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CREATING THE CONDITIONS FOR INTERNATIONAL BUSINESS EXPANSION: THE IMPACT OF REGULATION ON ECONOMIC GROWTH IN DEVELOPING COUNTRIES - A CROSS-COUNTRY ANALYSIS

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Abstract

The role of an effective regulatory regime in promoting economic growth and development and therefore international business has generated considerable interest among researchers and practitioners in recent years. In particular, building effective regulatory structures in developing countries is not simply an issue of the technical design of the most appropriate regulatory instruments, it is also concerned with the quality of supporting regulatory institutions and capacity. Many of the institutions that support markets are publicly provided and the effectiveness of these regulatory institutions can be expected to be an important determinant of how well markets function. This paper explores the role of regulation in affecting economic outcomes using an econometric model of the impact of regulatory governance. More precisely, it assesses through econometric modelling the impact of variations in the quality of regulatory governance on economic growth. Proxies for regulatory quality are included as determinants of economic growth. The results based on two different techniques of estimation suggest a strong causal link between regulatory quality and economic performance. The results confirm that "good" regulation is associated with higher economic growth, which in turn is conducive to the expansion of international business.

INTRODUCTION

The role of an effective regulatory regime in promoting economic growth and development has generated considerable interest among researchers and practitioners in recent years. State regulation is the means by which the state attempts to affect private sector behaviour; but the particular meaning attached to regulation and its translation into public policy has shifted over time, as a result of theoretical reasoning, new evidence and changes in political ideology (Hood, 1994). This evolving "force of ideas" is particularly evident in the changing focus of regulatory policy in developing countries. Economic regulation by government is associated with righting "market failures", including ameliorating the adverse distributional effects of private enterprise. From the 1960s to the 1980s, market failure was used to legitimise direct government involvement in productive activities in developing countries, by promoting industrialisation through import substitution, investing directly in industry and agriculture, and by extending public ownership of enterprises. However, following the apparent success of market liberalisation programmes in developed countries, and the evidence of the failure of

state-led economic planning in developing ones (World Bank, 1995), the role of state regulation was redefined and narrowed to that of ensuring a "level playing field" and an "undistorted" policy environment in which markets could operate. Deregulation was widely adopted, often as part of structural adjustment programmes, with the aim of reducing the "regulatory burden" on the market economy. At the same time, however, the wave of infrastructure privatisation that spread throughout the developing world in the 1990s - 121 developing countries introduced private investment in infrastructure schemes in the public utilities during that decade (Gray, 2001: 2) – has led to the creation of new regulatory bodies.

Privatisation and the more general process of economic liberalisation in developing countries have produced their own problems and failures. While economic assessments of the effects of privatisation on economic welfare in developing countries have generally been positive (Cook and Kirkpatrick, 2003), evidence of political mismanagement and corruption, together with perceptions of negative effects on employment, income distribution and the poor, have led to growing criticism of privatisation (Birdsall and Nellis, 2002; Chong and Lopez-de-Silanes, 2002). General dissatisfaction with the experience of privatisation has focused the attention of policymakers on the need for an effective regulatory framework, particularly in the utilities infrastructure field, where natural monopoly conditions can often prevent the emergence of competitive markets (Parker, 2002).

The results of some economic liberalisation programmes in developing countries have also been disappointing, with economic performance at the macro and sectoral levels failing to show a significant and sustained improvement, as compared to the pre-reform period. In seeking to explain the "failure" of structural adjustment and economic liberalisation in the developing world, analysts have sought to show that weaknesses in public policy have contributed significantly to the limited impact of the reforms (Burnside and Dollar, 1997; de Castro et al., 2002).

Since the 1960s, therefore, regulation policy in developing countries has shifted from the model of a positive or interventionist state, to a de-regulation, state-reduction model, to the current focus on the regulatory state (Majone, 1994, 1997). The regulatory state model implies leaving production to the private sector where competitive markets work well and using government regulation where significant market failure exists (World Bank, 2001: 1). Arguably, however, the performance of the new regulatory state remains under researched,

especially in the context of developing countries with their own peculiar economic and social problems and institutional characteristics. Building effective regulatory structures in developing countries is not simply an issue of the technical design of the regulatory instruments, it is also concerned with the quality of supporting regulatory institutions and capacity (World Bank, 2002: 152). Many of the institutions that support markets are publicly provided, and the effectiveness of these regulatory institutions will be an important determinant of how well markets function. The quality of regulatory governance will affect regulatory outcomes, which in turn can be expected to impact on economic growth.

