.
[51] Multicolinearity occurs when regressers are correlated with each other which cause the coefficients to be inefficient. While, endogeneity occurs when there is correlation between the regressers and the error term which causes inefficient and inconsistent biased estimates.

2004; Kinda et al., 2009). However, Beck et al. (2005); Hallward-Driemeier et al. (2006) and Commander and Svejnar (2010) choose to use single indicators.

The latter problem, endogeneity, is considered a serious problem in the context of investment climate regressions because the causality between firm performance and investment climate indicators is not well established. Because better performing firms may be more able to choose better business environment locations; they may also record better investment climate measures. One more reason of endogeneity is the omitted variables problem which may be correlated with other regressers. Hence, the estimated coefficients will be overestimated.

To tackle endogeneity problem, the conventional tool is to apply panel data approach and instrumental variable techniques. However, ICA data is limited to one year period for investment climate measures which prevents using lags of some variables as instruments. As most of the literature related to firm-level data and investment climate suggest, we apply the following solutions: we use objective measures as they are less affected by measurement errors and reverse causality (Kinda et al., 2009). We also use the location-industry averages instead of the original variables' data; these averaged variables are more likely to be exogenous to the firm whose effect on the business environment location is very minor (Hallward-Driemeier et al., 2006; Commander and Svejnar, 2010 & Dollar et al., 2006). In addition, we include the entire explanatory variables simultaneously to limit the omitted variables problem. Moreover, the inclusion of dummy set of industry and location would alleviate the effect of macro variables which may affect the firm performance and business environment (Hallward-Driemeier et al., 2006). And finally, we apply instrumental variables techniques to overcome endogeneity concerns.

The first set of variables is investment climate indicators (infrastructure, government-business relations, corruption and finance). Infrastructure was proxied by two variables, a dummy variable whether a firm has an electrical generator and by a dummy variable for the internet and email access as this measure broadly shows the advancement in infrastructure, in particular, electricity and telecommunications. Infrastructure, undoubtedly, is vital for encouraging new investments and easing business daily processes for the current firms (Hallward-Driemeier et al., 2006; Dollar et al., 2006).

Government-Business relations and bureaucracy are widely covered in ICA. They are considered a core of any business opening or expanding as they could significantly raise or reduce the cost of doing business. We introduce four variables to investigate the quality of government administrations and bureaucratic controls. The variables are the log of duration of clearing exports to their final shipment from customs, the log of how long it did take to clear imports for customs, the log of the time spent by high management to deal with official inspections. This information reflects the quality of government administrations and bureaucratic controls and to what extent firms suffer from regulations burden. The last variable, the participation to business association, is measured as dummy variable to show the role of these government-business partnership effects on firm performance.

Corruption is captured and measured by the log of the average percentage of sales paid as bribe to the officials.

Finance, was measured by a dummy variable whether the firm has a loan or not, and also by a dummy variable whether the firm has overdraft facilities for short term or not. Access to finance and well-function credit market is very important for economic growth.

The second set of variables was added to show the role of technological development impact on firm performance. It is more likely that firms adopting information technology tend to export and to grow faster (Goedhuys et al., 2008 & Hallward-Driemeier et al., 2006). Two variables are used. The first one, as contracted earlier, a dummy variable to state whether the firm use email or not. The second one is also a dummy variable, product, to indicate if the firm has upgraded or brought a new product line during the last period.

Moreover, other controls and characteristic variables were created. We try to examine the role of competition on the Syrian firm performance; a dummy variable indicates whether the firm has three or more competitors or not[52]. In addition, export orientation was captured by the log of the percentage of sales exported last year. ICA also provides information about foreign ownership captured by a dummy variable, whether part of the capital is foreign or not.

[52] See Commander and Svejnar (2010).

5.6 Results

In estimating the above model, we try to determine what the most important factors behind firm performance are in Syrian economy. First, table 7 shows the estimations for the basic Cobb-Douglas regressions. As reported in column 1, capital and labour are both positive and significant and their estimations are constant return to scale[53]. Column 2 introduces competition which is significant at 10 percent of significance level. Column 3 adds export and column 5 adds foreign ownership variable. Although they are positive, they are insignificant. Columns 5 and 6 incorporate all variables; they are insignificant. In this specification, export and foreign ownership look insignificant and not crucial for firms in Syria.

Turning to investment climate variables, table (8) presents the results for each business environment separately. Although the omitted variable problem is noticed here, most literature enters each variable alone to check its effect on performance (Commander and Svejnar, 2010). The dependent variable is the log of total sales. As expected, most of investment climate indicators are significant and hold the expected signs. Column 1 shows that electrical deficiency affects negatively firm performance. Moreover, column 2 shows positive and significant effect of the email variable which indicates the importance of technological infrastructure. Column 3 also reports a negative but insignificant effect of longer inspection time spent to deal with official requirements. Moreover, the longer the time needed to clear customs the worse the firm's performance as shown in columns 4-5. Likewise, participation to business association looks positive and insignificant as stated in column 6. Corruption seems to hinder the performance as presented in column 7. In terms of access to finance, it shows a positive and significant sign in columns 8-9 as measured by the firm access to overdraft facility and to credit. It shows just positive sign when measured by loan in column 10. Furthermore, technological development demonstrates insignificant coefficients as reported in columns 11. Finally, columns 12-14 report coefficients of human capacity as measured by manager's experience, workforce with university degree or higher and formal training; they are positive and significant. All the above results are consistent with the literature concerning firm performance and business environment.

[53] Chi-square test accepts the null that both coefficients are equal to one (P-value =0.6832).

To alleviate econometric problems, multicolinearity and endogeneity, table 9 provides estimations by running simultaneously all specifications and also including dummy variables for location and industry to control for the heterogeneity between firms. Column 1, where the dependent variable is log of the total sales, shows that foreign ownership has negative and insignificant effect. These results may contradict most of the related literature. Commander and Svejnar (2010) clarify that ownership of firm lost significance many times when controlling for other variables especially exports and competition. In addition, exports and competition appear positive but insignificant. In terms of business environment themes, infrastructure as represented by own electrical generator would not impact sales. However, technological infrastructure seems very important to boost performance in firm level. These results are consistent with most relevant literature. In other words, while Hallward-dreimeier et al. (2006), using objective measures, find that infrastructure does not affect firm performance, Dollar et al (2005) and Escibano and Guach (2005) find electricity deficiency and the log of the number of days to clear imports (exports) are harmful for growing business. Moreover, most studies report positive effect of the impact of internet access variable on firm performance[54] (Hallward-dreimeier et al., 2006; Dollar et al., 2005 & Escibano and Guach, 2005). However, Goedhuys et al. (2008) claim that internet would not affect firm productivity in Tanzanian manufacturing context. As can be shown in column 1, firms that have internet access would increase sales by 1.65%.

Moreover, time spent to deal with official requirement seems insignificant. However, participation to business associations seems positive and insignificant. Corruption (bribes) circumvents sales as it appears negative and significant. The increase of bribe paid by one percent would reduce the sales by 0.3 percent. Most studies stress that corruption in firm-level context has negative effect. Beck et al. (2005) and Hallward-dreimeier et al. (2006) confirm that corruption hinders firm performance.

Access to finance show significant and positive impact when measured by overdraft facility gained in the short term (three months). Firms which have financial facilities would increase sales by 0.62 percent. Beck et al. (2005), Hallward-dreimeier et al.

[54] Internet access is used in many studies to measure both the infrastructure and technological advancement.

(2006), Commander and Svejnar (2010) and Aterido et al. (2007) state that access to finance is vital to do business.

Regarding technological development, using email shows positive and significant signs. On the other hand, introducing new product lines or upgrading existing one is insignificant. Manager's experience plays positive role in enhancing sales, but workforce with university or higher education seems insignificant. Column 2 introduces formal training which is insignificant. Column 3 repeats the specification in column 1 but using loan as proxy for finance aspect. It shows insignificant effect because loan impact may take time to affect performance as will be seen in growth model.

For further analysis, we also use the log of the value added as dependent variable, column 4 shows the same results as that of column 1 confirming the importance of finance for improving firm performance and the adverse effect of corruption. However, all other variables are insignificant. Column 5 introduces formal training as proxy for education which is insignificant but manager's experience is significant. Moreover, Column 6 replaces overdraft by loan which shows an insignificant effect.

In sum, the above level analysis states that technological infrastructure, finance, and manager's experience are crucial and affect Syrian firms positively. On the other hand, corruption negatively impacts the firm performance. However, infrastructure, government-business relations and training are not very imperative. Finally, foreign ownership and competition seem not to impact firm performance.

In table 10, a further step is done to overcome endogeneity problem; following Commander and Svejnar (2010) instrumental variable method was applied to show the effect of different business environment themes of firm performance. The dependent variable is the total sales of the firm. Column 1 runs the model without investment climate variables. It is clear that foreign ownership and competition affect firm performance positively and significantly. Columns 2-10 introduce investment climate variables one by one to investigate their role individually. Most of them hold the expected signs and significant. Infrastructure, technological infrastructure, finance and workforce education present positive effects. However, corruption, government-business relations (inspection time and participation with association) and manager's experience are not significant. Column 11 runs

regression for all variables together to remove omitted variable problem[55]. Some variables change their sign and significance. It is clear that technological infrastructure, finance and workforce education are positive and significant. They play an important role for firm performance. However, corruption is negative and significant. Infrastructure, government-business relations and manager's experience are still insignificant and seem not to impact sales.

Following Commander and Svejnar (2010), the selected instruments are: the log of population, log of firm age, log of firm age squared, location, size of firm, industry, interactions between age and location, interactions between size and location, change of sales in the previous period and number of permanent workers. We construct other instruments, following Lewbel (1997), by multiplying the mean centred of the dependent variable (sales) by the mean centred of endogenous variables (labour and capital).

A battery of tests was also run to select the relevant instruments. First, Hansen test of overidentification is applied to test for the validity of the instruments. A rejection of the null hypothesis would suggest that the instruments are not valid. As it can be seen in the "diagnostics" panels the null is rejected in all cases which mean that the instruments used are valid. Then, relevance of the instruments tests are applied to show that the excluded instruments are correlated with the endogenous variables. F-test results are significant and bigger than 10. Moreover, the Anderson canonical correlation likelihood-ratio test (CCLR) confirms these conclusions. The null hypothesis is that the model is underidentified so a rejection of the null would suggest that the estimated models are identified. As it can be seen, this turns out to be the case in table 10. Moreover, endogeneity tests of one or more endogenous variables were implemented. The null hypothesis is that the specified endogenous variables can be treated as exogenous. As shown in the diagnostic panel in table 10, the null is rejected which confirms that the model can be run with these endogenous variables safely. Finally, heteroskedastity test is run, the null hypothesis is that the IVs are homoskedastic. The null was accepted and hence the model is well specified.

[55] When run all explanatory variables simultaneously, only the weak instruments test fails to reject the null hypothesis.

For robustness check, as ICA provides two years data for sales and labour variables, we turn to investigate the role of business environment on firm growth. Table 11 shows the regression in the case of dependent variables are sales growth, productivity growth and labour growth.

Columns 1& 2, where the dependent variable is sales growth, show the estimation of business environment variables. Foreign ownership and competition seem to have no effect in improving firm growth. Another surprising result is that export is insignificant. Infrastructure is insignificant, either measured by electricity deficiency or by email access. Moreover, burden regulations and government-business relations, as shown by time spent with officials and getting involved in associations, also are insignificant. Regarding corruption, it shows negative effect on growth (Beck et al., 2005). Moreover, getting loans would boost firm growth, while overdraft facility seems insignificant. This result is in contrast when running in levels of the dependent variable. In terms of development of technology, email and product variables are positive and significant. Adopting new technologies is vital for better firm performance (Goedhuys et al., 2008). However, manager's experience looks not important. However, Commander and Svejnar (2010) show that competition and all other investment climate variables are not significant.

Column 3 & 4 show the estimations for labour growth as the dependent variable. Technological infrastructure is positive and significant. Finance measured by overdraft facility impact the labour growth. Moreover, adoption of technology is also important for firm growth. On the other hand, corruption is negative and significant. Finally, participation with business association, time spent for inspections, and manager's experience present no effect on labour growth. Columns 5 & 6 set the estimations for value added growth variable. They confirm the role of adoption of technology and show that experience is important for growth. However, all other coefficients are insignificant.

In the context of firm growth, the technological advancement and access to finance is vital, while export, competition and regulation burden are not very important.

5.7 Conclusions

Investment climate has increasingly occupied an interesting place in research of firm performance, particularly after new available micro data were collected by World

Bank. Moreover, most of the literature argues that better investment climate is important for firm performance. Investment Climate Assessment (ICA) provides data for Syrian business environment in 2009. Using a dataset of 508 firms in five different provinces in Syria and covering mainly manufacturing sector, this chapter investigated the relationship between firm performance, in levels and growth, and ownership, export orientation, competition, technology and investment climate.

The main findings show that firm performance, measured in levels of sales and productivity is positively boosted by finance and technology and hindered by poor investment climate. However, competition and foreign ownership seem to have no effect. One important issue is that competition and foreign ownership positively affect firm performance when applying instrument variables method. When performance measured in growth of sales, productivity and labour are supported by access to finance and technological adoption.

Chapter Six

Conclusions, Limitations, and Future Research

In this chapter, I first summarize the findings from the previous chapters. I then provide some concluding remarks, limitations and suggest some future research.

6.1 Conclusion:

The introductory chapter raised the important question of the relationship between economic performance, measured mainly by economic growth, and corruption, ethnic diversity, economic reforms and business environment. This is particularly important because understanding economic performance and its determinants is still at the heart of economics. This thesis has given empirical evidence that supports the view that economic reform and better investment climate would boost economic performance in developing countries. This thesis has also shown that corruption and ethnic diversity would circumscribe economic performance as measured by economic growth.

6.1.1 Chapter two: economic growth and corruption

This chapter constructed a dataset of econometric studies of the relationship between economic growth and corruption. This data set consists of 465 coefficients of the effect of corruption on economic growth from 41 different empirical studies. We used this data set to carry out an econometric survey to investigate whether publication bias exists or not. And, we try to quantitatively understand the effects of differences in estimation methods and econometric specification on the significance and magnitude of the effect of corruption on growth.

