

Business Environment and Economic Growth: Further Empirical Results

Minh Quang Dao

Professor of Economics Eastern Illinois University 600 E. Lincoln Avenue Charleston, IL 61920 USA
Areas of specialisation: Public Finance and Economic Development

ABSTRACT

This paper examines the impact of the business environment on economic growth using several samples of both developed and developing countries. Based on data from the World Bank for the 2000-2015 period for a sample of 114 developed and developing economies, when using the Bank's Doing Business Indicators as proxies for business-friendly economic policies (also referred to as objective measures of business regulations, we find that the growth rate of GDP is dependent on a country's growth rate of arable land per capita, its share of gross capital formation in the GDP, its labor force growth rate, the growth rate of general government consumption, the growth rate of net exports, the number of procedures to build a warehouse, the time required to start a business, the time required to enforce contracts, the time required to resolve insolvency, and the cost of starting a business as a percent of per capita income. We observe that the coefficient estimates of three explanatory variables, namely, the time required to start a business, that required to resolve insolvency, and the number of procedures to build a warehouse, do not have their expected sign, possibly to the collinearity between these variables and the other two indicators, namely, the cost of starting a business as a percent of per capita income, and the time required to enforce contracts. On the other hand, when we use the World Bank's enterprise surveys as measures of the business environment from a sample of 91 developed and developing countries, we find that the growth rate of GDP is dependent on a country's labor force growth rate, its share of gross capital formation in the GDP, the growth rate of general government consumption, the growth rate of net exports, the percentage of senior management time spent dealing with the requirements of government regulations, the time required to obtain an operating license, the percentage of firms having a bribery incidence, losses due to theft, robbery, vandalism, and arson as a percent of sales, the percentage of firms competing against unregistered firms, the percentage of firms that have internationally recognized quality certification, and the percentage of firms that offer formal training. We observe that the coefficient estimates of three explanatory variables, namely, the time required to obtain an operating license, the percentage of firms having a bribery incidence, and the percentage of firms that have internationally recognized quality certification, do not have their expected sign. We suspect that this is also due to the collinearity between this variable and the other statistically significant enterprise survey indicators. Empirical results also show that the impact of the business environment also varies according to a country's level of economic development. Statistical results of such empirical examination will assist governments in both developed and developing countries focus on appropriate policies that recognize the importance of a good business environment in order to foster economic growth.

JEL Classifications: O12, O15, O40

Keywords: Doing Business Indicators, Enterprise Surveys, Per Capita GDP Growth, Business Environment

I. INTRODUCTION

This study empirically examines the impact of the business environment on economic growth. According to the *2013 World Development Report: Jobs*, while the key engine of job creation is the private sector, being responsible for 90 percent of all jobs in the developing economies, governments also play a

crucial role in ensuring that the conditions are present for robust private sector-led economic growth and in easing the constraints that prevent the private sector from creating good jobs for growth. The Report identifies the first stage in the approach to assist government meet these goals as policy fundamentals which include, among other things, macroeconomic stability and a business environment conducive to investment and hence to growth.

This paper attempts to estimate the impact of the business environment on economic growth. Based on data from the World Bank for the 2000-2015 period and a sample of 114 developed and developing countries, when using the Bank's Doing Business Indicators as proxies for business-friendly economic policies (also referred to as objective measures of business regulations, we find that the growth rate of GDP is dependent on a country's growth rate of arable land per capita, its share of gross capital formation in the GDP, its labor force growth rate, the growth rate of general government consumption, the growth rate of net exports, the number of procedures to build a warehouse, the time required to start a business, the time required to enforce contracts, the time required to resolve insolvency, and the cost of starting a business as a percent of per capita income. We observe that the coefficient estimates of three explanatory variables, namely, the time required to start a business, that required to resolve insolvency, and the number of procedures to build a warehouse, do not have their expected sign, possibly to the collinearity between these variables and the other two indicators, namely, the cost of starting a business as a percent of per capita income, and the time required to enforce contracts. On the other hand, when we use the World Bank's enterprise surveys as measures of the business environment and a sample of 91 developed and developing economies, we find that the growth rate of GDP is dependent on a country's labor force growth rate, its share of gross capital formation in the GDP, the growth rate of general government consumption, the growth rate of net exports, the percentage of senior management time spent dealing with the requirements of government regulations, the time required to obtain an operating license, the percentage of firms having a bribery incidence, losses due to theft, robbery, vandalism, and arson as a percent of sales, the percentage of firms competing against unregistered firms, the percentage of firms that have internationally recognized quality certification, and the percentage of firms that offer formal training. We observe that the coefficient estimates of three explanatory variables, namely, the time required to obtain an operating license, the percentage of firms having a bribery incidence, and the percentage of firms that have internationally recognized quality certification, do not have their expected sign. We suspect that this is also due to the collinearity between this variable and the other statistically significant enterprise survey indicators. Empirical results also indicate that the impact of the business environment also varies according to a country's level of economic development. Statistical results of such empirical examination will assist governments in both developed and developing countries focus on appropriate policies that recognize the importance of a good business environment in order to foster economic growth.

This paper is organized as follows. In the next section, a selected review of the economic literature on the effect of the business environment on economic growth is discussed. This is followed by the formulation of a neoclassical growth model based on the aggregate production function. We then specify a statistical model to be estimated. Theoretical underpinnings for the inclusion of explanatory variables are presented in this section. Empirical results are reported in the subsequent section. A final section gives concluding remarks as well as policy recommendations.

II. A SELECTED REVIEW OF THE LITERATURE

Much of the research on identifying the key determinants of economic growth recently points to differences in the business environment as an important supplementary contributing factor. Djankov, McLiesh, and Ramalho (2006) use objective measures of business regulations in 135 countries and find a positive relationship between better regulations as measured by the Doing Business indicator and economic growth. Gillanders and Whelan (2010) argue that the emphasis on the primacy of legal and political institutions may be misleading and argue that business-friendly economic policies as proxied by the World Bank's Doing Business indicator are the main factor contributing to cross-country differences in per capita income levels. They find that the Doing Business rank is dominant over a range of measures of legal and political institutional quality in terms of explaining variations in per capita income. They also find the rank to be statistically significant in explaining cross-country differences in economic growth while observing that the significant role of educational attainment as found by previous studies is not supported when the rank is included in their growth regressions. More recently, Dao (2013) examines the impact of both public policies and the business

environment on economic growth in developing countries. Using data from the World Bank for the 2000-2011 period and a sample of fifty-six developing economies he finds that the growth rate of per capita GDP is dependent on a country's economic management, its structural policies, its policies for social inclusion and equity, the number of procedures to build a warehouse, and the cost of starting a business as a percent of per capita income.

The current study is superior to that by Dao (2013) in that we specify a neoclassical growth model which incorporates the business environment and then formulate an empirical model to be estimated. This approach not only provides a more solid theoretical framework but also yields better empirical results that are not biased due to model misspecification. Empirical results are presented in a subsequent section. The final section gives concluding remarks as well as policy implications.

III. THE THEORETICAL MODEL

In deriving the GDP growth model, we shall make use of the rather traditional approach of the aggregate production function:

$$Y = f(K,L,N,G,X-M) \tag{1}$$

Where Y is income, K is physical capital, L is land, N is labor, G is government used as an input, and X-M is net exports.