The main finding is that although publication bias is severe, there seems to be a significant negative effect of corruption on growth. Importantly, we found among the main explanations for this effect's direction and significance that the effect is stronger in academic than non-academic studies and in those studies tried to address the heterogeneity by using fixed effect. Moreover, corruption could affect growth negatively through weakening institutions and trade openness effects. Finally, we found some evidence in favour of the Asian paradox, but this evidence does not

survive for further sensitivity tests. Countries in the MENA region are likely to experience a more negative impact of corruption on growth than countries in any other regions and there is no evidence that corruption on its own has a strong positive impact on growth.

6.1.2 Chapter three: economic growth and ethnic diversity

This chapter investigated a number of questions related to the behavior of ethnic diversity over time and across countries and its effects in terms of economic performance. This research tried to address two objectives: improving diversity measurement and treating diversity endogenously. We constructed a unique data set based mostly on primary data (national censuses) to measure ethnic diversity over time from 1989 to 2007. Using these data, we replicated the most recent results from the literature and showed that static (exogenous) diversity is indeed not robustly correlated with economic growth. However, when applying panel data and running diversity as endogenous variable, we found that ethnic diversity is negatively related to growth and this is robust due to the use of different econometric estimators, specifications, and measures.

6.1.3 Chapter four: economic reforms and economic performance

This chapter discussed economic reforms, their impact on economic performance as measured by GDP growth rate and industrial value added growth rate, and the most influential reforms in developing countries. This study used a panel of 56 developing countries, over the period of 1980-2006 in order to examine the effects of economic reforms as determinants of economic performance. The main reforms investigated were external stability, macroeconomic stability, financial development, trade liberalization and institutional quality. The main contribution is to analyse the short-run and long-run, effect of reforms on economic performance. It has been shown that in the long-run economic reform drives the economy and also boosts industry in developing countries. Also, institutions play an essential role in driving reforms and enhancing economic output either in total or in industrial sectors. Finally, the reforms in trade liberalization and global integration both increase industrial growth in developing countries.

6.1.4 Chapter five: firm performance and business environment

As most of the literature argues that a good investment climate is important for firm performance. This chapter tried to provide evidence of the relationship between investment climate, competition, ownership and export and firm performance in Syria. Investment Climate Assessment (ICA) provides data for the Syrian business environment in 2009. Using a dataset of 508 firms in five different provinces in Syria and covering mainly the industrial private sector, this chapter investigated the relationship between firm performance, in levels and growth, and ownership, export orientation, competition, technology and investment climate. One important investigation was done by using the instrumental variables method.

The main findings showed that firm performance, measured in levels of sales and productivity was positively boosted by finance and technology and hindered by poor investment climate, particularly corruption. However, competition and foreign ownership seem to have no effect. One important issue is that competition and foreign ownership positively affect firm performance when applying instrument variables method. Finally, when performance was measured in terms of growth of sales, productivity and labor, finance and technological adoption seem to have positive impact.

6.2 Contribution of this research

The main contributions of this research are summarized as follows:

1. We applied meta-analysis and meta-regression analysis methods to study the relationship between economic growth and corruption. This shows that despite severe publication bias, there seems to be a genuine negative effect of corruption on growth. This impact is systematically affected by whether the authors are academicians and whether the study incorporates fixed effects. Moreover, corruption can indirectly affect growth through institutions and openness to trade.
2. We used panel data to study the effect of dynamic ethnic diversity as endogenous variable on economic growth in transition context. Moreover, we constructed a unique data set based mostly on primary data (national censuses). Once diversity is instrumented (with lagged diversity and latitude), it shows a significant negative impact on economic growth. These rustles

were robust by applying different specifications, polarization measures, and econometric estimators.

3. We used panel data to provide evidence of the role of economic reforms on economic performance in developing countries as measured by economic growth and industrial growth. This research concentrates on the analysis of long-run and short-run effects. Moreover, this research focuses on and constructs individual indicators for the following reforms: external stability, macroeconomic stability, financial development, trade liberalization and institutional quality. The main finding is economic reforms strongly support growth in the long-run; they mostly have mixed effects in the short-run. Moreover, institutions seem to drive economic performance over the long run.
4. We demonstrated the relationship between business environment and firm performance in the Syrian industrial private sector. Performance is measured in level and growth variables. The main findings show that firm performance is positively boosted by finance and technology and hindered by poor investment climate. However, competition and foreign ownership seem to have no effect.

6.3 Limitations of the research

One of the main limitations of this research is that data from empirical papers on growth-corruption nexus is covered up to 2007. Including further issued papers would enrich the database and may provide other results.

As to diversity effect on economic growth, short period of the study prevented us from doing all diagnostic tests for GMM estimators.

Regarding economic reforms and economic performance, the limitation of available data prevented us to construct measures for total factor productivity. Other reforms are not included due to data restrictions, such as labor market and privatization.

Additionally, pooled data is not used for studying the relationship between firm performance and investment climate.

6.4 Future research

Future research could extend the datasets provided throughout the thesis. Moreover, meta-analysis could be applied to study of the relationship between corruption and other macroeconomic variables such as FDI.

Moreover, the effect of ethnic diversity on other regions and in different time spans could be studied. One important development is to develop the measurements of diversity.

Furthermore, pooled or panel data to develop the study of the relationship between firm performance and investment climate could be used.

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Figures

Chapter two

Figure 1: Histogram for 465 t-values of the coefficients of corruption on growth

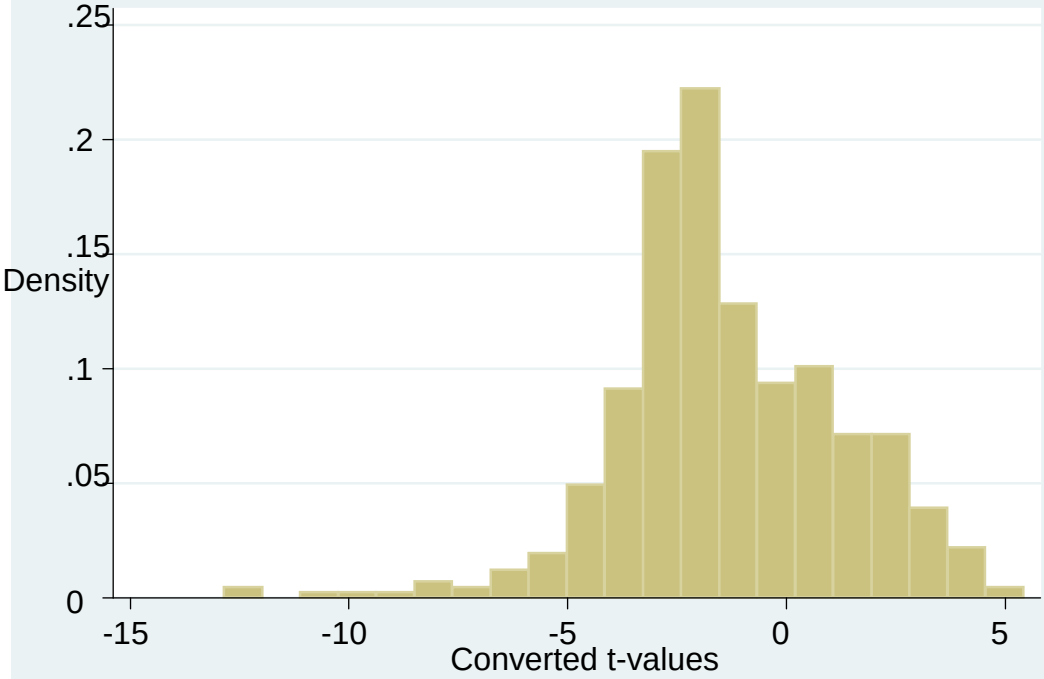
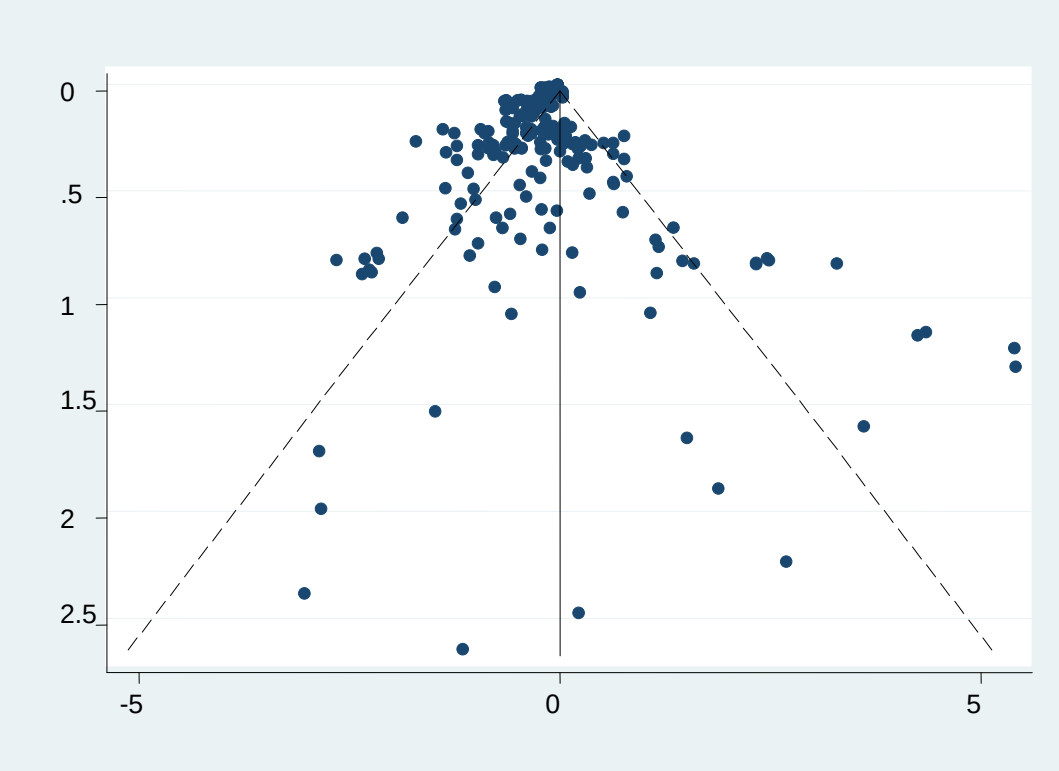
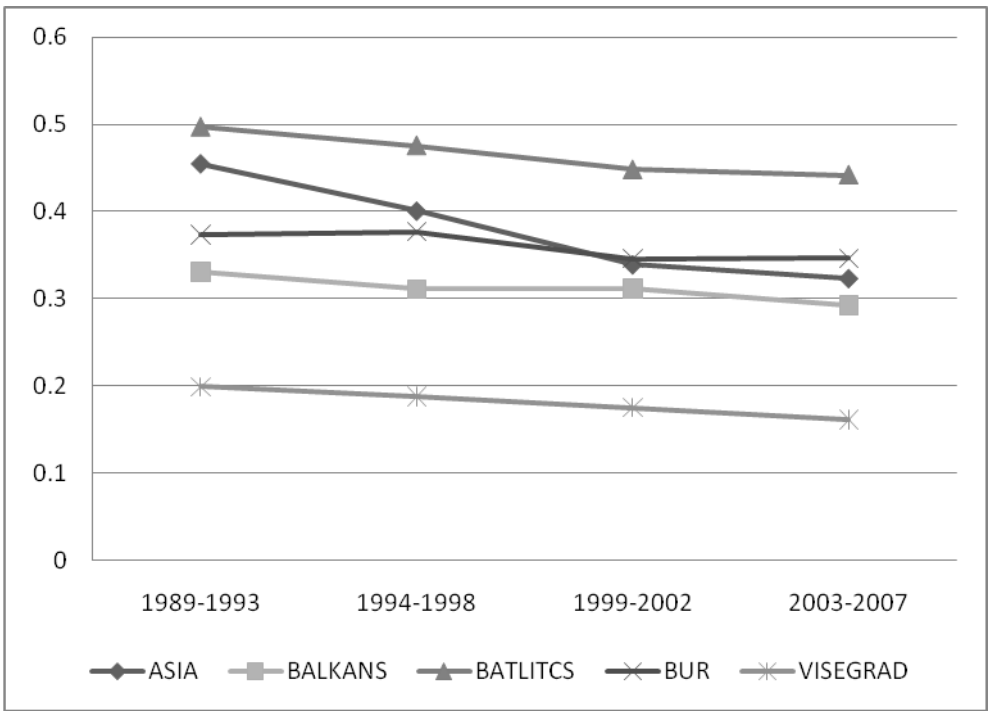


Figure 2: Funnel plot of corruption effect on economic growth using 460 estimates



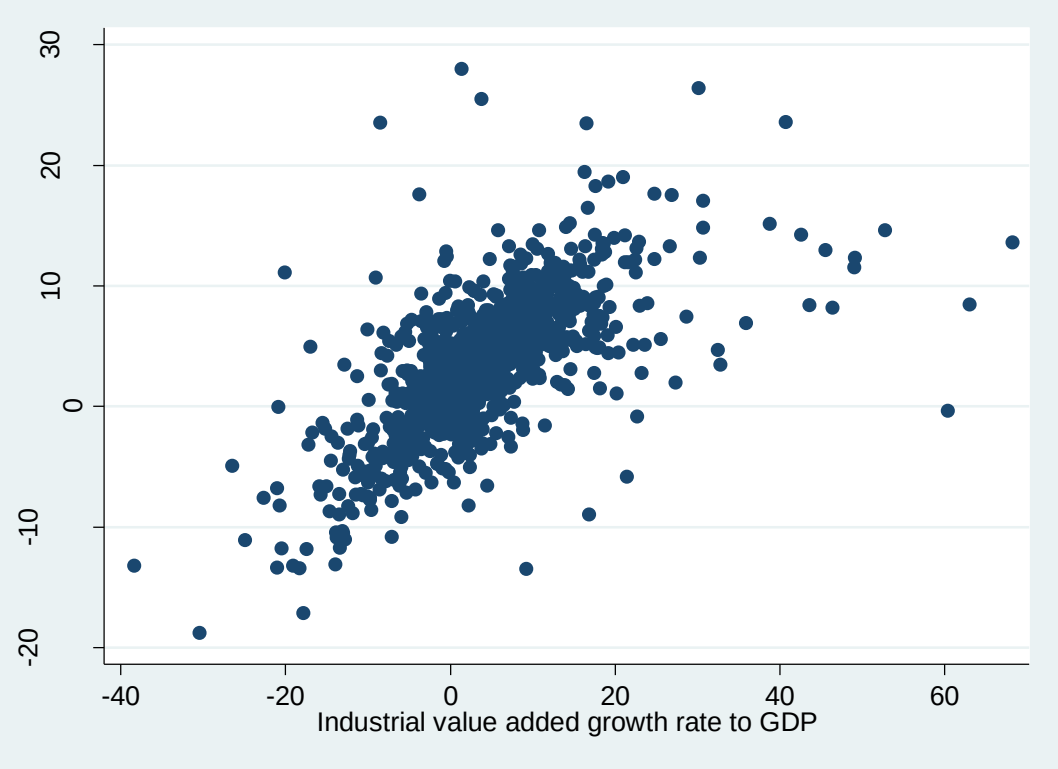
Chapter three

Figure 1: Ethnic Fractionalization in Transition: 1989 to 2007



Chapter four

Figure 1: the relationship between GDP growth and industrial growth



The relationship between economic growth as measured by GDP annual growth rate and industrial growth as measured by industrial value added to GDP growth rate for the 62 countries over the period 1980-2006. Each point represents one year point of time.