Differentiating (1) above, one obtains:

$$dY = f_K dK + f_L dL + f_N dN + f_G dG + f_{X-M} d(X-M) \tag{2}$$

Dividing through by Y to express the change as growth rate and after some manipulation, one gets:

$$y = f_M(dK/Y) + \alpha_L l + \alpha_N n + \alpha_G g + \alpha_{X-M}(x-m) \tag{3}$$

where lower case variables indicate growth rates, and α_i is the elasticity of output with respect to input i. To incorporate the effect of the business environment on growth, one simply adds the business environment indicators to the model.

IV. THE STATISTICAL MODEL

Following Djankov, McLiesh, and Ramalho (2004) and Gillanders and Whelan (2010), we use the World Bank's Doing Business indicators as proxies for business-friendly economic policies (also referred to as objective measures of business regulations).

To estimate the impact of the business environment on economic growth we specify the following statistical model:

$$\begin{aligned}
 y = & \beta_0 + \beta_1 Landgrwth + \beta_2 I/Y2015 + \beta_3 l + \beta_4 g00-14 + \beta_5 nx00-14 + \beta_6 ProcBusStrt \\
 & (+) \quad (+) \quad (+) \quad (+) \quad (+) \quad (-) \\
 & + \beta_7 TimeBusSt + \beta_8 CostBusStrt + \beta_9 ProcRegProp + \beta_{10} TimeRegProp + \beta_{11} PrcWrehaus \\
 & (-) \quad (-) \quad (-) \quad (-) \quad (-) \quad (-) \\
 & + \beta_{12} TimeWreHaus + \beta_{13} TimeElect + \beta_{14} TimeCont + \beta_{15} DisclIndx + \beta_{16} TimeInsol + \epsilon \tag{4} \\
 & (-) \quad (-) \quad (-) \quad (+) \quad (-)
 \end{aligned}$$

where y = Average annual growth rate of GDP, 2000-15.

Landgrwth = Average annual growth rate of arable land per person (low to 6 (high), 2000-14.

I/Y2015 = Share of gross capital formation in the GDP, in 2015.

l = Labor force growth rate, 2005-14.

g00-14 = Annual growth rate of general government consumption, 2000-14.

nx00-14 = Annual growth rate of net exports, in 2000-14.

ProcBusStrt = Number of procedures to start a business, in 2016.

TimeBusSt = Time required to start a business, in days, in 2016.

CostBusStrt = Cost of starting a business as a percent of per capita income, in 2016.
ProcRegProp = Number of procedures to register a property, in 2016.
TimeRegProp = Time required to register a property, in days, in 2016.
PrcWrehaus = Number of procedures to build a warehouse, in 2016.
TimeWreHaus = Time required to build a warehouse, in days, in 2016.
TimeElect = Time required to get electricity, in days, in 2016.
TimeCont = Time required to enforce contracts, in days, in 2016.
TimeInsol = Time required to resolve insolvency, in years, in 2016.
DisclIndx = Disclosure index, from 0-10 (least to most disclosure), in 2016.
 ε = random error term, with mean 0 and uniform variance.

We use the 2000-2015 GDP growth rate at market prices based on constant local currency for y . We expect the coefficient estimates for all five input growth variables to have a positive sign. On the other hand, with the exception of the disclosure index variable, we expect the coefficient estimates for all other Doing Business indicators to have a negative sign.

To estimate the impact of the business environment on economic growth using the World Bank's enterprise surveys as measures of the business environment, we specify the following statistical model:

$$\begin{aligned}
 y = & \beta_0 + \beta_1 \text{Landgrwth} + \beta_2 \text{I/Y2015} + \beta_3 l + \beta_4 g00-14 + \beta_5 nx00-14 + \beta_6 \text{SemMgmt}\% \\
 & (+) \quad (+) \quad (+) \quad (+) \quad (+) \quad (-) \\
 & + \beta_7 \text{VisitsNum} + \beta_8 \text{TimeLic} + \beta_9 \text{Corrupt}\% + \beta_{10} \text{Crime}\% + \beta_{11} \text{Informal}\% \\
 & (-) \quad (-) \quad (-) \quad (-) \quad (-) \\
 & + \beta_{12} \text{FemMgr}\% + \beta_{13} \text{Banks}\% + \beta_{14} \text{Outage} + \beta_{15} \text{Quality}\% + \beta_{16} \text{TimeCustms} \\
 & (+) \quad (+) \quad (-) \quad (+) \quad (-) \\
 & + \beta_{17} \text{frmltrain} + \varepsilon \quad (5) \\
 & (+)
 \end{aligned}$$

where y = Average annual growth rate of GDP, 2000-15.

Landgrwth = Average annual growth rate of arable land per person (low to 6 (high), 2000-14.

I/Y2015 = Share of gross capital formation in the GDP, in 2015.

l = Labor force growth rate, 2005-14.

g00-14 = Annual growth rate of general government consumption, 2000-14.

nx00-14 = Annual growth rate of net exports, in 2000-14.

SemMgmt% = Percent of senior management time spent dealing with the requirements of government regulations, various years.

VisitsNum = Number of visits or required meetings with tax officials, various years.

TimeLic = Time required to obtain an operating license, various years.

Corrupt% = Percentage of firms having a bribery incidence, various years.

Crime% = Losses due to theft, robbery, vandalism, and arson as a percent of sales, various years.

Informal% = Percentage of firms competing against unregistered firms, various years.

FemMgr% = Percentage of firms with a female top manager, various years.

Banks% = Percentage of firms using banks to finance working capital, various years.

Outage = Value lost due to electrical outages as a percent of sales, in 2016.

Quality% = Percentage of firms that have internationally recognized quality certification, various years.

TimeCustms = Average time to clear exports through customs in days, various years.

frmltrain = Percentage of firms offering formal training, various years.

ε = random error term, with mean 0 and uniform variance.

We expect the following factors to exert a positive impact on economic growth: percentage of firms with a female top manager, that using banks to finance working capital, that possessing an internationally recognized quality certification, and that offering formal training. On the other hand, senior management

time dealing with the requirements of government regulations as well as the number of visits or required meetings with tax officials, time required to obtain an operating license and to clear exports through customs, and percentage of firms having a bribery incidence or having to compete against unregistered firms, along with percentage of sales lost due to theft, robbery, vandalism, and arson and due to electrical outages, all contribute negatively to economic growth.

Data for all variables are from the *2016 World Bank Indicators*.

V. EMPIRICAL RESULTS

Table 1 gives least-squares estimates of regression coefficients in equation (4) for a sample of 114 developed and developing countries¹. We observe that eight of the explanatory variables are statistically significant at the 10 percent or lower level and all but six coefficient estimates do have their anticipated sign. The goodness of fit of the model is quite good as indicated by the value of 0.553 of the adjusted coefficient of determination.

TABLE 1 – *Dependent Variable: GDP Growth Rate (All Countries)*

	<i>Coefficient Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	-2.7274	-2.5992
<i>Landgrwth</i>	0.1226	1.2746
<i>I/Y2015</i>	0.1232	5.4628***
<i>l</i>	0.5179	5.4768***
<i>g00-14</i>	0.1303	3.8925***
<i>nx00-14</i>	0.2205	3.9947***
<i>ProcBusStrt</i>	-0.0348	-0.4696
<i>TimeBusSt</i>	0.0135	1.3740*
		-
<i>CostBusStrt</i>	-0.0164	2.6140***
<i>ProcRegProp</i>	0.0724	0.8961
<i>TimeRegProp</i>	0.0001	0.0303
<i>PrcWrehaus</i>	0.1494	3.8742***
<i>TimeWreHaus</i>	0.0007	0.3423
<i>TimeElect</i>	-0.0005	-0.2191
<i>TimeCont</i>	-0.0011	-1.6956**
<i>DisclIndx</i>	0.0522	0.7450
<i>TimeInsol</i>	0.1970	1.2564

Adjusted $R^2 = 0.553$

*Significant at the 10 percent level.