Tables

Chapter two

Table 1: Tests for Genuine Effect and Reporting Bias (MST and FAT-PET tests)

	1	2	3	4
	Ln|t|	Ln|t|^	t	t^
lndf	0.144	0.144		
	(2.54)*	(2.68)**		
1/Se			0.0000463	0.0000463
			(1.41)	(0.11)
Constant	-0.042	-0.042	-1.403	-1.403
	(-1.17)	(-0.18)	(-11.63)***	(-7.70)***
Observations	460	460	460	460
R-squared	0.01	0.0145	0.21	0.1912
Absolute value of t statistics in parentheses				
* significant at 5%; ** significant at 1%				
^ bootstrap to derive robust standard errors with 1000 replications				

Table 2: Tests for Genuine Effect and Reporting Bias in Published and Unpublished Papers (MST and FAT-PET tests)

	Published	Published, Bootstrap	Unpublished	Unpublished, Bootstrap
	t	t^	t	t^
1/Se	0.000794	0.000720	0.0000172	0.0000219
	(4.39)***	(4.48)***	(0.57)	(0.73)
Constant	-1.720	-1.448	-1.339	-1.523
	(-8.99)***	(-8.04)***	(-8.82)***	(-9.47)***
Observations	228	203	232	207
R-squared	0.078	0.091	0.001	0.003
Absolute value of t statistics in parentheses				
* significant at 5%; ** significant at 1%				
^ bootstrap to derive robust standard errors with 1000 replications				

Table 3: Meta-regression analysis of the effect of corruption on economic growth

VARIABLES	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) WLS GSpecific	(6) MR-RE GSpecific
pubtype	0.0229	0.0229	-0.0845**	-0.0215	-0.0797*	
	(0.0511)	(0.0509)	(0.0429)	(0.0404)	(0.0411)	
authors	0.133**	0.133***	0.161***	0.134***	0.160***	0.145***
	(0.0593)	(0.0405)	(0.0466)	(0.0453)	(0.0462)	(0.0390)
countryregion	-0.104	-0.104	-0.0820	-0.0118		
	(0.156)	(0.137)	(0.1000)	(0.126)		
panel	-0.0513	-0.0513	-0.0369	-0.0468	-0.0353	-0.0355
	(0.0477)	(0.0364)	(0.0341)	(0.0364)	(0.0342)	(0.0298)
endo	0.0612	0.0612**	0.0708**	0.0685**	0.0732**	0.0703**
	(0.0419)	(0.0305)	(0.0313)	(0.0318)	(0.0308)	(0.0290)
fixed	-0.101**	-0.101	-0.308***	-0.205***	-0.309***	-0.210***
	(0.0491)	(0.0720)	(0.0464)	(0.0423)	(0.0461)	(0.0346)
mid	-0.00247	-0.00247	0.00545**	0.00274	0.00571**	0.00274
	(0.00305)	(0.00352)	(0.00268)	(0.00251)	(0.00269)	(0.00244)
wb	-0.0674	-0.0674	-0.0514	-0.0456		
	(0.253)	(0.195)	(0.189)	(0.196)		
icrg	-0.229	-0.229	-0.242	-0.250	-0.202**	-0.106***
	(0.242)	(0.184)	(0.171)	(0.188)	(0.0857)	(0.0356)
ticpi	-0.292	-0.292	-0.283	-0.266	-0.236***	-0.124***
	(0.242)	(0.189)	(0.173)	(0.188)	(0.0872)	(0.0348)
comb	-0.333	-0.333*	-0.290*	-0.327	-0.253**	-0.198**
	(0.257)	(0.188)	(0.175)	(0.200)	(0.110)	(0.0838)
other	-0.172	-0.172	-0.236	-0.158	-0.197**	
	(0.242)	(0.186)	(0.174)	(0.188)	(0.0967)	
ctc	-0.0178	-0.0178	-0.132	-0.134	-0.158	
	(0.282)	(0.230)	(0.195)	(0.222)	(0.105)	
included	-0.184	-0.184	-0.219*	-0.195**	-0.209*	-0.206**
	(0.123)	(0.114)	(0.132)	(0.0935)	(0.124)	(0.0855)

initcond	-0.0443	-0.0443	-0.138***	-0.0926*	-0.137***	-0.0869*
	(0.0650)	(0.0589)	(0.0501)	(0.0504)	(0.0492)	(0.0454)
transit	0.0542	0.0542	-0.102	-0.00532	-0.113*	
	(0.0814)	(0.0746)	(0.0653)	(0.0627)	(0.0626)	
lac	0.175	0.175	0.111	0.0668		
	(0.370)	(0.224)	(0.198)	(0.330)		
mena	-0.285**	-0.285*	-0.341**	-0.273***	-0.342**	-0.254**
	(0.131)	(0.163)	(0.161)	(0.103)	(0.157)	(0.0997)
asia	0.286	0.286**	0.391***	0.328	0.498***	0.363***
	(0.353)	(0.124)	(0.129)	(0.315)	(0.170)	(0.103)
afr	0.0840	0.0840	0.232**	0.172*	0.229**	0.164*
	(0.120)	(0.114)	(0.104)	(0.0939)	(0.104)	(0.0879)
others	-0.168**	-0.168	-0.181*	-0.157***	-0.181*	-0.153***
	(0.0694)	(0.103)	(0.100)	(0.0605)	(0.0945)	(0.0578)
trade	0.129**	0.129***	0.198***	0.158***	0.198***	0.161***
	(0.0526)	(0.0434)	(0.0353)	(0.0398)	(0.0349)	(0.0371)
instit	0.219***	0.219***	0.223***	0.220***	0.237***	0.235***
	(0.0816)	(0.0563)	(0.0538)	(0.0620)	(0.0497)	(0.0550)
human	-0.0475	-0.0475	-0.0546	-0.0496	-0.0482	-0.0521
	(0.0529)	(0.0334)	(0.0346)	(0.0407)	(0.0333)	(0.0392)
invest	0.0326	0.0326	0.0238	0.00530		0.00424
	(0.0454)	(0.0537)	(0.0430)	(0.0363)		(0.0331)
political	-0.0855	-0.0855	-0.0983*	-0.0742	-0.0907	-0.0905**
	(0.0594)	(0.0662)	(0.0581)	(0.0462)	(0.0572)	(0.0416)
gov	-0.0706	-0.0706	-0.0361	-0.0412	-0.0399	-0.0406
	(0.0493)	(0.0549)	(0.0431)	(0.0387)	(0.0405)	(0.0363)
Constant	-0.0837	-0.0837	-0.0236	-0.0696	-0.0545	-0.226***
	(0.271)	(0.207)	(0.207)	(0.210)	(0.142)	(0.0839)
Observations	460	460	438	460	438	460
R-squared	0.185	0.185	0.448		0.447	

Notes: Dependent variable is partial correlation coefficient between corruption and growth. The bootstrap is to derive robust standard errors, with 1000 replications. WLS is weighted least squares with weights given by the inverse of the standard error. MR-RE is for random effects. Gspecific refers to results obtained using the general to specific method. Standard

errors in parentheses with *** p<0.01, ** p<0.05, * p<0.1. All estimations carried out through the metareg routine in STATA.

Table 4: Meta-regression analysis the effect of corruption on economic growth (sensitivity regression)

VARIABLES	(1) OLS	(2) Bootstrap SEs	(3) WLS	(4) MR-RE	(5) OLS	(6) bootstrap	(7) WLS	(8) MR-RE	(9) OLS	(10) bootstrap	(11) WLS	(12) MR-RE
pubtype	0.00192	0.00192	-0.0821**	-0.0247								
	(0.0405)	(0.0361)	(0.0387)	(0.0324)								
authors	0.208***	0.208***	0.196***	0.197***								
	(0.0470)	(0.0321)	(0.0359)	(0.0369)								
countryregion	0.0496	0.0496	0.0441	0.0540								
	(0.0751)	(0.0542)	(0.0567)	(0.0591)								
panel	0.0262	0.0262	0.0626*	0.0430								
	(0.0360)	(0.0315)	(0.0332)	(0.0286)								
endo	-0.000778	-0.000778	0.0382	0.0171								
	(0.0388)	(0.0298)	(0.0311)	(0.0306)								
fixed	-0.150***	-0.150***	-0.318***	-0.206***								
	(0.0381)	(0.0468)	(0.0496)	(0.0318)								
mid	-0.00147	-0.00147	0.00564*	0.00107								
	(0.00279)	(0.00271)	(0.00317)	(0.00221)								
wb					0.00755	0.00755	0.0362	0.0167				
					(0.259)	(0.196)	(0.185)	(0.210)				
icrg					-0.260	-0.260	-0.319**	-0.310				
					(0.243)	(0.180)	(0.161)	(0.198)				
ticpi					-0.313	-0.313*	-0.379**	-0.330*				
					(0.243)	(0.175)	(0.161)	(0.197)				
comb					-0.554**	-0.554***	-0.595***	-0.568***				
					(0.256)	(0.175)	(0.161)	(0.208)				
other					-0.225	-0.225	-0.471***	-0.249				
					(0.244)	(0.179)	(0.180)	(0.198)				
ctc					-0.0640	-0.0640	-0.109	-0.0946				
					(0.247)	(0.178)	(0.163)	(0.200)				

included					-0.0347	-0.0347	0.0893	-0.00380				
					(0.0943)	(0.0977)	(0.143)	(0.0742)				
initcond									-0.0520	-0.0520	-0.0474	-0.0342
									(0.0502)	(0.0393)	(0.0379)	(0.0404)
transit									0.0367	0.0367	0.0444	0.0277
									(0.0615)	(0.0482)	(0.0538)	(0.0483)
lac									0.299	0.299	0.395*	0.261
									(0.366)	(0.200)	(0.210)	(0.337)
mena									-0.261**	-0.261*	-0.358**	-0.252**
									(0.129)	(0.151)	(0.155)	(0.106)
asia									0.175	0.175	0.167	0.182
									(0.357)	(0.109)	(0.105)	(0.327)
afr									0.0256	0.0256	0.0880	0.0451
									(0.117)	(0.104)	(0.0971)	(0.0935)
others									-0.179***	-0.179*	-0.233**	-0.175***
									(0.0663)	(0.104)	(0.100)	(0.0618)
trade									0.156***	0.156***	0.265***	0.179***
									(0.0445)	(0.0366)	(0.0423)	(0.0354)
instit									0.177***	0.177***	0.232***	0.172***
									(0.0609)	(0.0619)	(0.0660)	(0.0494)
human									-0.0684	-0.0684*	-0.153***	-0.0981**
									(0.0482)	(0.0354)	(0.0377)	(0.0389)
invest									-0.00659	-0.00659	0.00578	-0.0233
									(0.0416)	(0.0488)	(0.0411)	(0.0343)
political									0.0187	0.0187	-0.0780	0.00857
									(0.0513)	(0.0570)	(0.0581)	(0.0414)
gov									-0.155***	-0.155***	-0.184***	-0.154***
									(0.0411)	(0.0397)	(0.0357)	(0.0333)
Constant	-0.265***	-0.265***	-0.307***	-0.284***	0.114	0.114	0.139	0.123	-0.172	-0.172*	-0.189*	-0.172*
	(0.0593)	(0.0381)	(0.0431)	(0.0461)	(0.241)	(0.173)	(0.160)	(0.196)	(0.112)	(0.0997)	(0.101)	(0.0904)
Observations	460	460	438	460	460	460	438	460	460	460	438	460

R-squared	0.071	0.071	0.264		0.082	0.082	0.144		0.116	0.116	0.302

Notes: Dependent variable is partial correlation coefficient between corruption and growth. The bootstrap is to derive robust standard errors, with 1000 replications. WLS is weighted least squares with weights given by the inverse of the standard error. MR-RE is for random effects. Standard errors in parentheses with *** p<0.01, ** p<0.05, * p<0.1. All estimations carried out through the metareg routine in STATA.