**Significant at the 5 percent level.

***Significant at the 1 percent level.

All else equal, a one-percentage point increase in the share of gross capital formation in the GDP is expected to lead to a 0.12 percentage point increase in GDP growth. On the other hand, as the growth rate of the labor force increases by one percentage point, we expect the GDP growth rate to increase by 0.52 percentage points, *ceteris paribus*. A one-percentage point increase in the growth rate of general government consumption is expected to lead to an increase of 0.13 percentage point in GDP growth, other things being equal. As the growth rate of net exports increases by one percentage point we would expect GDP to grow another 0.22 percentage point, *ceteris paribus*. As the share of the cost of a business start in per capita income increases by one percentage point, it is expected that this will lead to a decrease of 0.02 percentage point in GDP growth, all else equal. A one day increase in the time required to enforce contracts is expected to result in a decline of 0.001 percentage point in GDP growth.

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 2. We note that the goodness of fit of the model to the data is improved as indicated by the higher value of 0.571 of the adjusted coefficient of determination.

We observe that all but two explanatory variables are statistically significant at the 5 percent or lower level, while the coefficient estimates of three of them do not have their expected sign. We also note that the growth rate of per capita arable land is now mildly significant at the 10 percent level and its coefficient estimate does have the expected positive sign. *Ceteris paribus*, as the growth rate of per capita arable land increases by one percentage point, we would expect a country's GDP growth rate to increase by 0.12 percentage point, while the results remain similar as far as the effect of all other four input growth rates is concerned. On the other hand, a one-percentage point increase in the share of the cost of starting a business in per capita income leads to an expected decrease of 0.017 percentage point in the GDP growth rate, all else equal.

TABLE 2 – Dependent Variable: GDP Growth Rate (Revised Model): All Countries

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	-2.102	-2.632
<i>Landgrwth</i>	0.121	1.318*
<i>I/Y2015</i>	0.119	5.491***
<i>l</i>	0.510	5.677***
<i>g00-14</i>	0.134	4.188***
<i>nx00-14</i>	0.215	4.173***
<i>TimeBusSt</i>	0.013	1.823**
<i>CostBusStrt</i>	-0.017	-3.037***
<i>PrcWrehaus</i>	0.150	4.328***
<i>TimeCont</i>	-0.001	-1.799**
<i>TimeInsol</i>	0.202	1.329*

Adjusted $R^2 = 0.571$

*Significant at the 10 percent level.

**Significant at the 5 percent level.

***Significant at the 1 percent level.

We suspect that due to the extent of the multicollinearity problem among explanatory variables, the coefficient estimates of three of them do not have their anticipated sign. We report this extent in table 3 in the form of a sample correlation coefficient matrix. We observe that the cost of starting a business as a percent of per capita GDP is linearly related to the time required to start a business, while both the number of procedures to build a warehouse and the time required to resolve insolvency are also linearly correlated with the time required to enforce contracts.

Table 4 gives least-squares estimates of regression coefficients in equation (4) for a sample of thirty-one upper-middle income countries². We observe that five of the explanatory variables are statistically significant at the 10 percent or lower level and all but six coefficient estimates do have their anticipated sign. The goodness of fit of the model is very good as indicated by the high value of 0.701 of the adjusted coefficient of determination

TABLE 3 – Sample Correlation Coefficient Matrix

	<i>Landgrwth</i>	<i>I/Y2015</i>	<i>l</i>	<i>g00-14</i>	<i>nx00-14</i>	<i>TimeBusSt</i>	<i>CostBusStrt</i>	<i>PrcWrehaus</i>	<i>TimeCont</i>	<i>TimeInsol</i>
<i>Landgrwth</i>	1									
<i>I/Y2015</i>	-0.192	1								
	-2.072									
<i>l</i>	-0.303	0.191	1							
	-3.360	2.054								
<i>g00-14</i>	-0.132	0.088	0.291	1						
	-1.404	0.936	3.217							
<i>nx00-14</i>	0.158	-0.248	-0.308	-0.205	1					
	1.690	-2.704	-3.424	-2.220						

<i>TimeBusSt</i>	0.006	0.016	0.057	0.293	-0.398	1			
	0.061	0.167	0.605	3.249	-4.589				
<i>CostBusStrt</i>	-0.021	-0.133	0.218	0.258	-0.174	0.473	1		
	-0.219	-1.423	2.368	2.825	-1.866	5.689			
<i>PrcWrehaus</i>	0.136	-0.022	-0.007	0.027	0.116	0.010	-0.021	1	
	1.458	-0.237	-0.079	0.290	1.239	0.105	-0.224		
<i>TimeCont</i>	-0.094	-0.208	0.063	-0.064	-0.004	0.034	0.006	0.214	1
	-1.004	-2.250	0.665	-0.677	-0.043	0.358	0.065	2.323	
<i>TimeInsol</i>	-0.110	-0.076	0.273	0.191	-0.233	0.347	0.360	0.234	0.204
	-1.171	-0.810	3.006	2.060	-2.533	3.913	4.085	2.546	2.209

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

For this group of countries, arable land per person and net exports growth rates are not statistically significant even though their coefficient estimates do have the anticipated positive sign. All else equal, a one percentage point increase in the share of gross capital formation in the GDP is expected to lead to a 0.12 percentage point increase in GDP growth while a one percentage point increase in labor force growth rate is expected to result in an increase of 0.56 percentage point in GDP growth. As the growth rate of general government consumption increases by one percentage point one would expect an increase of 0.21 percentage point in GDP growth, ceteris paribus. On the other hand, a one-day increase in the time required to register property is expected to lead to a decrease of 0.05 percentage point in GDP growth.

TABLE 4 – Dependent Variable: GDP Growth Rate (Upper-Middle Income Countries)

	<i>Coefficient Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	1.485	0.699
<i>Landgrwth</i>	0.091	0.499
<i>I/Y2015</i>	0.115	3.307***
<i>l</i>	0.562	1.713*
<i>g00-14</i>	0.206	2.742***
<i>nx00-14</i>	0.135	1.269
<i>TimeBusSt</i>	0.004	0.243
<i>CostBusStrt</i>	0.001	0.078
<i>PrcWrehaus</i>	0.023	0.234
<i>TimeCont</i>	-0.001	-0.643
<i>TimeInsol</i>	0.324	1.293
<i>DisclIndx</i>	-0.024	-0.198
<i>ProcRegProp</i>	-0.180	-1.455
<i>ProcBusStrt</i>	-0.110	-0.656
<i>TimeWreHaus</i>	0.008	1.912**
<i>TimeElect</i>	-0.001	-0.071
<i>TimeRegProp</i>	-0.052	-3.050***

Adjusted R² = 0.701

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 5. We note that the goodness of fit of the model to the data is improved as indicated by the higher value of 0.790 of the adjusted coefficient of determination.

We observe that all explanatory variables are statistically significant at the 5 percent or lower level, while the coefficient estimates of two of them do not have their expected sign. We also note that the growth rate of net exports is now strongly significant at the 1 percent level and its coefficient estimate does have the expected positive sign. Ceteris paribus, as the growth rate

TABLE 5 – Dependent Variable: GDP Growth Rate (Revised Model): Upper-Middle Income Countries

	Coefficient Estimates	t-Statistics
<i>Intercept</i>	0.815	0.794
<i>I/Y2015</i>	0.109	4.175***
<i>l</i>	0.482	2.410**
<i>g00-14</i>	0.215	3.705***
<i>nx00-14</i>	0.167	2.861***
<i>TimeInsol</i>	0.323	1.754**
<i>ProcRegProp</i>	-0.202	-2.142**
<i>TimeWreHaus</i>	0.009	3.517***
		-
<i>TimeRegProp</i>	-0.056	5.146***

Adjusted $R^2 = 0.790$

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

of this variable increases by one percentage point, we would expect a country's GDP growth rate to increase by 0.17 percentage point, while the results remain similar as far as the effect of all other three input growth rates is concerned. On the other hand, a one-procedure increase in registering a property leads to an expected decrease of 0.20percentage point in the GDP growth rate, all else equal. Similarly, as the time required to register a property increases by one day, one would expect GDP growth rate to decrease by 0.06 percentage point, ceteris paribus.

We suspect that due to the extent of the multicollinearity problem among explanatory variables, the coefficient estimates of two of them do not have their anticipated sign. We report this extent in table 6 in the form of a sample correlation coefficient matrix. We observe that the time required to build a warehouse is linearly related to the time required to register a property, while the time required to resolve insolvency is also linearly correlated with the number of procedures to register a property.

TABLE 6 – Sample Correlation Coefficient Matrix

	<i>I/Y2015</i>	<i>l</i>	<i>g00-14</i>	<i>nx00-14</i>	<i>TimeInsol</i>	<i>ProcRegProp</i>	<i>TimeWreHaus</i>	<i>TimeRegProp</i>
<i>I/Y2015</i>	1							
<i>l</i>	-0.024	1						
	-0.131		1					
<i>g00-14</i>	0.324	0.148	1					
	1.845	0.807		1				
		-			1			
<i>nx00-14</i>	-0.013	0.110	0.079	1				
		-				1		
<i>TimeInsol</i>	-0.068	0.598	0.425		1			
	-0.307	0.203	-0.195	-0.312		1		
	-1.739	1.114	-1.071	-1.768			1	

<i>ProcRegProp</i>	-0.052	0.170	-0.386	-0.355	0.317	1		
	-0.280	0.930	-2.252	-2.045	1.799			
<i>TimeWreHaus</i>	-0.050	0.031	0.025	-0.483	0.422	0.445	1	
	-0.268	0.168	0.137	-2.971	2.505	2.677		
<i>TimeRegProp</i>	0.125	0.322	-0.062	-0.410	0.387	0.410	0.454	1
	0.680	1.830	-0.335	-2.423	2.262	2.424	2.741	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

Table 7 gives least-squares estimates of regression coefficients in equation (4) for a sample of twenty-nine OECD countries³. We observe that four of the explanatory variables are statistically significant at the 10 percent or lower level and all but five coefficient estimates do have their anticipated sign. The goodness of fit of the model is very good as indicated by the high value of 0.690 of the adjusted coefficient of determination. Both the share of gross capital formation in the GDP and the growth rate of general government consumption exert a positive effect on economic growth, all else equal.

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 8. We note that the goodness of fit of the model to the data is improved as indicated by the higher value of 0.760 of the adjusted coefficient of determination.

TABLE 7 – Dependent Variable: GDP Growth Rate (OECD Countries)

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	-4.154	-1.924
<i>Landgrwth</i>	0.134	0.640
<i>l</i>	0.288	1.142
<i>g00-14</i>	0.638	3.225***
<i>TimeCont</i>	0.001	0.671
<i>DisclIndx</i>	0.037	0.328
<i>ProcBusStrt</i>	-0.035	-0.318
<i>TimeRegProp</i>	0.018	1.716*
<i>TimeInsol</i>	0.366	1.929**
<i>TimeWreHaus</i>	-0.003	-0.577
<i>PrcWrehaus</i>	0.013	0.217
<i>ProcRegProp</i>	-0.131	-1.212
<i>TimeBusSt</i>	0.023	0.941
<i>CostBusStrt</i>	-0.022	-0.448
<i>TimeElect</i>	0.003	0.648
<i>I/Y2015</i>	0.170	2.491***
<i>nx00-14</i>	0.141	1.402

Adjusted R² = 0.690

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

We observe that six of the explanatory variables are statistically significant at the 10 percent or lower level and all but four coefficient estimates do have their anticipated sign. We also point out that while three explanatory variables, namely, time required to enforce contracts, time required to build a warehouse, and time required to get electricity, are not statistically significant using t-tests, their exclusion from the model causes its explanatory power as measured by the adjusted coefficient of determination to decrease. We suspect that this result is due to the extent of multicollinearity which exists among the included explanatory variables.

TABLE 8 – Dependent Variable: GDP Growth Rate (Revised Model): OECD Countries

	Coefficient Estimates	t-Statistics
<i>Intercept</i>	-3.711	-2.980
<i>l</i>	0.197	0.964
<i>g00-14</i>	0.657	4.190***
<i>TimeCont</i>	0.001	1.217
<i>TimeRegProp</i>	0.024	2.923***
<i>TimeInsol</i>	0.356	2.479**
<i>TimeWreHaus</i>	-0.003	-1.223
<i>ProcRegProp</i>	-0.145	-1.769**
<i>TimeElect</i>	0.003	1.024
<i>I/Y2015</i>	0.158	3.126***
<i>nx00-14</i>	0.117	1.545*

Adjusted R² = 0.760

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

As the growth rate of general government consumption increases by one percentage point, it is expected that GDP growth rate would increase by 0.66 percentage point, all else remaining equal. A one-procedure increase in registering property is expected to lead to a 0.14 percentage point decrease in GDP growth rate, ceteris paribus. On the other hand as the share of gross capital formation in the GDP increases by one percentage point, one would expect GDP growth rate to increase by 0.16 percentage point, holding other variables constant. We report the extent of the multicollinearity problem in the form of a correlation coefficient matrix presented in Table 9. We observe that time required to enforce contracts is linearly associated with time required to build a warehouse, that the latter is linearly correlated with time required to get electricity, and that the number procedures for registering property is also highly correlated with the time required for doing so.