Chapter three

Table 1**:** SUR Estimation of augmented Solow model with exogenous diversity indices (Dependent variable: growth rate of per capita GDP)

	1	2	3	4	5	6	7
Ln I/Y	0.0620	0.0923	0.0990	0.111	0.101	0.0848	0.0683
	(0.0943)	(0.0989)	(0.101)	(0.105)	(0.102)	(0.100)	(0.102)

Ln HK	0.128*	0.141**	0.142*	0.142*	0.143*	0.143**	0.112
	(0.0688)	(0.0713)	(0.0725)	(0.0744)	(0.0732)	(0.0727)	(0.0785)
Ln(n+ g+ δ)	-0.0109	-0.0108	-0.0147	-0.0213	-0.0164	-0.0145	-0.00896
	(0.0374)	(0.0383)	(0.0389)	(0.0402)	(0.0392)	(0.0387)	(0.0412)
Ln Initial income	-0.00111	-0.00299	-0.00176	-0.00141	-0.00144	-0.000477	0.00272
	(0.0443)	(0.0464)	(0.0471)	(0.0485)	(0.0477)	(0.0472)	(0.0486)
Ethnic Fractionalization		-0.150					
		(0.142)					
Ethnic Polarization			-0.414				
(α=0.8)			(0.379)				
Ethnic Polarization				-0.934			
(α=1.6)				(0.833)			
Polarization					-0.126		
(MRQ)					(0.118)		
Ethno-linguistic-religious						-0.006	
fractionalization						(0.0215)	
Ethno-linguistic-religious							-0.003
fractionalization (average)							(0.00217)
Constant	-0.347	-0.268	-0.267	-0.234	-0.268	-0.369	-0.258
	(0.497)	(0.525)	(0.535)	(0.560)	(0.542)	(0.527)	(0.556)
Observations	24;24	24;24	24;24	24;24	24;24	24;24	24;24
	24;24	24;24	24;24	24;24	24;24	24;24	24;24
R-squared	-0.39;0.84	-0.32;0.84	-0.33;0.84	-0.34;0.84	-0.34;0.84	-0.45;0.83	-0.31;0.83
	0.77;0.82	0.77;0.82	0.77;0.83	0.76;0.83	0.76;0.83	0.77;0.83	0.76;0.83

Note: SUR estimates. Standard errors in parentheses, * indicates significant at 10%, ** significant at 5%, *** significant at 1%.

Table 2: SUR Estimation of augmented Solow model with exogenous diversity indices and without initial income (Dependent variable: growth rate GDP per capita)

	1	2	3	4	5	6
Ln I/Y	0.576***	0.588***	0.586***	0.614***	0.589***	0.539***

	(0.143)	(0.145)	(0.146)	(0.142)	(0.146)	(0.151)
ln HK	0.314***	0.304**	0.284**	0.252**	0.276**	0.294**
	(0.117)	(0.120)	(0.119)	(0.112)	(0.119)	(0.129)
ln(n+ g+ δ)	-0.130**	-0.121*	-0.131**	-0.145**	-0.132**	-0.131*
	(0.0628)	(0.0643)	(0.0634)	(0.0589)	(0.0630)	(0.0669)
Ethnic Fractionalization		-0.369				
		(0.290)				
Ethnic Polarization(α=0.8)			-0.949			
			(0.724)			
Ethnic Polarization(α=1.6)				-2.669*		
				(1.377)		
Polarization (MRQ)					-0.298	
					(0.217)	
Ethno-linguistic-religious fractionalization						-0.0552
						(0.0391)
Constant	-0.358	-0.152	-0.0972	0.146	-0.0562	-0.358
	(0.535)	(0.558)	(0.560)	(0.544)	(0.560)	(0.571)
Observations	24;24;24;24	24;24;24;24	24;24;24;24	24;24;24;24	24;24;24;24	24;24;24;24
R-squared	-3.58;0.19	-3.13;0.22	-2.98;0.23	-2.87;0.25	-2.94;0.24	-2.85;0.22
	0.16;0.32	0.17;0.34	0.17;0.34	0.17;0.38	0.17;0.34	0.17;0.33

Note: SUR estimates. Standard errors in parentheses, * indicates significant at 10%, ** significant at 5%, *** significant at 1%.

Table 3: IV Estimation of augmented Solow model with endogenous diversity indices (Dependent variable: growth rate GDP per capita; Instruments used are one-period lagged diversity and latitude)

	1	2	3	4	5	6
Ln I/Y	0.0197	0.0221	0.0257	0.0228	0.0208	0.0227
	(0.0281)	(0.0281)	(0.0281)	(0.0281)	(0.0283)	(0.0279)

ln HK	0.0461***	0.0455***	0.0435***	0.0455***	0.0477***	0.0437***
	(0.0115)	(0.0114)	(0.0112)	(0.0114)	(0.0120)	(0.0105)
ln(n+ g+ δ)	0.00191	0.000989	-0.000647	0.000601	0.00113	0.00360
	(0.00604)	(0.00618)	(0.00626)	(0.00622)	(0.00626)	(0.00606)
Ln Initial Income	0.00498	0.00496	0.00380	0.00473	0.00456	0.00788
	(0.00597)	(0.00595)	(0.00595)	(0.00595)	(0.00638)	(0.00586)
Ethnic Fractionalization	-0.079***					
	(0.0283)					
Ethnic Polarization (α=0.8)		-0.192***				
		(0.0706)				
Ethnic Polarization (α=1.6)			-0.432***			
			(0.137)			
Polarization (MRQ)				-0.059***		
				(0.0211)		
Ethno-linguistic-religious fract.					-0.0106**	
					(0.00416)	
Ethno-linguistic-religious fract. (avg)						-0.00101**
						(0.000488)
Constant	-0.0922	-0.0868	-0.0553	-0.0817	-0.121	-0.103
	(0.107)	(0.107)	(0.106)	(0.107)	(0.113)	(0.105)
Observations	76	76	76	76	76	76
R-squared	0.285	0.277	0.287	0.278	0.248	0.268
			Diagnostics			
Instruments	l(1).eth latitude	l(1).peth08 latitude	l(1).peth16 latitude	l(1).p latitude	l(1).f latitude	l(1).fr latitude
Sargan-Hansen	2.235	2.584	2.896	2.604	3.824	3.0810
	(0.1349)	(0.108)	(0.088)	(0.1066)	(0.0505)	(0.081)
Shea Partial R-sq	0.8793	0.8395	0.7982	0.8246	0.8992	0.99
F-statistic	207.74	130.88	56.74	99.26	107.037	100000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Anderson CCLR	160.70	139.06	121.64	132.31	174.42	696.85
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Pagan-Hall	2.702	2.890	3.208	2.922	1.526	5.259
	(0.2590)	(0.235)	(0.201)	(0.232)	(0.4662)	(0.0721)
RESET	0.64	1.03	0.89	1.03	0.39	1.48
	(0.4235)	(0.3105)	(0.346)	(0.3098)	(0.5312)	(0.2242)

Note: Standard errors in parentheses below coefficients and, in the bottom panel, p-values in parentheses. * indicates significant at 10%, ** significant at 5%, *** significant at 1%.

Table 4: IV Estimation of augmented Solow model with endogenous diversity indices without initial income (Dependent variable: growth rate GDP per capita; Instruments are lagged diversity and latitude)

	(1)	(2)	(3)	(4)	(5)	(6)
Ln I/Y	0.0243	0.0269	0.0297*	0.0275	0.0255	0.036*
	(0.0169)	(0.0169)	(0.0166)	(0.0168)	(0.0174)	(0.0004)
ln HK	0.0450***	0.0444***	0.0425***	0.0444***	0.0468***	0.048***

	(0.0128)	(0.0128)	(0.0127)	(0.0128)	(0.0132)	(0.013)
ln(n+ g+ δ)	-0.000267	-0.00130	-0.00249	-0.00162	-0.000887	0.00022
	(0.00528)	(0.00534)	(0.00536)	(0.00535)	(0.00544)	(0.005)
Ethnic Fractionalization	-0.0889*** (0.0331)					
Ethnic Polarization(α=0.8)		-0.216*** (0.0836)				
Ethnic Polarization(α=1.6)			-0.469*** (0.169)			
Polarization (MRQ)				-0.067*** (0.0254)		
Ethnic-linguistic-religious fract.					-0.0112** (0.00483)	
Ethnic-linguistic-religious fract. (avg)						-0.001 (0.00043)
Constant	-0.0482	-0.0423	-0.0194	-0.0388	-0.0828	-0.0332
	(0.0569)	(0.0574)	(0.0583)	(0.0575)	(0.0594)	(0.0587)
Observations	76	76	76	76	76	76
R-squared	0.280	0.272	0.284	0.273	0.242	0.251
			Diagnostics			
Instruments	l(1).eth latitude	l(1).peth08 latitude	l(1).peth16 latitude	l(1).p latitude	l(1).f latitude	l(1).fr latitude
Sargan-Hansen (J)	0.403	0.558	0.974	0.616	2.209	1.529
	(0.5257)	(0.4552)	(0.3236)	(0.4325)	(0.1372)	(0.2163)
Shea Partial R-sq	0.8894	0.8538	0.8208	0.8409	0.9105	0.99
First stage F	117.5	84.61	66.8	76.59	149.71	10000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Anderson CCLR	167.33	146.15	130.67	139.72	183.4	684.60
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pagan-Hall	2.394	2.516	2.760	2.552	1.004	2.809
	(0.3022)	(0.2842)	(0.2515)	(0.2792)	(0.6053)	(0.2455)
RESET	2.11	3.06	2.33	2.88	1.62	2.47

	(0.1465)	(0.0804)	(0.1269)	(0.0896)	(0.2024)	(0.1159)

Note: Standard errors in parentheses below coefficients and, in the bottom panel, p-values in parentheses. * indicates significant at 10%, ** significant at 5%, *** significant at 1%.

Table 5: System GMM Estimation of augmented Solow model with exogenous diversity (Dependent variable: growth rate GDP per capita)

	(1)	(2)	(3)	(4)	(5)
lagged growth	0.115	0.109	0.118	0.0448	0.00449
	(0.190)	(0.187)	(0.195)	(0.132)	(0.244)
Ln I/Y	0.212	0.216	0.216	0.155*	0.284
	(0.158)	(0.155)	(0.151)	(0.0917)	(0.181)

Ln HK	0.0449	0.0414	0.0329	0.0334	-0.0084
	(0.0594)	(0.0588)	(0.0640)	(0.0428)	(0.105)
Ln(n+ g+ δ)	0.125	0.121	0.122	0.0715	0.127
	(0.120)	(0.115)	(0.116)	(0.0502)	(0.190)
Ln Initial income	0.0553	0.0574	0.0600	0.0480	0.0842
	(0.0630)	(0.0618)	(0.0640)	(0.0439)	(0.135)
Ethnic Fractionalization	0.415				
	(0.606)				
Ethnic Polarization		0.865			
(α=0.8)		(1.257)			
Polarization			0.268		
(MRQ)			(0.387)		
Ethno-linguistic-religious fractionalization				0.0340	
				(0.0262)	
Ethno-linguistic-religious fractionalization (average					0.0118
					(0.0182)
Observations	76	76	76	76	76
Number of countries	26	26	26	26	26
		Diagnostics			
AR(1)	-1.7	-1.03	-1.04	-1.04	-1.01
	(0.284)	(0.301)	(0.299)	(0.159)	(0.313)

Note: System GMM estimates for growth rate of GDP per capita, 26 transition economies between 1989 and 2007. In the level equation, the instrument used is the first difference of the lagged dependent variable. In the transformed equation, the instrument used is the second lag of the dependent variable. In the top panel, standard errors are in parentheses and * indicates significant at 10%, ** significant at 5%, *** significant at 1%. Period dummies are always included, not reported, and are all significant at 1% in all specifications.

Table 6: System GMM Estimation of augmented Solow model with endogenous diversity (Dependent variable: growth rate GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)
L.lng1	-0.114	-0.124	-0.140	-0.123	-0.0846	-0.0868
	(0.105)	(0.102)	(0.100)	(0.101)	(0.112)	(0.126)
Ln I/Y	-0.00240	0.00121	0.0114	0.00350	-0.00646	0.0180
	(0.0210)	(0.0208)	(0.0196)	(0.0202)	(0.0218)	(0.0190)
Ln HK	0.0603***	0.0618***	0.0536***	0.0592***	0.0665**	0.0436**

	(0.0212)	(0.0217)	(0.0180)	(0.0209)	(0.0270)	(0.0196)
Ln(n+ g+ δ)	0.00276	-0.000391	-0.00290	-0.000730	0.00260	0.00654
	(0.00645)	(0.00773)	(0.00736)	(0.00764)	(0.00669)	(0.00743)
Ln Initial income	0.0126	0.0109	0.00665	0.0102	0.0101	0.0178**
	(0.00850)	(0.00858)	(0.00786)	(0.00826)	(0.00866)	(0.00839)
Ethnic Fractionalization	-0.169**					
	(0.0788)					
Ethnic Polarization (α=0.8)		-0.483**				
		(0.216)				
Ethnic Polarization (α=1.6)			-1.036**			
			(0.402)			
Polarization (MRQ)				-0.142**		
				(0.0628)		
Ethno-linguistic-religious fractionalization					-.0206*	
					(0.0116)	
Ethno-linguistic-religious fractionalization (average)						-0.0013**
						(0.000557)
Constant	-0.193	-0.174	-0.0686	-0.151	-0.257*	-0.157
	(0.122)	(0.123)	(0.0991)	(0.117)	(0.142)	(0.122)
Observations	76	76	76	76	76	76
Number of countries	26	26	26	26	26	26
			Diagnostics			
AR(1)	0.91	0.80	0.52	0.73	0.77	-0.08
	(0.363)	(0.423)	(0.604)	(0.464)	(0.441)	(0.940)
Hansen test	19.78	18.69	20.08	20.29	21.29	19.48
	(0.955)	(0.970)	(0.950)	(0.946)	(0.942)	(0.960)

Note: System GMM estimates for growth rate of GDP per capita, 26 transition economies between 1989 and 2007. In the level equation, the instruments used are time dummies and latitude, the first differenced of the dependent variable, investment, human capital, population, and the first difference of the lagged fractionalization index. In the transformed equation, the instruments used are the first difference of latitude, lagged dependent variable, investment, human capital, population and second lag of the respective fractionalization index. In the top panel, standard errors are in parentheses and * indicates significant at 10%, ** significant at 5%, *** significant at 1%. Period dummies are always included, not reported, and are all significant at 1% in all specifications.