TABLE 9 – Sample Correlation Coefficient Matrix

	<i>l</i>	<i>g00-14</i>	<i>TimeElect</i>	<i>TimeRegProp</i>	<i>TimeInsol</i>	<i>TimeWreHaus</i>	<i>TimeCont</i>	<i>ProcRegProp</i>	<i>I/Y2015</i>	<i>nx00-14</i>
<i>l</i>	1									
<i>g00-14</i>	0.505	1								
	3.040									
<i>TimeElect</i>	-0.032	-0.047	1							
	-0.166	-0.247								
<i>TimeRegProp</i>	0.248	-0.081	-0.019	1						
	1.333	-0.421	-0.097							
<i>TimeInsol</i>	0.083	0.131	0.104	0.064	1					
	0.435	0.685	0.545	0.335						
<i>TimeWreHaus</i>	0.059	-0.087	0.457	0.283	0.192	1				
	0.308	-0.454	2.669	1.534	1.019					
<i>TimeCont</i>	-0.081	-0.263	0.109	0.346	0.272	0.428	1			
	-0.424	-1.415	0.572	1.917	1.469	2.460				
<i>ProcRegProp</i>	0.073	0.171	0.041	0.454	0.119	0.083	0.478	1		
	0.379	0.901	0.213	2.647	0.625	0.434	2.826			
<i>I/Y2015</i>	0.301	0.480	-0.031	-0.210	-0.221	0.000	-0.637	-0.358	1	
	1.643	2.843	-0.159	-1.116	-1.175	-0.002	-4.296	-1.989		

<i>nx00-14</i>	-0.507	-0.378	0.135	0.154	0.199	0.154	0.290	0.142	-0.432	1
	-3.056	-2.120	0.708	0.812	1.057	0.807	1.578	0.747	-2.490	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

Table 10 gives least-squares estimates of regression coefficients in equation (4) for a sample of twenty-five lower-middle income countries⁴. We observe that five of the explanatory variables are statistically significant at the 10 percent or lower level and all but seven coefficient estimates do have their anticipated sign. The goodness of fit of the model is reasonable good as indicated by the value of 0.466 of the adjusted coefficient of determination. While the share of gross capital formation in the GDP, labor force growth, and general government consumption growth are significant per capita arable land and net exports growth are not in influencing GDP growth. Whereas the cost of starting a business as a percent of per capita income and the number of procedures to build a warehouse are both significant, only the coefficient estimate of the former variable has the expected negative sign.

TABLE 10 – Dependent Variable: GDP Growth Rate (Lower-Middle Income Countries)

	<i>Coefficient Estimates</i>	<i>t- Statistics</i>
<i>Intercept</i>	-2.345	-0.566
<i>Landgrwth</i>	0.546	0.754
<i>I/Y2015</i>	0.111	1.420*
<i>l</i>	1.052	1.615*
<i>g00-14</i>	0.231	2.756**
<i>nx00-14</i>	0.043	0.318
<i>TimeBusSt</i>	-0.002	-0.044
<i>CostBusStrt</i>	-0.047	-2.537**
<i>ProcWarehaus</i>	0.127	2.507**
<i>TimeCont</i>	0.000	0.098
<i>TimeInsol</i>	0.151	0.465
<i>DisclIndx</i>	-0.021	-0.122
<i>ProcRegProp</i>	0.044	0.222
<i>ProcBusStrt</i>	-0.183	-0.918
<i>TimeWreHaus</i>	0.010	1.316
<i>TimeElect</i>	0.001	0.145
<i>TimeRegProp</i>	-0.006	-0.499

Adjusted R² = 0.466

*Significant at the 10 percent level

**Significant at the 5 percent level

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 11. We note that the goodness of fit of the model to the data is much improved as indicated by the much higher value of 0.696 of the adjusted coefficient of determination. We observe that all seven explanatory variables are statistically significant at the 5 percent or lower and that only two coefficient estimates do not have the anticipated negative sign, namely the number of procedures to build a warehouse and the time required to build a warehouse.

TABLE 11 – Dependent Variable: GDP Growth Rate (Revised Model): Lower-Middle Income Countries

	<i>Coefficient Estimates</i>	<i>t- Statistics</i>
<i>Intercept</i>	-0.185	-0.176
<i>I/Y2015</i>	0.063	2.706*

<i>l</i>	0.564	2.961**
<i>g00-14</i>	0.172	5.075**
<i>CostBusStrt</i>	-0.041	-3.971**
<i>ProcWarehaus</i>	0.130	4.161**
<i>TimeCont</i>	-0.001	-1.799*
<i>TimeWreHaus</i>	0.006	2.175*

Adjusted $R^2 = 0.466$

*Significant at the 5 percent level

**Significant at the 1 percent level

All else equal, as the share of gross capital formation in the GDP increases by one percentage point, one would expect GDP growth to increase by 0.06 percentage point. A one percentage point increase in labor force growth is expected to lead to a 0.56 percentage point increase in GDP growth, ceteris paribus. As the growth rate of general government consumption increases by one percentage point, one would expect that GDP growth would increase by 0.17 percentage point, all else equal. On the other hand, a one percentage point increase in the share of the cost of starting a business in per capita income is expected to lead to a decrease of 0.04 percentage point in GDP growth. As the time required to enforce contracts increases by a day, one would expect this to result in a decrease of 0.001 percentage point in GDP growth, ceteris paribus. We report a mild case of collinearity between the procedure to build a warehouse and labor force growth and between this latter variable and the time required to enforce contracts in the form of a sample correlation coefficient matrix presented in Table 12.

TABLE 12 – *Sample Correlation Coefficient Matrix*

	<i>I/Y2015</i>	<i>l</i>	<i>g00-14</i>	<i>CostBusStrt</i>	<i>PrcWrehaus</i>	<i>TimeCont</i>	<i>TimeWreHaus</i>
<i>I/Y2015</i>	1						
<i>l</i>	-0.177	1					
	-0.861						
<i>g00-14</i>	-0.106	0.191	1				
	-0.510	0.931					
<i>CostBusStrt</i>	0.150	0.486	0.099	1			
	0.727	2.670	0.476				
		-					
<i>PrcWrehaus</i>	-0.044	0.308	-0.053	-0.115	1		
		-					
	-0.212	1.554	-0.253	-0.556			
<i>TimeCont</i>	-0.312	0.214	-0.003	0.013	0.289	1	
	-1.576	1.052	-0.012	0.063	1.448		
<i>TimeWreHaus</i>	0.042	0.031	-0.102	0.244	0.156	0.034	1
	0.203	0.148	-0.494	1.207	0.756	0.165	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

Next, we re-estimate the model using the World Bank's enterprise surveys indicators as proxies for business-friendly economic policies. Table 13 gives least-squares estimates of regression coefficients in equation (5) for a sample of 91 developed and developing countries⁵. We also want to point out that there are no data available for these indicators for almost all OECD countries. The goodness of fit of the model to the data is reasonably good as indicated by the value of 0.430 of the adjusted coefficient of determination. All but one variables are statistically significant at the 10 percent or less level, while three coefficient estimates do not have their expected sign, namely, the time required to obtain an operating license, the percentage of firms having a bribery incidence, and the percentage of firms that have internationally recognized quality certification.

TABLE 13 – Dependent Variable: GDP Growth Rate (All Countries)

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	2.545	2.614
<i>l</i>	0.429	2.719***
<i>g00-14</i>	0.074	2.163**
<i>nx00-14</i>	0.235	4.294***
<i>I/Y2015</i>	0.099	5.274***
<i>SenMgmt%</i>	-0.032	-1.547*
<i>VisitsNum</i>	-0.052	-0.574
<i>TimeLic</i>	0.009	1.581*
<i>Corrupt%</i>	0.024	1.805**
<i>Crime%</i>	-0.441	-1.969**
<i>Informal%</i>	-0.028	-2.672***
<i>Quality%</i>	-0.038	-1.959**
<i>frml train</i>	0.026	2.218**

Adjusted R² = 0.430

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

Since the number of visits or required meetings with tax officials is not significant, we exclude it from the model and report the results in Table 14. The goodness of fit of the model is slightly improved as only one explanatory variable is removed from the model, as indicated by the slightly higher value of 0.435 of the adjusted coefficient of determination. Qualitatively speaking, the results have remained the same. A one-percentage point increase in labor force growth is expected to lead to an increase of 0.42 percentage point in GDP growth, all else equal. As general government consumption increases by 1 percentage point, one would expect GDP growth to increase by 0.07 percentage point, ceteris paribus. A one-percentage point increase in net exports growth is expected to result in a 0.24 percentage point in GDP growth and as the share of gross capital formation in the GDP increases by one percentage point, one would expect GDP growth to increase by 0.10 percentage point, other things being equal.