Chapter four

Table 1: Between effect model, dependent variable; GDP growth rate

	(1) gdpg	(2) gdpg	(3) gdpg	(4) gdpg	(5) gdpg
lngdpc0	0.0919	0.156	0.0654	0.0285	0.175
	(1.06)	(1.78)	(0.72)	(0.24)	(1.09)
lninv	3.953***	4.018***	3.291***	5.349***	3.935***
	(5.03)	(5.18)	(3.75)	(5.30)	(3.70)
lnh	-1.178	-1.274*	-2.000**	-0.823	-1.798
	(-1.89)	(-2.01)	(-2.89)	(-1.00)	(-2.02)
lnp	1.292	2.056	1.802	1.090	1.114
	(0.72)	(1.14)	(0.96)	(0.48)	(0.43)
ES	0.946**				
	(3.36)				
MS		1.205**			
		(3.19)			
FD			0.447*		
			(2.40)		
FT				0.554**	
				(3.42)	
IICRG					0.634
					(1.47)
_cons	-2.468	-1.706	4.795	-10.53	-4.929
	(-0.44)	(-0.31)	(0.77)	(-1.53)	(-0.64)
N	1327	1362	1386	1143	1092
N_g	54	55	55	44	42

t statistics in parentheses, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is GDP growth. The explanatory variables are initial income, investment, human capital, population growth, and reform indicators (external stability, macroeconomic stability, financial development, trade liberalization and institutional quality). The estimations are done in Stata using xtreg command for the between effect.

Table 1A: Between effect model, dependent variable; GDP growth rate

	(1) gdpg	(2) gdpg	(3) gdpg	(4) gdpg	(5) gdpg

lngdpc0	0.0544	0.0911	0.0197	-0.0148	-0.0842
	(0.58)	(0.96)	(0.21)	(-0.11)	(-0.53)
lninv	3.518***	3.501***	2.747**	4.469***	1.583
	(4.16)	(4.19)	(3.03)	(3.69)	(1.39)
lnh	-1.114	-1.216	-1.826*	-0.808	-1.624*
	(-1.77)	(-1.91)	(-2.66)	(-0.96)	(-2.08)
lnp	1.877	2.390	2.503	1.313	1.011
	(0.92)	(1.17)	(1.21)	(0.52)	(0.40)
_Iregion_3	0.835	0.996	1.028	0.756	2.261*
	(1.23)	(1.47)	(1.47)	(0.89)	(2.55)
_Iregion_4	-0.0669	0.106	-0.181	-0.240	-0.430
	(-0.12)	(0.19)	(-0.32)	(-0.35)	(-0.58)
_Iregion_5	-0.0176	0.626	-0.118	0.0291	0.677
	(-0.03)	(0.93)	(-0.18)	(0.04)	(0.89)
ES	0.826**				
	(2.83)				
MS		1.115**			
		(2.69)			
FD			0.408*		
			(2.21)		
FT				0.468*	
				(2.65)	
IICRG					0.987*
					(2.48)
_cons	0.959	1.731	8.670	-5.760	5.894
	(0.16)	(0.28)	(1.33)	(-0.73)	(0.77)
N	1327	1362	1386	1143	1092
N_g	54	55	55	44	42

t statistics in parentheses, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is GDP growth. The explanatory variables are initial income, investment, human capital, population growth, and reform indicators (external stability, macroeconomic stability, financial development, trade liberalization and institutional quality). The estimations are done in Stata using xtreg command for the between effect.

Table 2: Between effect model, dependent variable; industrial value added growth rate

	(1)	(2)	(3)	(4)	(5)
	ivag	ivag	ivag	ivag	ivag
lnivac0	0.0229	0.0311	-0.0126	-0.177	0.00698
	(0.21)	(0.28)	(-0.11)	(-1.09)	(0.03)
lninv	6.702***	6.648***	6.432***	7.113***	5.683***

	(6.67)	(6.47)	(5.75)	(5.06)	(3.89)
lnh	-0.335	-0.745	-0.952	-0.751	-1.462
	(-0.42)	(-0.91)	(-1.09)	(-0.65)	(-1.16)
lnp	3.933	5.111*	4.641	2.042	2.742
	(1.55)	(2.01)	(1.74)	(0.62)	(0.77)
ES	1.261**				
	(2.95)				
MS		1.253*			
		(2.19)			
FD			0.307		
			(1.22)		
FT				0.551*	
				(2.37)	
IICRG					1.202
					(1.67)
_cons	-5.531	-0.643	0.429	-8.890	-5.417
	(-0.74)	(-0.09)	(0.05)	(-0.90)	(-0.51)
N	1224	1273	1280	1050	971
N_g	51	52	52	41	38

t statistics in parentheses, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is industrial value added to GDP growth. The explanatory variables are initial values of industrial value added to GDP, investment, human capital, population growth, and reform indicators (external stability, macroeconomic stability, financial development, trade liberalization and institutional quality). The estimations are done in Stata using xtreg command for the between effect

Table 1A: Between effect model, dependent variable; GDP growth rate

	(1)	(2)	(3)	(4)	(5)
	gdpg	gdpg	gdpg	gdpg	gdpg
lngdpc0	0.0544	0.0911	0.0197	-0.0148	-0.0842
	(0.58)	(0.96)	(0.21)	(-0.11)	(-0.53)
lninv	3.518***	3.501***	2.747**	4.469***	1.583
	(4.16)	(4.19)	(3.03)	(3.69)	(1.39)
lnh	-1.114	-1.216	-1.826*	-0.808	-1.624*

	(-1.77)	(-1.91)	(-2.66)	(-0.96)	(-2.08)
lnp	1.877	2.390	2.503	1.313	1.011
	(0.92)	(1.17)	(1.21)	(0.52)	(0.40)
_Iregion_3	0.835	0.996	1.028	0.756	2.261*
	(1.23)	(1.47)	(1.47)	(0.89)	(2.55)
_Iregion_4	-0.0669	0.106	-0.181	-0.240	-0.430
	(-0.12)	(0.19)	(-0.32)	(-0.35)	(-0.58)
_Iregion_5	-0.0176	0.626	-0.118	0.0291	0.677
	(-0.03)	(0.93)	(-0.18)	(0.04)	(0.89)
ES	0.826**				
	(2.83)				
MS		1.115**			
		(2.69)			
FD			0.408*		
			(2.21)		
FT				0.468*	
				(2.65)	
IICRG					0.987*
					(2.48)
_cons	0.959	1.731	8.670	-5.760	5.894
	(0.16)	(0.28)	(1.33)	(-0.73)	(0.77)
N	1327	1362	1386	1143	1092
N_g	54	55	55	44	42

t statistics in parentheses, $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable is industrial value added to GDP growth. The explanatory variables are initial values of industrial value added to GDP, investment, human capital, population growth, and reform indicators (external stability, macroeconomic stability, financial development, trade liberalization and institutional quality). The estimations are done in Stata using xtreg command for the between effect

Table 3: PMG model, dependent variable; GDP growth rate

	(1) D.gdpg	(2) D.gdpg	(3) D.gdpg	(4) D.gdpg	(5) D.gdpg
EC					
ES	0.00566				
	(0.02)				
MS		1.930***			
		(882696.15)			
FD			0.120***		
			(34947.08)		
FT				1.156***	

				(7.25)	
IICRG					0.684**
					(3.16)
SR					
EC	-0.871***	-0.853***	-0.845***	-0.892***	-0.897***
	(-24.85)	(-26.07)	(-25.88)	(-23.54)	(-22.88)
LLNGDPC	-5.118**	-5.882***	-3.782**	-6.899***	-4.895***
	(-2.94)	(-4.36)	(-2.78)	(-4.46)	(-3.53)
D.LNINV	8.176***	7.894***	8.604***	10.78***	10.08***
	(5.08)	(5.83)	(5.11)	(6.04)	(5.77)
D.LNP	-29.18	-36.81	-24.45	-16.21	-35.13
	(-0.76)	(-1.00)	(-0.80)	(-0.43)	(-0.82)
D.LNH	-17.37	-24.02**	-19.08*	-19.02	-23.84**
	(-1.93)	(-2.67)	(-2.54)	(-1.77)	(-2.82)
D.ES	3.319***				
	(4.48)				
D.MS		0.528			
		(0.89)			
D.FD			-2.832**		
			(-3.27)		
D.FT				-1.102	
				(-1.51)	
D.IICRG					1.957*
					(2.55)
_cons	116.6**	137.8***	88.84**	158.8***	116.3***
	(3.20)	(4.72)	(2.94)	(4.55)	(3.65)
N	1286	1307	1341	1098	1050

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimations are done by using (xtpmg) routine in Stata. Sample excludes oil countries due to missing data in these countries. All estimations are PMG. Hausman test show that there is no difference between PMG and MG estimators. While the first panel (LR) shows long-run effects. The second panel reports both short-run effects (SR) and the speed of adjustment (ec). The lag structure is ARDL (1, 0, 1, 1, 1, 1) and the order of variables is: GDPG, LNGDPC, LNINV, LNP, LNH, reform indicator.

Table 4: PMG model, dependent variable; industrial value added growth rate

	(1) D.ivag	(2) D.ivag	(3) D.ivag	(4) D.ivag	(5) D.ivag
EC					
ES	1.842***				
	(4.51)				
MS		1.275**			
		(3.25)			
FD			-0.657*		
			(-2.57)		
FT				0.764***	
				(3.80)	
IICRG					0.786***
					(3.35)
SR					

EC	-0.888***	-0.884***	-0.877***	-0.947***	-0.923***
	(-22.16)	(-20.53)	(-22.27)	(-20.08)	(-21.96)
D.lninv	13.29***	12.45***	13.18***	15.48***	13.28***
	(5.07)	(4.76)	(4.83)	(5.31)	(4.77)
D.lnp	51.33	215.9	26.32	135.1	155.6
	(0.54)	(0.79)	(0.29)	(0.73)	(0.82)
D.lnh	28.66	63.54	31.40	97.79	43.76
	(0.83)	(0.81)	(0.66)	(0.95)	(0.68)
D.ES	2.671				
	(1.33)				
D.MS		2.678*			
		(2.52)			
D.FD			-2.079		
			(-1.61)		
D.FT				0.462	
				(0.42)	
D.IICRG					3.645***
					(4.43)
_cons	4.872***	6.340*	5.453***	2.654	3.136
	(3.90)	(2.28)	(3.71)	(0.78)	(1.47)
N	1229	1261	1281	1043	990

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Estimations are done by using (xtpmg) routine in Stata. Sample excludes oil countries due to missing data in these countries. All estimations are PMG. Hausman test show that there is no difference between PMG and MG estimators. While the first panel (LR) shows long-run effects. The second panel reports both short-run effects (SR) and the speed of adjustment (ec). The lag structure is ARDL (1, 1, 1, 1, 1) and the order of variables is: IVAG, LNINV, LNP, LNH, reform indicator.

Table 5, Hausman test for homogeneity and comparison between TPMG and MG estimators

	GDP growth rate	Industrial growth rate
ES	0.17 (0.6772)	0.17 (6782)
MS	2.07 (0.1498)	1.69 (0.1934)
FD	1.29 (0.2558)	0.29 (0.5905)
FL	1.07 (0.3016)	0.64 (0.4239)
IICRG	0.22 (0.6375)	0.34(0.5233)

Hausman test performs to check the homogeneity on the long run for each regression. The null that there is no difference between the above two estimators and hence PMG is preferable. The number is x^2 results and p-value between brackets.

Table 6: IV model, dependent variable; GDP growth rate

	(1) gdpg	(2) gdpg	(3) gdpg	(4) gdpg
L.lngdpc	0.198*	0.265**	0.00639	0.249**
	(2.02)	(3.22)	(0.05)	(3.02)
lninv	4.671***	4.221***	2.433*	5.278***
	(7.91)	(7.16)	(2.25)	(10.44)
lnh	-0.273	-0.529	-1.224*	-0.488
	(-0.87)	(-1.67)	(-2.12)	(-1.44)
lnp	0.398	1.196	1.778	1.323
	(0.28)	(0.92)	(0.99)	(1.01)
ES	0.548**			
	(3.22)			
MS		1.184***		
		(4.49)		
FD			2.121**	
			(3.11)	

FT				0.432***
				(4.19)
_cons	-13.27***	-10.29**	5.709	-15.73***
	(-3.43)	(-2.64)	(0.67)	(-4.39)
Observations	1008	1019	999	1007
F	18.67	18.35	20.79	33.40
Hansen test	0.366	0.845	0.136	0.968
(P-value)				
Anderson CCLR	3.54e-249	4.35e-308	2.62e-13	0
(P-value)				
Anderson-Rubn	0	0	1.11e-13	0
(P-value)				
Excluded	L.ES	L.MS	L.FT	L.FT
instruments	L.IICRG	L.IICRG	L.IICRG	L.IICRG

t statistics in parentheses $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6 A. IV model, dependent variable GDP growth rate

	(1)	(2)	(3)	(4)
	gdpg	gdpg	gdpg	gdpg
L.lngdpc	0.0705	0.174*	0.218*	0.158
	(0.69)	(2.03)	(1.99)	(1.76)
lninv	4.083***	3.828***	3.475***	4.744***
	(6.31)	(5.87)	(4.33)	(8.24)
lnh	-0.163	-0.472	-0.865	-0.410
	(-0.52)	(-1.47)	(-1.63)	(-1.17)
lnp	0.469	1.092	1.860	1.365
	(0.31)	(0.80)	(1.14)	(0.98)
_Iregion_3	1.295*	1.023	-1.464	0.903
	(2.28)	(1.87)	(-1.37)	(1.72)
_Iregion_4	-0.185	0.0164	-0.767	-0.271
	(-0.37)	(0.03)	(-1.33)	(-0.60)
_Iregion_5	0.280	0.643	-1.834*	0.0213
	(0.51)	(1.15)	(-2.17)	(0.04)
ES	0.540**			
	(3.14)			
MS		1.161***		
		(4.28)		

FD			1.592**	
			(2.82)	
FT				0.411***
				(3.87)
_cons	-8.831*	-7.715	-2.839	-11.97**
	(-2.17)	(-1.88)	(-0.51)	(-3.10)
Observations	1008	1019	999	1007
F	19.16	18.05	16.46	24.06
Hansen test	0.161	0.438	0.0354	0.667
(P-value)				
AndersonCCLR	2.86e-244	2.99e-293	3.23e-19	0
(P-value)				
Anderson-Rubn	0	0	4.99e-20	0
(P-value)				
Excluded instruments	L.ES	L.MS	L.FT	L.FT
	L.IICRG	L.IICRG	L.IICRG	L.IICRG

t statistics in parenthese * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: IV model, dependent variable; industrial value added growth rate