TABLE 14 – Dependent Variable: GDP Growth Rate (Revised Model): All Countries

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	2.546	2.626
<i>l</i>	0.422	2.696***
<i>g00-14</i>	0.074	2.169**
<i>nx00-14</i>	0.239	4.441***
<i>I/Y2015</i>	0.100	5.323***
<i>SenMgmt%</i>	-0.031	-1.517*
<i>TimeLic</i>	0.010	1.631*
<i>Corrupt%</i>	0.022	1.723**
<i>Crime%</i>	-0.445	-1.999**
<i>Informal%</i>	-0.029	-2.833***
<i>Quality%</i>	-0.039	-2.041**
<i>frml train</i>	0.026	2.264**

Adjusted R² = 0.435

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

A one percentage point increase in the time senior management spent dealing with the requirements of government regulations is expected to lead to a decrease of 0.03 percentage point in GDP growth, ceteris paribus. As the share of losses due to the theft, robbery, vandalism, and arson in sales increases by one percentage point, one would expect that this would result in a decrease of 0.45 percentage point in GDP growth, other things remaining constant. A one-percentage point increase in the number of firms competing with unregistered ones is expected to lead to a 0.03 percentage point decrease in GDP growth, while a one percentage point increase in the number of firms that offer formal training is expected to result in an increase of 0.03 percentage point increase in GDP growth, ceteris paribus.

We report the extent of the multicollinearity problem in the form of a correlation coefficient matrix presented in Table 15. We observe that the percent of senior management time spent dealing with the requirements of government regulations is linearly related to the time required to obtain an operating license and to the percentage of firms that offer formal training.

TABLE 15 – Sample Correlation Coefficient Matrix

	<i>l</i>	<i>g00-14</i>	<i>nx00-14</i>	<i>I/Y2015</i>	<i>SenMgmt%</i>	<i>TimeLic</i>	<i>Corrupt%</i>	<i>Crime%</i>	<i>Informal%</i>	<i>Quality%</i>	<i>frml train</i>
<i>l</i>	1										
<i>g00-14</i>	0.286	1									
	2.820										
<i>nx00-14</i>	-0.060	-0.115	1								
	-0.566	-1.091									
<i>I/Y2015</i>	-0.006	-0.011	-0.113	1							
	-0.057	-0.100	-1.070								
<i>SenMgmt%</i>	-0.033	-0.238	-0.145	0.107	1						
	-0.310	-2.312	-1.379	1.011							
<i>TimeLic</i>	-0.038	-0.186	-0.218	-0.124	0.291	1					
	-0.356	-1.782	-2.108	-1.178	2.873						
<i>Corrupt%</i>	0.343	0.193	-0.096	-0.052	-0.173	-0.143	1				
	3.447	1.857	-0.905	-0.493	-1.656	-1.359					
<i>Crime%</i>	0.380	0.009	-0.179	-0.120	0.044	-0.003	0.158	1			
	3.875	0.089	-1.716	-1.140	0.413	-0.031	1.511				
<i>Informal%</i>	0.447	0.090	0.007	-0.116	-0.050	0.160	0.195	0.335	1		
	4.721	0.853	0.069	-1.099	-0.476	1.532	1.872	3.357			
<i>Quality%</i>	-0.326	-0.264	0.017	-0.009	0.038	-0.016	-0.228	-0.122	-0.244	1	
	-3.252	-2.585	0.159	-0.085	0.359	-0.151	-2.209	-1.160	-2.374		
<i>frml train</i>	-0.109	-0.176	-0.308	0.005	0.213	0.210	-0.237	0.060	0.070	0.348	1
	-1.037	-1.691	-3.060	0.049	2.060	2.027	-2.298	0.565	0.658	3.504	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

The former is also linearly associated with the percentage of firms having a bribery incidence. And not surprisingly, there is a strong positive linear association between the percentage of firms having internationally recognized quality certification and that offering formal training.

Table 16 gives least-squares estimates of regression coefficients in equation (5) for a sample of 31 upper-middle income countries⁶. The goodness of fit of the model is very good as indicated by the very high value of 0.855 of the adjusted coefficient of determination. We observe that all but four explanatory variables are significant at the 10 percent or lower level

TABLE 16 – Dependent Variable: GDP Growth Rate (Upper-Middle Income Countries)

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	3.396	3.055
<i>l</i>	0.331	1.943**
<i>g00-14</i>	0.201	4.144***
<i>nx00-14</i>	0.285	4.178***
<i>I/Y2015</i>	0.159	5.429***
<i>SenMgmt%</i>	-0.060	-3.469***
<i>TimeLic</i>	0.037	5.038***
<i>Corrupt%</i>	-0.026	-1.182
<i>Crime%</i>	-0.111	-0.333
<i>Informal%</i>	-0.097	-5.824***
<i>Quality%</i>	-0.066	-2.830***
<i>frml train</i>	0.064	4.719***
<i>TimeCustms</i>	0.015	0.299
<i>Outage%</i>	-0.444	-4.243***
<i>Banks%</i>	0.024	1.470*
<i>VisitsNum</i>	0.104	1.098

Adjusted R² = 0.855

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

while four coefficient estimates do not have their expected sign.

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 17. We note that the goodness of fit of the model to the data is improved as indicated by the higher value of 0.871 of the adjusted coefficient of determination. We observe that all but one explanatory variables are statistically significant at the 10 percent or lower and that only three coefficient estimates do not have their expected sign. Even though the percentage of firms having a bribery incidence is not quite

TABLE 17 – Dependent Variable: GDP Growth Rate (Revised Model): Upper-Middle Income

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	3.229	3.360
<i>l</i>	0.339	2.133**
<i>g00-14</i>	0.207	4.830***
<i>nx00-14</i>	0.291	5.548***
<i>I/Y2015</i>	0.161	6.159***
<i>SenMgmt%</i>	-0.059	-3.655***
<i>TimeLic</i>	0.038	5.590***
<i>Corrupt%</i>	-0.026	-1.307
<i>Informal%</i>	-0.097	-6.769***
<i>Quality%</i>	-0.068	-3.186***
<i>frml train</i>	0.067	5.791***
<i>Outage%</i>	-0.443	-4.640***
<i>Banks%</i>	0.025	1.627*

Adjusted $R^2 = 0.871$

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

significant even at the 10 percent level, its removal from the model results in a decrease in the explanatory power of the model. We suspect that this result along with that that three coefficient estimates do not have their anticipated sign is probably due to the degree of multicollinearity that exists among some explanatory variables.