	(1)	(2)	(3)	(4)
	ivag	ivag	ivag	ivag
L.lnivac	-0.573	0.210	-0.105	0.177
	(-1.70)	(1.39)	(-0.55)	(1.18)
lninv	7.377***	6.701***	3.401	6.735***
	(8.27)	(8.06)	(1.94)	(8.35)
lnh	-0.121	-0.828	-2.064*	-1.008
	(-0.22)	(-1.54)	(-2.18)	(-1.76)
lnp	-3.275	3.441	2.440	2.470
	(-0.89)	(1.49)	(0.88)	(1.08)
ES	3.571*			
	(2.11)			
MS		1.774*		
		(2.07)		
FD			2.552*	
			(2.16)	
FT				0.410*
				(2.12)
_cons	-13.91*	-9.094	10.49	-12.85*
	(-1.99)	(-1.45)	(0.82)	(-2.11)

Observations	920	928	932	940
F	16.21	15.79	13.92	17.08
Hansen test	0.518	0.911	0.517	0.753
(P-value)				
Anderson CCLR	2.13e-16	4.70e-61	4.85e-11	0
(P-value)				
Anderson Rubn	4.99e-17	4.67e-71	2.62e-11	0
(P-value)				
Excluded	IICRG	IICRG	IICRG	IICRG
instruments	FT	FT	FT	FT

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7A: IV model, dependent variable; industrial value added growth rate

	(1)	(2)	(3)	(4)
	ivag	ivag	ivag	ivag
L.lnivac	-0.744*	0.0993	0.0152	0.00415
	(-2.12)	(0.59)	(0.09)	(0.03)
lninv	6.770***	6.182***	4.621***	5.890***
	(6.78)	(6.45)	(4.10)	(6.40)
lnh	-0.0723	-0.852	-1.530*	-0.890
	(-0.14)	(-1.48)	(-1.97)	(-1.50)
lnp	-1.490	3.628	3.548	2.952
	(-0.45)	(1.61)	(1.36)	(1.31)
_Iregion_3	3.928**	1.790*	-0.249	2.352**
	(3.17)	(2.10)	(-0.16)	(2.84)
_Iregion_4	2.145	0.672	0.111	0.396
	(1.73)	(0.78)	(0.13)	(0.52)
_Iregion_5	2.420	1.344	-1.105	1.018
	(1.83)	(1.29)	(-0.81)	(1.14)
ES	3.367*			
	(2.02)			
MS		1.868*		
		(2.06)		
FD			1.904*	
			(2.19)	

FT				0.372
				(1.87)
_cons	-5.855	-5.282	4.987	-6.068
	(-0.84)	(-0.80)	(0.60)	(-0.96)
N	920	928	932	940
F	13.94	13.71	11.99	14.49
Hansen test	0.531	0.598	0.393	0.217
(P-value)				
Anderson	7.97e-18	1.14e-58	6.06e-20	0
CCLR				
(P-value)				
Anderso	1.41e-18	7.37e-68	6.92e-21	0
Rubn				
(P -value)				
Excluded	IICRG	IICRG	IICRG	IICRG
instruments	FT	FT	FT	FT

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Chapter five

Table 1: The distribution of firm according to their legal status and economic activity

	LEGAL STATUS								
Sector	Cooperative (tadhamun)	Limited partnership (Tawsyia baseeta)	Mixed company (mushtarika)	Shareholding company (musahama)	Holding company (qabidha)	Sole proprietorship (fardyia)	Partnership company (ta'awunyia)	Other	Total
Food processing	37	12	1	2	0	22	0	5	79
Textiles	19	12	3	0	0	28	0	2	64
Garments	21	4	4	0	0	19	1	4	53
Chemicals	12	7	0	1	0	14	0	2	36
Plastics & rubber	4	3	3	3	0	4	0	0	17
Non metallic mineral	4	0	0	0	0	5	0	2	11
Basic metals	3	1	0	2	0	0	0	0	6
Fabricate metal product	2	1	0	0	0	2	0	0	5
Electronics (31 & 32)	1	0	0	0	0	6	0	1	8
Machinery and equipment	6	2	2	1	0	6	0	2	19
Other manufacturing	18	5	1	1	1	21	0	4	51
Construction	3	2	2	0	0	3	0	1	11
Wholesale	12	7	1	1	0	13	0	3	37
Retail	3	3	0	0	0	4	0	0	10
Other services	15	9	7	2	0	25	1	13	72
IT	3	0	0	1	0	2	0	2	8
Tourism	6	2	0	0	1	11	0	1	21
Total	169	70	24	14	2	185	2	42	508

Table 2: The distribution of firm according to their legal status and size

	SAMPLING SIZE			
Legal status	small	medium	large	Total
Cooperative (tadhamun)	52	65	52	169
Tawsyia baseeta	18	34	18	70
Mixed company (mushtarika)	10	8	5	23
Shareholding company (musahama)	1	5	8	14
Holding company (qabidha)	2	0	0	2
Sole proprietorship (fardyia)	85	75	25	185
Partnership company (ta'awunyia)	1	0	1	2
Other	15	15	12	42
Total	184	202	121	507

Table 3: The distribution of firm according to their size and economic activity

SAMPLING SIZE				
Sector	small	medium	large	Total
Food processing	21	37	21	79
Textiles	14	29	21	64
Garments	12	25	16	53
Chemicals	9	12	15	36
Plastics & rubber	1	8	7	16
Non metallic mineral	2	6	3	11
Basic metals	2	1	3	6
Fabricate metal product	2	1	2	5
Electronics (31 & 32)	5	1	2	8
Machinery and equipment	7	9	3	19
Other manufacturing	22	17	12	51
Construction	4	5	2	11
Wholesale	25	9	3	37
Retail	5	4	1	10
Other services	38	27	7	72
IT	3	3	2	8
Tourism	12	8	1	21
Total	184	202	121	507

Table 4: Deficiency in infrastructure

	OBSERVATION	AVERAGE HOURS	MIN	MAX	TOTAL LOST SALE%
Power outage	431	2.7	1	40	9.85
Insufficient water supply	49	12	1	48	7.28
Unavailable main phone line	101	13.34	0	99	3.88
Transport failures	164	6.70	0	99	8

Table 5: Time needed to gain access to main permits and government services

EXPERIENCE	NOT APPLICABLE	MEAN*	MIN	MAX	GIFT/PAYMENT % OF FIRMS
Mainline telephone connection	278	33.3	1	160	36.36 (156)
Electrical connection	293	15.9	1	60	28.46 (113)
Water connection	308	4.42	1	7	9.33 (32)
Construction permit	254	76.17	1	180	25.76 (93)
Import license	261	7.46	1	20	25.21 (92)
Operating license	282	38.7	2	90	25.20 (96)

( ) number of observation. *for 90% of observations report a delay to remove the outliers

Table 6: Time spent for different inspections with officials' requirements

	HOW MANY INSPECTIONS	AVERAGE DURATION OF MEETING (HOUR)	THE PROCESS ACCELERATED USING ANY INFORMAL MEANS?
Tax Inspectorate	3.75	1.84	70 (233)
Labour and Social Security	6.15	1.14	70 (271)
Fire and Building Safety	2.13	0.97	37.50 (12)
Sanitation/Epidemiology	8	1.23	53.49 (69)
Municipality	11.54	1	81.21 (242)
Municipal Police	14	1	86.60 (181)
Environmental	6.62	1.2	52.83 (84)

( ) number of observation

Table 7: Effect of ownership, export, competition on firm performance

	(1) sales	(2) sales	(3) sales	(4) sales	(5) sales	(6) sales
capital	0.215***	0.219***	0.210***	0.216***	0.214***	0.214***
	(4.36)	(4.64)	(4.20)	(4.29)	(4.21)	(4.20)
labour	0.760***	0.762***	0.752***	0.764***	0.752***	0.753***
	(10.53)	(10.97)	(10.28)	(10.53)	(10.21)	(10.26)
lnpop		0.0932	0.109	0.111	0.0940	0.0954
		(0.68)	(0.74)	(0.75)	(0.62)	(0.63)
lnage		-0.0837	-0.0163	-0.0186	-0.0941	-0.103
		(-0.28)	(-0.05)	(-0.06)	(-0.28)	(-0.31)
lnage2		0.00521	-0.00315	-0.00340	0.00716	0.00843
		(0.09)	(-0.05)	(-0.05)	(0.11)	(0.13)
compet3		0.506*			0.487	0.480
		(1.80)			(1.12)	(1.09)
export			0.0486		0.0441	0.0444
			(1.23)		(1.14)	(1.14)
foreign				-0.159		-0.0957
				(-0.54)		(-0.33)
_cons	11.13***	9.315***	9.503***	9.462***	9.355***	9.355***
	(14.50)	(4.03)	(3.91)	(3.89)	(3.82)	(3.82)
N	349	349	349	349	349	349
R^2	0.522	0.527	0.525	0.523	0.529	0.529

t statistics in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01. Dummy variables are included for location and industry

Table 8: Effect of ownership, export, competition, technology and investment climate on firm level performance

	(1) sales	(2) sales	(3) sales	(4) sales	(5) sales	(6) sales	(7) sales	(8) sales	(9) sales	(10) sales	(11) sales	(12) sales	(13) sales	(14) sales
capital	0.237***	0.190***	0.212***	0.204***	0.201***	0.212***	0.211***	0.214***	0.200***	0.213***	0.213***	0.212***	0.199***	0.211***
	(4.69)	(4.05)	(4.21)	(3.83)	(3.96)	(4.17)	(4.22)	(4.26)	(3.91)	(4.16)	(4.18)	(4.19)	(4.07)	(4.29)
labour	0.742***	0.663***	0.746***	0.774***	0.790***	0.749***	0.715***	0.685***	0.725***	0.752***	0.756***	0.767***	0.700***	0.703***
	(9.76)	(9.58)	(9.94)	(9.99)	(10.55)	(10.20)	(9.82)	(8.65)	(9.73)	(10.23)	(10.18)	(10.52)	(9.39)	(9.72)
generator	-0.453*													
	(-1.91)													
email		1.352***												
		(4.27)												
inspection			-0.0611											
			(-0.69)											
expclear				-0.200										
				(-1.21)										
impclear					-0.267**									
					(-2.44)									
assoc						0.870								
						(1.08)								
lnbribe							-0.338**							
							(-2.24)							

overdraft								0.736***						
								(2.82)						
credit									0.479***					
									(2.83)					
loan										0.0983				
										(0.35)				
product											-0.0591			
											(-0.23)			
experience												0.389*		
												(1.78)		
uni_workforce													0.874***	
													(2.64)	
train														0.649***
														(2.64)
_cons	12.30***	9.973***	10.04***	8.338***	9.227***	8.259***	10.36***	8.207***	8.948***	9.210***	9.384***	8.546***	8.916***	9.269***
	(6.11)	(4.13)	(3.85)	(2.89)	(3.19)	(3.05)	(4.12)	(3.28)	(3.70)	(3.72)	(3.82)	(3.42)	(3.57)	(3.86)
N	349	349	349	290	277	349	349	349	349	349	349	349	349	349
R^2	0.476	0.559	0.530	0.556	0.608	0.532	0.538	0.541	0.540	0.529	0.529	0.534	0.539	0.539

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dummy variables are included for location and industry. foreign compet3 export lnpop lnage lnage2 variables also included in regressions and their coefficients omitted for space limit.

Table 9: Effect of ownership, export, competition, technology and investment climate on firm performance

	(1) sales	(2) sales	(3) sales	(4) lnva08	(5) lnva08	(6) lnva08
capital	0.180***	0.184***	0.178***	0.165***	0.167***	0.163***
	(3.97)	(4.05)	(3.88)	(3.36)	(3.39)	(3.26)
labour	0.571***	0.574***	0.621***	0.543***	0.547***	0.592***
	(7.16)	(7.31)	(8.37)	(6.62)	(6.79)	(7.50)
foreign	-0.251	-0.257	-0.182	-0.483	-0.503	-0.430
	(-0.86)	(-0.89)	(-0.64)	(-1.57)	(-1.61)	(-1.35)
compet3	0.521	0.533	0.501	-0.179	-0.183	-0.173
	(1.21)	(1.25)	(1.18)	(-0.52)	(-0.53)	(-0.51)
export	0.0273	0.0232	0.0280	0.0339	0.0315	0.0356
	(0.71)	(0.60)	(0.73)	(0.79)	(0.73)	(0.83)
lnpop	0.133	0.121	0.0857	0.276	0.260	0.220
	(0.81)	(0.75)	(0.52)	(1.53)	(1.46)	(1.18)
lnage	-0.122	-0.0923	-0.114	-0.174	-0.151	-0.126
	(-0.35)	(-0.26)	(-0.33)	(-0.48)	(-0.41)	(-0.34)
lnage2	-0.000336	-0.00665	-0.00192	0.0250	0.0197	0.0173
	(-0.01)	(-0.10)	(-0.03)	(0.36)	(0.28)	(0.24)
generator	0.124	0.146	0.0884	0.302	0.317	0.279
	(0.54)	(0.63)	(0.38)	(0.99)	(1.05)	(0.91)
email	1.165***	1.239***	1.178***	0.546	0.616*	0.584
	(3.51)	(4.00)	(3.49)	(1.49)	(1.75)	(1.54)
inspection	0.0546	0.0519	0.0605	0.0167	0.0134	0.0302
	(0.69)	(0.67)	(0.76)	(0.17)	(0.14)	(0.32)
assoc	0.342	0.236	0.596	0.0572	-0.0448	0.375
	(0.48)	(0.35)	(0.74)	(0.07)	(-0.06)	(0.44)
lnbribe	-0.341**	-0.300**	-0.401***	-0.335**	-0.303*	-0.407**
	(-2.30)	(-1.99)	(-2.71)	(-2.00)	(-1.67)	(-2.40)
overdraft	0.621**	0.568**		0.639**	0.611**	
	(2.44)	(2.16)		(2.12)	(2.01)	
product	-0.143	-0.191	-0.186	-0.155	-0.189	-0.197
	(-0.53)	(-0.71)	(-0.69)	(-0.49)	(-0.60)	(-0.63)

experience	0.346	0.383*	0.292	0.412	0.445*	0.339
	(1.56)	(1.71)	(1.29)	(1.60)	(1.77)	(1.28)
uni_workforce	0.407		0.425	0.329		0.334
	(1.21)		(1.23)	(0.87)		(0.86)
train		0.366			0.244	
		(1.39)			(0.74)	
loan			0.127			0.0608
			(0.44)			(0.21)
_cons	7.922***	8.164***	8.657***	6.393*	6.750**	7.181**
	(2.77)	(2.92)	(3.03)	(1.96)	(2.13)	(2.17)
N	349	349	349	310	310	310
R^2	0.584	0.585	0.577	0.483	0.483	0.475

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Dummy variables are included for location and industry.