With the exception of per capita arable land growth, all other four input growth variables are strongly significant. All else equal, as labor force growth rate increases by one percentage point, one would expect GDP growth to increase by 0.34 percentage point. A one percentage point increase in general government consumption growth, net exports growth, and the share of gross capital formation in the GDP, is expected to lead to an increase of 0.21, 0.29, and 0.16 percentage point in GDP growth, respectively, ceteris paribus. As percentage of senior management time spent dealing with government regulations, percentage of firms having a bribery incidence, that competing with unregistered firms, and percentage of sales lost due to electrical outages increase by one percentage point, one would expect GDP growth to decrease by 0.06, 0.03, 0.10, and 0.44 percentage point, respectively, all else remaining the same. On the other hand, a one percentage point increase in percentage of firms offering formal training and in that using banks to finance working capital is expected to result in a 0.07 and a 0.02 percentage point increase in GDP growth, ceteris paribus.

We report the extent of the multicollinearity problem in the form of a correlation coefficient matrix presented in Table 18. We observe that the percent of senior management time spent dealing with the requirements of government regulations is linearly related to the time required to obtain an operating. We also note that the percentage of firms that have internationally recognized quality certification is linearly associated with that which offer formal training, whereas the percentage of firms that use banks to finance working capital is also linearly correlated with the number of visits or required meetings with tax officials.

TABLE 18 – Sample Correlation Coefficient Matrix

	<i>l</i>	<i>g00-14</i>	<i>nx00-14</i>	<i>I/Y2015</i>	<i>SenMgmt%</i>	<i>TimeLic</i>	<i>Informal%</i>	<i>Quality%</i>	<i>frml train</i>	<i>Outage%</i>	<i>Banks%</i>	<i>VisitsNum</i>
<i>l</i>	1											
<i>g00-14</i>	0.231	1										
	1.277											
<i>nx00-14</i>	-0.251	-0.003	1									
	-1.399	-0.018										
<i>I/Y2015</i>	-0.059	0.296	-0.059	1								
	-0.319	1.666	-0.316									
<i>SenMgmt%</i>	0.100	-0.102	-0.296	0.001	1							
	0.539	-0.550	-1.669	0.004								
<i>TimeLic</i>	0.174	-0.147	-0.223	-0.229	0.401	1						
	0.951	-0.798	-1.234	-1.266	2.356							
<i>Informal%</i>	0.139	-0.207	-0.083	-0.025	0.092	0.313	1					
	0.755	-1.142	-0.448	-0.134	0.500	1.775						
<i>Quality%</i>	-0.243	-0.236	0.029	0.194	0.004	0.041	-0.050	1				
	-1.351	-1.305	0.159	1.064	0.023	0.221	-0.268					
<i>frml train</i>	-0.027	-0.180	-0.353	-0.057	0.105	0.100	0.337	0.467	1			
	-0.143	-0.988	-2.033	-0.306	0.570	0.542	1.927	2.844				
<i>Outage%</i>	0.216	-0.049	-0.246	0.022	0.116	0.412	-0.006	-0.093	-0.076	1		
	1.193	-0.265	-1.368	0.121	0.626	2.437	-0.031	-0.501	-0.408			

<i>Banks%</i>	-0.030	-0.215	0.093	-0.483	0.256	0.427	0.386	-0.087	0.170	0.087	1	
	-0.161	-1.187	0.502	-2.967	1.427	2.545	2.253	-0.472	0.931	0.471		
<i>VisitsNum</i>	0.135	0.035	-0.242	0.090	-0.171	-0.145	0.201	0.061	-0.044	0.033	-0.354	1
	0.734	0.186	-1.344	0.488	-0.932	-0.791	1.103	0.329	-0.235	0.180	-2.035	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

Table 19 gives least-squares estimates of regression coefficients in equation (5) for a sample of 28 lower-middle income countries⁷. The goodness of fit of the model is quite good as indicated by the high value of 0.575 of the adjusted coefficient of determination. We observe that only five explanatory variables are significant at the 10 percent or lower level but also that only two coefficient estimates do not have their expected sign, namely, the percentage of senior management time spent dealing with government regulations and the percentage of firms that offer formal training.

TABLE 19 – *Dependent Variable: GDP Growth Rate (Lower-Middle Income Countries)*

	<i>Coefficient</i>	
	<i>Estimates</i>	<i>t-Statistics</i>
<i>Intercept</i>	3.241	2.160
<i>l</i>	0.471	1.991**
<i>g00-14</i>	0.182	3.523***
<i>nx00-14</i>	0.125	1.202
<i>I/Y2015</i>	0.048	2.227**
<i>SenMgmt%</i>	0.024	0.751
<i>TimeLic</i>	-0.002	-0.212
<i>Corrupt%</i>	0.010	0.510
<i>Crime%</i>	-0.522	-1.352*
<i>Informal%</i>	-0.028	-2.372**
<i>Quality%</i>	0.044	1.061
<i>frml train</i>	-0.021	-1.306
<i>Outage%</i>	-0.045	-1.011
<i>Banks%</i>	0.011	0.467

Adjusted $R^2 = 0.575$

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 20. We note that the goodness of fit of the model to the data is improved as indicated by the higher value of 0.640 of the adjusted coefficient of determination. We observe that while only five explanatory variables are statistically significant at the 10 percent or lower level, the removal of the other four variables results in a lower explanatory power of the model as measured by the adjusted coefficient of determination. We also note that only one coefficient estimate, namely that of the percentage of firms that offer formal training, has the unexpected negative sign. We suspect that these results are possibly due to the extent of multicollinearity that exists among some included explanatory variables. The share of gross capital formation in the GDP, labor force growth, and general government consumption growth are all significant and exert a positive impact on GDP growth.

TABLE 20 – Dependent Variable: GDP Growth Rate (Revised Model): Lower-Middle Income Countries

	Coefficient	
	Estimates	t-Statistics
<i>Intercept</i>	3.784	3.531
<i>l</i>	0.432	2.082**
<i>g00-14</i>	0.179	4.229***
<i>nx00-14</i>	0.091	1.227
<i>I/Y2015</i>	0.056	3.060***
<i>Crime%</i>	-0.512	-1.623*
<i>Informal%</i>	-0.029	-2.772***
<i>Quality%</i>	0.044	1.263
<i>frml train</i>	-0.018	-1.292
<i>Outage%</i>	-0.046	-1.235

Adjusted R² = 0.640

*Significant at the 10 percent level

**Significant at the 5 percent level

***Significant at the 1 percent level

All else equal, as labor force growth, general government consumption growth, and the share of gross capital formation in the GDP increase by one percentage point, one would expect GDP growth to increase by 0.43, 0.18, and 0.06 percentage point, respectively. On the other hand, as the percentage of sales lost due to theft, robbery, vandalism, and arson, as the percentage of firms competing with unregistered firms, and as the percentage of sales lost due to electrical outages, increase by one percentage point, GDP growth is expected to decrease by 0.51, 0.03, and 0.05 percentage point, respectively, holding everything else constant. Conversely, a one percentage point increase in the number of firms that have internationally recognized quality certification is expected to lead to an increase of 0.04 percentage point in GDP growth.

We report the extent of the multicollinearity problem in the form of a correlation coefficient matrix presented in Table 21. We observe that the percentage of firms that offer formal training is linearly related to both losses due to theft, robbery, vandalism, and arson as a percent of sales and the percentage of firms that have internationally recognized quality certification.