Table 10: Effect of ownership, export, competition, technology and investment climate on firm performance (IV estimations)

	(1) sales	(2) sales	(3) sales	(4) sales	(5) sales	(6) sales	(7) sales	(8) sales	(9) sales	(10) sales	(11) sales
labour	0.460***	0.613***	0.464***	0.481***	0.416***	0.439***	0.518***	0.401***	0.469***	0.542***	0.503***
	(3.80)	(4.61)	(3.82)	(3.87)	(3.56)	(3.95)	(4.43)	(3.28)	(3.80)	(4.32)	(5.21)
capital	0.498***	0.538***	0.506***	0.507***	0.481***	0.400***	0.424***	0.444***	0.520***	0.547***	0.243***
	(4.35)	(4.63)	(4.32)	(4.32)	(4.42)	(3.65)	(3.96)	(3.63)	(4.17)	(4.66)	(3.56)
foreign	3.057***	2.480**	3.036***	2.668**	2.350**	1.360	2.504***	3.729***	2.997***	3.191***	1.855**
	(2.73)	(2.17)	(2.71)	(2.30)	(2.11)	(1.18)	(2.64)	(2.91)	(2.64)	(2.81)	(2.31)
compet3	0.815**	0.706**	0.801**	0.748**	0.830***	0.710**	0.595*	0.500	0.845**	0.823**	0.357
	(2.48)	(2.12)	(2.42)	(2.22)	(2.66)	(2.34)	(1.90)	(1.53)	(2.50)	(2.47)	(1.21)
generator		-1.41***									0.271
		(-2.88)									(0.81)
inspection			0.0577								0.0281
			(0.36)								(0.27)
assoc				-3.146**							-1.005
				(-2.21)							(-1.07)
email					0.782*						0.595*
					(1.79)						(1.74)
uni_workforce						1.797***					0.789*

					(3.05)						(1.94)
experience						0.100					0.141
						(0.27)					(0.58)
overdraft							1.411***				1.058***
							(2.82)				(3.37)
lnbribe								0.168			-0.443**
								(0.48)			(-2.36)
product										-0.852***	-0.469
										(-3.18)	(-1.64)
_cons	6.619***	6.543***	6.370***	9.484***	6.455***	7.028***	7.644***	7.641***	5.961***	5.912***	10.99***
	(3.85)	(3.78)	(3.43)	(4.34)	(3.95)	(4.44)	(3.81)	(4.26)	(2.70)	(3.36)	(7.16)
N	349	349	349	349	349	349	275	341	349	349	341
R^2	0.337	0.328	0.335	0.305	0.404	0.441	0.424	0.355	0.325	0.316	0.504
F	52.17	42.65	41.52	40.62	46.03	50.25	38.73	43.61	40.88	42.28	25.39
jp	0.351	0.782	0.310	0.641	0.328	0.565	0.144	0.701	0.335	0.884	0.389
Idp	0.00624	0.00566	0.00435	0.00468	0.0104	0.0594	0.00662	0.0457	0.0169	0.00470	0.9998
Endog	0.0022	0.0002	0.0051	0.0001	0.0271	0.0290	0.0404	0.0055	0.0027	0.0003	0.0612
Ivhettest	0.4401	0.1393	0.4323	0.4825	0.6457	0.1744	0.4039	0.7581	0.5143	0.3912	0.9641

JP is the P-value of Hansen test for overidentification. Idp is the P-value of weak instrument test. Endog is P-value of endogeneity test. Ivhettest is P-value for hetroscdasticity test.

Table 11: Effect of ownership, export, competition, technology, and investment climate on firm growth

	(1) SGD	(2) SGD	(3) LG	(4) LG	(5) VAG	(6) VAG
sales07	-0.111***	-0.104***			-0.0482	-0.0400
	(-3.93)	(-3.77)			(-1.51)	(-1.30)
lnl07			-0.112***	-0.0958***	-0.0197	-0.0172
			(-5.08)	(-4.67)	(-0.42)	(-0.36)
foreign	0.0875	0.0768	0.00624	0.0222	-0.136	-0.130
	(0.40)	(0.35)	(0.05)	(0.16)	(-0.71)	(-0.68)
compet3	0.443	0.438	0.190**	0.198**	0.204	0.203
	(1.00)	(0.99)	(2.36)	(2.50)	(1.28)	(1.31)
export	-0.0104	-0.0130	0.00788	0.00748	-0.00743	-0.00854
	(-0.50)	(-0.62)	(0.75)	(0.70)	(-0.35)	(-0.39)
lnpop	-0.0582	-0.0511	-0.0291	-0.0418	0.0635	0.0481
	(-0.69)	(-0.64)	(-0.72)	(-0.99)	(0.66)	(0.49)
lnage	-0.0990**	-0.0976**	-0.0656***	-0.0639***	-0.128**	-0.126**
	(-2.54)	(-2.52)	(-2.90)	(-2.80)	(-2.59)	(-2.55)
generator	0.0910	0.0881	-0.0142	-0.0344	0.128	0.126
	(0.83)	(0.81)	(-0.21)	(-0.50)	(0.96)	(0.96)
email	0.352	0.356	0.217***	0.232***	0.114	0.116
	(1.38)	(1.40)	(2.67)	(2.67)	(0.72)	(0.71)
overdraft	0.140		0.213***		0.150	
	(1.22)		(3.04)		(1.22)	
product	0.399**	0.391**	0.240***	0.237***	0.231*	0.234*
	(2.47)	(2.41)	(2.97)	(2.87)	(1.66)	(1.67)
lnbribe	-0.00662**	-0.00698**	-0.00253**	-0.00252**	-0.00643	-0.00657
	(-2.39)	(-2.51)	(-1.99)	(-2.00)	(-1.29)	(-1.33)
inspection	-0.0579	-0.0611	-0.0184	-0.0200	-0.0199	-0.0185
	(-1.43)	(-1.53)	(-0.75)	(-0.80)	(-0.48)	(-0.43)
assoc	0.00833	-0.0389	0.0199	0.0679	-0.154	-0.122
	(0.03)	(-0.15)	(0.14)	(0.49)	(-0.44)	(-0.34)
experience	-0.000717	-0.0197	-0.00945	-0.0317	0.259**	0.243*
	(-0.01)	(-0.18)	(-0.22)	(-0.72)	(2.03)	(1.93)
loan		0.280**		0.0938		0.116
		(2.02)		(1.38)		(0.57)
_cons	2.723**	2.625**	0.849	1.036	-0.315	-0.197
	(2.00)	(2.03)	(1.20)	(1.40)	(-0.19)	(-0.12)
N	339	339	341	341	297	297
R^2	0.165	0.170	0.239	0.218	0.117	0.115

SGD: sales growth. LG: labour growth. VAG: value added growth.

Appendices

Chapter two

Appendix 1: Econometric studies of the effect of corruption on economic growth

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Appendix 2: Variable definitions

Variable name	**Definition**
size effect	t-value of the coefficient
authors	Dummy, if all authors from academia=1.
panel	Dummy, if the model use cross section=1.
endo	Dummy, if the model control for endogenity=1.
fixed	Dummy, if the regression account for fixed effects or country dummy=1.
pubtype	Dummy, if the study published on journal=1.
wb	Dummy, if corruption measured by one of world bank corruption measure s=1.
icrg	Dummy, if corruption measured by International Country Risk Guide measure of corruption =1.
ticpi	Dummy, if corruption measured by Transparency international measure=1.
comb	Dummy, if corruption measured by different organizations, or combined of (WB, ICRG, TI) =1.
other	Dummy, if corruption measured by the authors' measure=1.
ctc.	Dummy, if corruption measured by Control to Corruption measure=1.
cpc	Dummy, if model uses corruption measure constructed by principal components=1
trade	Dummy, if the study contains trade or openness variable=1.
instit	Dummy, if the study contains institutional variable=1.
human	Dummy, if the study contains human capital or population variable=1.
invest	Dummy, if the study contains investment variable=1.
political	Dummy, if the study contains political or democracy variable=1.
gov	Dummy, if the study contains governmental intervention or public spending variable=1.
transit	Dummy, if the study contains transition countries=1.
lac	Dummy, if the study contains Latin American countries=1.
mena	Dummy, if the study contains Middle East and North Africa countries=1.
asia	Dummy, if the study contains Asian countries=1.
afr	Dummy, if the study contains African countries=1.
others	Dummy, if the study contains other countries not specified above=1.
size effect	t-value of the coefficient

Appendix 3: Descriptive statistics.

	Obs	Mean	Sd.	Min	Max	Freq	Percent
DF	460	101.37	173.06	0	1498	-	-
AUTHORS	460	0.82	0.38	0	1	378	82.00
COUNTRYREGION	460	0.07	0.26	0	1	36	7.74
PANEL	460	0.53	0.50	0	1	249	53.55
ENDO	460	0.33	0.47	0	1	151	32.47
FIXED	460	0.35	0.48	0	1	160	34.41
MID	460	9.54	6.21	0	20	-	-
PUBTYPE	460	0.50	0.50	0	1	228	49.03
WB	460	0.03	0.17	0	1	13	2.8
ICRG	460	0.28	0.45	0	1	130	27.96
TICPI	460	0.36	0.48	0	1	165	35.48
COMB	460	0.03	0.18	0	1	16	3.44
OTHER	460	0.20	0.40	0	1	94	20.22
CTC.	460	0.09	0.29	0	1	45	9.68
INCLUDED	460	0.03	0.17	0	1	14	3.01
TRADE	460	0.32	0.47	0	1	149	32.04
INSTIT	460	0.09	0.29	0	1	43	9.25
HUMAN	460	0.73	0.45	0	1	337	72.63
INVEST	460	0.33	0.47	0	1	155	33.33
POLITICAL	460	0.18	0.39	0	1	84	18.06
GOV	460	0.40	0.49	0	1	185	39.78
TRANSIT	460	0.86	0.34	0	1	401	86.24
LAC	460	0.93	0.26	0	1	430	92.47
MENA	460	0.86	0.34	0	1	401	86.24
ASIA	460	0.93	0.26	0	1	431	92.69
AFR	460	0.91	0.28	0	1	424	91.18
OTHERS	460	0.87	0.34	0	1	403	86.67
INITIAL CONDITION	460	0.78	0.41	0	1	361	77.63

Appendix 4: Quality of research impact (Citation of Scholar Google)

Table 3A: the effect of Quality of research on the relationship between growth and corruption

VARIABLES	(1) OLS	(2) bootstrap	(3) WLS	(4) MR	(5) WLS Specfic	(6) MR Specfic
cite	0.000114*	0.000114	0.000255***	0.000157***	0.000250***	0.000143***
	(6.81e-05)	(7.34e-05)	(5.88e-05)	(5.19e-05)	(5.61e-05)	(5.06e-05)
Typeof publication	0.0111	0.0111	-0.101**	-0.0370	-0.0996**	
	(0.0515)	(0.0538)	(0.0420)	(0.0403)	(0.0404)	
authors	0.160***	0.160***	0.203***	0.169***	0.195***	0.170***
	(0.0613)	(0.0497)	(0.0461)	(0.0462)	(0.0456)	(0.0397)
countryregion	-0.134	-0.134	-0.132	-0.0545		
	(0.156)	(0.147)	(0.0996)	(0.126)		
panel	-0.0634	-0.0634*	-0.0643**	-0.0623*	-0.0699**	-0.0538*
	(0.0481)	(0.0352)	(0.0320)	(0.0364)	(0.0326)	(0.0302)
endo	0.0531	0.0531*	0.0480	0.0574*	0.0530*	0.0622**
	(0.0421)	(0.0288)	(0.0304)	(0.0316)	(0.0298)	(0.0288)
fixed	-0.120**	-0.120	-0.328***	-0.233***	-0.325***	-0.227***
	(0.0502)	(0.0784)	(0.0429)	(0.0427)	(0.0429)	(0.0348)
mid	-0.00250	-0.00250	0.00470*	0.00276	0.00500*	0.00268
	(0.00305)	(0.00367)	(0.00253)	(0.00248)	(0.00255)	(0.00241)
wb	-0.0550	-0.0550	-0.0190	-0.0284		
	(0.253)	(0.201)	(0.192)	(0.194)		
icrg	-0.203	-0.203	-0.194	-0.213	-0.181**	-0.0757**
	(0.242)	(0.186)	(0.170)	(0.186)	(0.0876)	(0.0368)
ticpi	-0.276	-0.276	-0.250	-0.242	-0.233***	-0.103***
	(0.241)	(0.189)	(0.173)	(0.186)	(0.0889)	(0.0352)
comb	-0.313	-0.313*	-0.265	-0.299	-0.252**	-0.183**
	(0.257)	(0.188)	(0.175)	(0.198)	(0.110)	(0.0832)
other	-0.177	-0.177	-0.239	-0.163	-0.221**	
	(0.241)	(0.184)	(0.174)	(0.186)	(0.0993)	
ctc	0.00532	0.00532	-0.0865	-0.0994	-0.177	
	(0.282)	(0.232)	(0.195)	(0.220)	(0.108)	