TABLE 21 – Sample Correlation Coefficient Matrix

	<i>l</i>	<i>g00-14</i>	<i>I/Y2015</i>	<i>nx00-14</i>	<i>Crime%</i>	<i>Informal%</i>	<i>Quality%</i>	<i>frml train</i>	<i>Outage%</i>
<i>l</i>	1								
<i>g00-14</i>	0.185	1							
	0.960								
<i>I/Y2015</i>	0.046	-0.066	1						
	0.234	-0.338							
<i>nx00-14</i>	0.012	0.157	-0.144	1					
	0.059	0.811	-0.741						
<i>Crime%</i>	0.338	0.087	0.015	0.081	1				
	1.831	0.445	0.078	0.414					
<i>Informal%</i>	0.309	-0.075	-0.135	-0.022	0.321	1			
	1.658	-0.385	-0.695	-0.114	1.726				
<i>Quality%</i>	-0.207	-0.302	-0.121	-0.294	-0.003	-0.027	1		
	-1.081	-1.616	-0.622	-1.566	-0.014	-0.136			
<i>frml train</i>	0.129	-0.206	0.056	-0.238	0.322	0.068	0.365	1	
	0.662	-1.074	0.284	-1.248	1.734	0.348	1.996		
<i>Outage%</i>	0.298	0.193	-0.206	0.082	0.294	0.002	0.357	0.058	1

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

V. CONCLUSION

In this paper we formulate a neoclassical growth model based on the aggregate production function which incorporates the contribution of the business environment and use an econometric model to examine the effect of this environment on economic growth using data from several samples of both developed and developing countries. From the statistical results we are able to draw the following conclusions:

- a. When we use the World Bank's Doing Business Indicators as proxies for business-friendly economic policies:
 1. Within the set of 114 developed and developing economies used in this study, the cost of starting a business as a percent of per capita income and the time required to enforce contracts both exert a negative impact on GDP growth. Governments in general need to have in place policies aimed at reducing the cost of starting a business, as well as at speeding up the time required to enforce contracts, in order to facilitate economic growth.
 2. For upper-middle income countries in particular, both the number of procedures and the time required to register property negatively affect GDP growth. It is thus crucial for governments in these countries to reduce both the number of procedures and the time required to register property in order to enhance GDP growth.
 3. For the group of lower-middle income economies, as in the case of all countries looked at as a whole, the cost of starting a business as a percent of per capita income and the time required to enforce contracts both exert a negative impact on GDP growth. Governments in these countries, then, need to have in place policies aimed at reducing the cost of starting a business, as well as at speeding up the time required to enforce contracts, in order to facilitate economic growth.
 4. For OECD countries in particular, the time required to build a warehouse and the number of procedures to register property adversely affect GDP growth. Governments in these countries need to have policies designed to speed up the time required to build a warehouse while reducing the number of procedures to register property.
- b. When the World Bank's Enterprise Survey Indicators are used as proxies for business-friendly economic policies:
 1. Within the set of 91 developed and developing economies used in this study, the percentage of senior management time spent dealing with government regulations, losses due to theft, robbery, vandalism, and arson as a percent of sales, the percentage of firms competing with unregistered firms all exert a negative impact on GDP growth. On the other hand, the percentage of firms that offer formal training positively contribute to economic growth. Governments in general need to have in place policies aimed at reducing regulations, property crimes, as well as the number of unregistered firms in order to facilitate economic growth.
 2. For upper-middle income countries in particular, the percentage of senior management time spent dealing with government regulations, the percentage of firms having a bribery incidence, the percentage of firms competing with unregistered firms, and percentage of sales lost due to electrical outages all negatively affect GDP growth. On the other hand, the percentage of firms that offer formal training and that use banks to finance their working capital both positively contribute to economic growth. It is thus crucial for governments in these countries to reduce government regulations, corruption, the number of unregistered firms, and electrical outages while at the same time encouraging more firms to offer formal training and use banks to finance their working capital in order to enhance GDP growth. In essence, it is necessary to limit the relative importance of the informal sector.
 3. For the group of lower-middle income economies, the percentage of firms competing with unregistered firms, losses due to theft, robbery, vandalism, and arson as a percent of sales, and percentage of sales lost due to electrical outages all negatively affect GDP growth. On the other hand, the percentage of firms that have internationally recognized quality certification positively contributes to economic growth. It is thus important for governments in these countries to reduce

the number of unregistered firms, property crimes, as well as electrical outages while at the same time encouraging more firms to obtain internationally recognized quality certification in order to promote further GDP growth.

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Notes

¹ The sample consists of the following countries: Albania, Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chile, China, Colombia, Republic of Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt Arab Republic, El Salvador, Estonia, Finland, France, Gabon, the Gambia, Georgia, Germany, Greece, Guatemala, Honduras, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Republic of Korea, Kyrgyz Republic, Latvia, Lebanon, Lesotho, Libya, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Senegal, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sudan, Swaziland, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, and Zimbabwe.

² The sample consists of the following countries: Albania, Algeria, Azerbaijan, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Gabon, Georgia, Jordan, Kazakhstan, Lebanon, Macedonia, Malaysia, Mauritius, Mexico, Mongolia, Namibia, Panama, Paraguay, Peru, Romania, South Africa, Thailand, Tunisia, Turkey, and Venezuela.

³ The sample consists of the following countries: Australia, Austria, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Republic of Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States.

⁴ The sample consists of the following countries: Armenia, Bolivia, Cameroon, Republic of Congo, Egypt Arab Republic, El Salvador, Guatemala, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Lesotho, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Philippines, Senegal, Sudan, Swaziland, Tajikistan, Ukraine, and Vietnam.

⁵ The sample consists of the following countries: Albania, Algeria, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Benin, Bhutan, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Republic, Chile, China, Colombia, Democratic Republic of Congo, Costa Rica, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt Arab Republic, El Salvador, Estonia, Gabon, the Gambia, Georgia, Guatemala, Honduras, Hungary, India, Indonesia, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Romania, Russian Federation, Rwanda, Senegal, Sierra Leone, Slovak Republic, Slovenia, South Africa, Sudan, Swaziland, Tajikistan, Tanzania, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela, Vietnam, and Zimbabwe. Since per capita arable land growth, percentage of firms with a female top manager, that using banks to finance working capital, the value lost due to electrical outages as a percent of sales, and the average time to clear exports through customs were found to be nonsignificant, they are excluded from the model. Results with their inclusion are available from the author upon request.

⁶ The sample consists of the following countries: Albania, Algeria, Azerbaijan, Belarus, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Gabon, Georgia, Jordan, Kazakhstan, Lebanon, Macedonia, Malaysia, Mauritius, Mexico, Mongolia, Namibia, Panama, Paraguay, Peru, Romania, South Africa, Tunisia, Turkey, and Venezuela. Since per capita arable land growth and the percentage of firms with a female top manager are not found to be significant, they are omitted from the model. Results with their inclusion are available from the author upon request.

⁷ The sample consists of the following countries: Armenia, Bangladesh, Bhutan, Bolivia, Cameroon, Egypt Arab Republic, El Salvador, Guatemala, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Lao PDR, Lesotho, Mauritania, Moldova, Morocco, Nicaragua, Nigeria, Pakistan, Philippines, Senegal, Sudan, Swaziland, Tajikistan, Ukraine, and Vietnam. Since per capita arable land growth, the number of visits or required meetings with tax officials, the average time to clear exports through customs, and the percentage of firms with a female top manager are not found to be significant, they are omitted from the model. Results with their inclusion are available from the author upon request.