included	-0.231*	-0.231**	-0.323***	-0.258***	-0.345***	-0.270***
	(0.126)	(0.111)	(0.100)	(0.0948)	(0.0922)	(0.0877)
initialcondition	-0.0602	-0.0602	-0.158***	-0.114**	-0.162***	-0.109**
	(0.0656)	(0.0603)	(0.0495)	(0.0503)	(0.0487)	(0.0456)
transit	0.0349	0.0349	-0.126*	-0.0335	-0.117*	
	(0.0820)	(0.0807)	(0.0645)	(0.0626)	(0.0611)	
lac	0.202	0.202	0.159	0.108		
	(0.370)	(0.228)	(0.196)	(0.327)		
mena	-0.296**	-0.296*	-0.357**	-0.293***	-0.357**	-0.272***
	(0.131)	(0.155)	(0.157)	(0.102)	(0.154)	(0.0990)
asia	0.290	0.290**	0.398***	0.330	0.545***	0.385***
	(0.352)	(0.121)	(0.126)	(0.312)	(0.168)	(0.102)
afr	0.0818	0.0818	0.216**	0.170*	0.226**	0.169*
	(0.120)	(0.116)	(0.101)	(0.0928)	(0.102)	(0.0870)
others	-0.177**	-0.177*	-0.195*	-0.169***	-0.185*	-0.160***
	(0.0694)	(0.106)	(0.0999)	(0.0600)	(0.0943)	(0.0573)
trade	0.131**	0.131***	0.195***	0.164***	0.195***	0.168***
	(0.0525)	(0.0458)	(0.0342)	(0.0394)	(0.0340)	(0.0368)
instit	0.229***	0.229***	0.246***	0.237***	0.267***	0.261***
	(0.0817)	(0.0602)	(0.0535)	(0.0616)	(0.0496)	(0.0552)
human	-0.0503	-0.0503	-0.0618*	-0.0537	-0.0537	-0.0555
	(0.0528)	(0.0348)	(0.0353)	(0.0403)	(0.0336)	(0.0389)
invest	0.0240	0.0240	-0.00476	-0.0107		-0.00862
	(0.0456)	(0.0561)	(0.0451)	(0.0363)		(0.0331)
political	-0.120*	-0.120*	-0.165***	-0.125**	-0.162***	-0.144***
	(0.0629)	(0.0720)	(0.0528)	(0.0486)	(0.0530)	(0.0453)
gov	-0.0530	-0.0530	-4.97e-05	-0.0190	-0.000455	-0.0215
	(0.0503)	(0.0530)	(0.0410)	(0.0389)	(0.0388)	(0.0366)
Constant	-0.0801	-0.0801	-0.0165	-0.0632	-0.0480	-0.235***
	(0.270)	(0.217)	(0.206)	(0.207)	(0.143)	(0.0831)
Observations	460	460	438	460	438	460
R-squared	0.190	0.190	0.478		0.476	

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Cite is the number of citation of the paper on Google Scholar at 2007.

Table 4A: the effect of Quality of research on the relationship between growth and corruption

VARIABLES	(1) OLS	(2) bootstrap	(3) WLS	(4) MR	(5) OLS	(6) bootstrap	(7) WLS	(8) MR	(9) OLS	(10) bootstrap	(11) WLS	(12) MR
cite	5.97e-05	5.97e-05	6.84e-05	7.06e-05	2.71e-05	2.71e-05	0.000131*	3.63e-05	2.60e-05	2.60e-05	0.000109**	5.78e-05
	(5.75e-05)	(5.03e-05)	(6.11e-05)	(4.51e-05)	(5.96e-05)	(6.28e-05)	(6.92e-05)	(4.78e-05)	(5.83e-05)	(5.21e-05)	(5.22e-05)	(4.69e-05)
typeofpublication	-0.00456	-0.00456	-0.0890**	-0.0323								
	(0.0410)	(0.0367)	(0.0391)	(0.0327)								
authors	0.217***	0.217***	0.204***	0.206***								
	(0.0477)	(0.0328)	(0.0375)	(0.0373)								
countryregion	0.0510	0.0510	0.0460	0.0558								
	(0.0751)	(0.0541)	(0.0569)	(0.0590)								
panel	0.0203	0.0203	0.0559	0.0360								
	(0.0365)	(0.0314)	(0.0341)	(0.0289)								
endo	-0.00572	-0.00572	0.0328	0.0113								
	(0.0391)	(0.0290)	(0.0309)	(0.0307)								
fixed	-0.150***	-0.150***	-0.320***	-0.207***								
	(0.0381)	(0.0473)	(0.0496)	(0.0317)								
mid	-0.00127	-0.00127	0.00583*	0.00130								
	(0.00279)	(0.00284)	(0.00319)	(0.00222)								
wb					0.00769	0.00769	0.0366	0.0168				
					(0.259)	(0.193)	(0.185)	(0.210)				
icrg					-0.258	-0.258	-0.311*	-0.308				
					(0.244)	(0.178)	(0.161)	(0.198)				
ticpi					-0.313	-0.313*	-0.376**	-0.329*				
					(0.243)	(0.173)	(0.161)	(0.197)				
comb					-0.557**	-0.557***	-0.611***	-0.572***				
					(0.256)	(0.174)	(0.162)	(0.208)				
other					-0.230	-0.230	-0.491***	-0.256				
					(0.244)	(0.178)	(0.182)	(0.198)				
ctc					-0.0631	-0.0631	-0.105	-0.0934				
					(0.247)	(0.175)	(0.163)	(0.200)				
included					-0.0468	-0.0468	0.0219	-0.0205				
					(0.0981)	(0.0884)	(0.102)	(0.0774)				
initialcondition									-0.0533	-0.0533	-0.0497	-0.0361

									(0.0503)	(0.0390)	(0.0382)	(0.0404)
transit									0.0349	0.0349	0.0350	0.0231
									(0.0617)	(0.0494)	(0.0531)	(0.0484)
lac									0.310	0.310	0.444**	0.289
									(0.367)	(0.211)	(0.213)	(0.337)
mena									-0.264**	-0.264*	-0.370**	-0.260**
									(0.129)	(0.150)	(0.156)	(0.106)
asia									0.170	0.170	0.142	0.171
									(0.357)	(0.108)	(0.105)	(0.327)
afr									0.0234	0.0234	0.0779	0.0402
									(0.117)	(0.103)	(0.0968)	(0.0935)
others									-0.183***	-0.183*	-0.249**	-0.185***
									(0.0670)	(0.110)	(0.101)	(0.0623)
trade									0.157***	0.157***	0.272***	0.182***
									(0.0446)	(0.0380)	(0.0424)	(0.0355)
instit									0.176***	0.176***	0.223***	0.172***
									(0.0610)	(0.0659)	(0.0625)	(0.0494)
human									-0.0704	-0.0704*	-0.161***	-0.103***
									(0.0484)	(0.0362)	(0.0383)	(0.0391)
invest									-0.00911	-0.00911	-0.0104	-0.0304
									(0.0420)	(0.0478)	(0.0425)	(0.0348)
political									0.0134	0.0134	-0.0957	-0.00465
									(0.0528)	(0.0585)	(0.0597)	(0.0427)
gov									-0.153***	-0.153***	-0.177***	-0.150***
									(0.0413)	(0.0402)	(0.0353)	(0.0334)
Constant	-0.270***	-0.270***	-0.311***	-0.289***	0.113	0.113	0.135	0.121	-0.166	-0.166	-0.163	-0.159*
	(0.0595)	(0.0369)	(0.0433)	(0.0461)	(0.242)	(0.172)	(0.160)	(0.196)	(0.112)	(0.103)	(0.101)	(0.0909)
Observations	460	460	438	460	460	460	438	460	460	460	438	460
R-squared	0.073	0.073	0.268		0.082	0.082	0.154		0.116	0.116	0.309	

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Cite is the number of citation of the paper on Google Scholar at 2007.

Chapter three

Appendix 1: Correlation matrix.

	Log (n+ g+ δ)	Log Human Capital	Log Investment	Ethnic Fractionalization	Ethnic Polarization (α=0.8)	Ethnic Polarization (α=1.6)	Polarization (MRQ)	Ethno-linguistic-religious fractionalization
Log Human Capital	-0.0985							
Log Investment	-0.0906	0.2606						
Ethnic Fractionalization	0.0727	0.0057	-0.0982					
Ethnic Polarization(α=0.8)	-0.0140	0.0042	-0.0477	0.9771				
Ethnic Polarization(α=1.6)	-0.1021	-0.0179	0.0170	0.8629	0.9319			
Polarization (MRQ)	-0.0404	0.0096	-0.0302	0.9619	0.9962	0.9553		
Ethno-linguistic-religious fractionalization	-0.0292	0.0824	-0.0723	0.9174	0.9108	0.8301	0.9028	
Growth rate GPD per capita	-0.1110	0.1981	0.0059	-0.3788	-0.3657	-0.3710	-0.3605	-0.2457

Appendix 2: Variable definitions.

VARIABLE	DESCRIPTION, SOURCE
Asia	Dummy variable for transition countries in ASIA Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
Balkans	Dummy variable for countries are Albania, Bulgaria, Croatia, Macedonia, Moldova and Romania
Bank	Bank Sector Reform index, period average, EBRD Transition Reports
Batlitcs	Dummy variable for countries: Estonia, Latvia and Lithuania.
bmp	Black market premium, DDGT (97)
Bur	Dummy variable for countries Belarus, Ukraine and Russia.
cis	Dummy for CIS countries
Civil Liberties	Index of civil liberties, period average, Freedom House
Completion	Competition Policy index, period average, EBRD Transition Reports
Corruption	ICRG corruption index
Democracy	Democracy-autocracy index, period average, Polity IV
ebrd	Overall ebrd reform index, EBRD Transition Reports
enterprise	Enterprise reform index, period average, EBRD Transition Reports
ETH	Ethnic fractionalization index, restricted data
ethun	Ethnic fractionalization index, unrestricted data
F	Ethno-linguistic-religious fractionalization (pca)
Fiscal	Fiscal surplus/GDP: period average of ratio of general government surplus (deficit) to GDP, period average, EBRD Transition Reports
FR	Ethno-linguistic-religious fractionalization (average)
Growth of per capita GDP	Growth rate of PPP-adjusted GDP. WEO (WDI), UNDP, CIA, PWT
GDP per capita	GDP per capita, PPP (constant 2005 international $) (NY.GDP.PCAP.PP.KD) WDI
Illiteracy	Adult illiteracy rate, data 2008, Human Development Reports, UNDP, data is due availability from1995 to 2005
Infant Mortality	Infant mortality rate (per 1,000 live births), period average. Transmonee database
Infrastructure	Index on infrastructure reform, EBRD Transition Reports
Investment	I/GDP, EBRD Transition Reports
latitude	The value of the latitude of the country, CIA 2000
Legal System	Dummy for legal system: civil law
Log GDP per capita	Logarithm of ppp-adjusted GDP per capita, period average, WEO (WDI), UNDP, CIA, PWT
ling	Linguistic Index
Ln (schooling)	Ln General upper secondary education (ISCED 3A) enrolments (gross enrolment ratio). Transmonee database
Financial depth	Financial depth: log of ratio of broad money to GDP, period average. EBRD Transition

logpop89	Logarithm of population of the country in 1989, in thousands,
Large-scale privatization	Large-scale privatization index, period average, EBRD Transition Reports
natural resources	natural resources Calculated as Fuel exports (% of merchandise exports) WDI,
Polarization (MRQ)	Polarization (MRQ) Index
Ethnic Polarization (α=0.8)	Ethnic Polarization (α=0.8) Index
EthnicPolarization (α=1.6)	Ethnic Polarization (α=1.6) Index
Phone	Telephones per capita, period average EBRD DATA & UN Statistical Yearbook
Price liberalization	Price liberalization index, period average, EBRD Transition Reports
School	Upper-secondary education (ISCED 3, all programmes) enrolments (gross enrolment ratio). Transmonee database
Small-scale privatization	Small-scale privatization index, EBRD Transition Reports
Trade and foreign exchange liberalization	Trade and foreign exchange liberalization index, period average, EBRD Transition Reports
Visegrad	Dummy variable for countries: Czech Republic, Hungary, Poland, Slovakia and Slovenia
Ln of Initial Income	Ln of real per capita GDP calculated at the beginning of each period, WDI & EBRD Transition Reports

Chapter four

Appendix 1: Sample countries

ALGERIA	DJIBOUTI	IRAN, ISLAMIC REP.	SRI LANKA
Argentina	Dominica	Jamaica	St. Kitts and Nevis
Belize	Dominican Republic	Jordan	St. Lucia
Bhutan	Ecuador	Malaysia	St. Vincent and the Grenadines
Bolivia	Egypt, Arab Rep.	Mauritius	Sudan
Botswana	El Salvador	Mexico	Suriname
Brazil	Fiji	Morocco	Swaziland
Cameroon	Gabon	Nicaragua	Syrian Arab Republic
Cape Verde	Grenada	Panama	Thailand
Chile	Guatemala	Paraguay	Tonga
China	Guyana	Peru	Tunisia
Colombia	Honduras	Philippines	Turkey
Congo, Rep.	India	Seychelles	Uruguay
Costa Rica	Indonesia	South Africa	Venezuela, RB

Chapter five

Appendix 1: definitions of the variables

Variable name	Definition
Capital	Log of the sum of net book value of capital stock of machinery and land and building.
Labour	Log of total labour (permanent + temporary) in 2008
Sales	Log of total sales in 2008
Sales07	Log of total sales in 2007
Lnl07	Log of total labour (permanent + temporary) in 2007
Lnpop	Log of population city
Lnva08	Log of value added in 2008
Lnage	Log of firm age
Lnage2	(Log of firm age) squared
Compet3	dummy equal 1 if number of competitors>=3
Export	log of (Direct exports as Last year percent of sales+1)
Foreign	dummy equal 1 if part of the capital is foreign-owned
Generator	dummy equal 1 if the firm has an electrical generator
Email	dummy equal 1 if the firm has access to email
Expclear	Log of the average number of days to clear exports in customs
Impclear	Log of the average number of days to clear imports in customs
Assoc	dummy equal 1 if the firm being member of a business association
Lnbribe	Log of percent of total annual sales paid as informal payment
Overdraft	dummy equal 1 if the firm has overdraft facility
Credit	dummy equal 1 if the firm has credit facility
Loan	dummy equal 1 if the firm has loan
Product	dummy equal 1 if the firm has developed or upgraded product line
Experience	Log of the number of the years of the firms' managers experience
Uni_workforce	dummy equal 1 if the firm has workforce with Some university or higher education
train	dummy equal 1 if the firm provides formal training for permanent workers