This paper explores the role of regulatory governance in affecting economic growth using an econometric model. More precisely, it assesses through econometric modelling the impact of variations in the quality of regulation on economic performance. Although earlier studies have looked at governance as a cause of cross-country productivity or income differences (Olson, et al., 1998; Kaufmann and Kraay, 2002), this paper differs in concentrating on regulation rather than wider governance issues. The subject discussed is of real importance to international business because of the effects of regulation on the economic environment firms face internationally, with consequent implications for trade flows and foreign investment. Regulatory quality, as reflected in economic growth performance, contributes to the market environment faced by firms internationally. The results confirm that "good" regulation is associated with higher economic growth, which in turn is conducive to the expansion of international business.

The rest of the paper is organised as follows. Section 2 reviews issues in the economics literature pertinent to the debate on the role of regulation in economic growth, before turning to regulatory measures and proxies for regulatory governance. In section 3 the models used are presented. Section 4 deals with a descriptive analysis of the data used and reports the regression results. Finally, section 4 provides conclusions and the implications for development policy. The results confirm that the quality of state regulation impacts on economic growth.

LITERATURE REVIEW AND REGULATORY GOVERNANCE

Economic Regulation

The theory of economic regulation developed from the nineteenth century and the literature is now vast (for recent reviews, see Laffont and Tirole, 1993, 2000; Levy and Spiller, 1994; Newbery, 1999). The case for economic regulation is premised on the existence of significant market failure resulting from economies of scale and scope in production, from information imperfections in market transactions, from the existence of incomplete markets and externalities, and from resulting income and wealth distribution effects. It has been suggested that market failures may be more pronounced, and therefore the case for public regulation is stronger, in developing countries (Stern, 1991; Stiglitz 1998). However, regulation of markets may not result in a welfare improvement as compared to the economic outcome under imperfect market conditions. The economics of regulation literature has identified various circumstances where the regulation of markets might reduce rather than increase economic welfare. The seminal study by Averch and Johnson (1962) demonstrated how regulation of a firm's rate of return could lead to incentives to over-invest. Following publication of Averch and Johnson's paper, studies highlighted other potential inefficiencies that could be introduced by rate of return regulation, notably distorted service quality and higher operating costs (e.g. Bailey, 1973).

Information asymmetries may also contribute to imperfect regulation. The regulator and the regulated can be expected to have different levels of information about such matters as costs, revenues and demand. The regulated company holds the information that the regulator needs to regulate optimally and the regulator must establish rules and incentive mechanisms to coax this information from the private sector. Given that it is highly unlikely that the regulator will receive all of the information required to regulate optimally to maximise social welfare, the results of regulation, in terms of outputs and prices, remain "second best" to those of a perfectly competitive market. Shapiro and Willig (1990) argue that state ownership provides more information to regulators than private ownership so contracting should be less problematic when the state both owns and regulates. However, state ownership is associated with inadequate incentives to gather and use this information to maximise economic welfare (Hayek, 1945). In other words, there tends to be a trade off between state ownership reducing the information asymmetries and hence transaction costs of regulation and the relative incentives under state control and private ownership for agents to maximise

economic efficiency (Grossman and Hart, 1986; Sappington and Stiglitz, 1987; Shapiro and Willig, 1990; Yarrow, 1999).

Welfare-improving regulation assumes that the regulatory authority's actions are motivated by the public interest. This has been criticised by public choice theorists who argue that individuals are essentially self-interested in or out of the public arena and it is necessary, therefore, to analyse the regulatory process as the product of relationships between different groups (Buchanan, 1972; Baldwin and Cave, 1999: chapter 3). This has been refined in the concept of "regulatory capture", which involves the regulatory process becoming biased in favour of particular interests. In the extreme case, the regulatory capture literature concludes that regulation *always* leads to socially sub-optimal outcomes because of "inefficient bargaining between interest groups over potential utility rents" (Newbery, 1999: 134; also, Laffont, 1999). In the Chicago tradition of regulatory capture (Stigler, 1971; Peltzman, 1976) regulators are presumed to favour producer interests because of the concentration of regulatory benefits and diffusion of regulatory costs, which enhances the power of lobbying groups as rent seekers (Reagan, 1987).

Regulation is also subject to "political capture"; indeed, political capture may be a much greater threat than capture by producer groups outside of the political system. Where political capture occurs, the regulatory goals are distorted to pursue political ends. Under political capture, regulation becomes a tool of self-interest within government or the ruling elite (Stiglitz, 1998). More generally, it is to be expected that both the process and outcomes of a regulatory regime will be determined by the specific institutional context of an economy, as reflected in its formal and informal rules of economic transacting (North, 1990). By setting the "rules of the game", institutions impact on economic development (World Bank, 2002). Economic development is seen not simply as a matter of amassing economic resources in the form of physical and human capital, but as a matter of "institution building" so as to reduce information imperfections, maximise economic incentives and reduce transaction costs. Included in this institution building are the laws and political and social rules and conventions that are the basis for successful market production and exchange. In particular, relevant modes of conduct in the context of the regulatory state might include probity in public administration, independence of the courts, low corruption and cronyism, and traditions of civic responsibility. "Institution building" including building a "good"

regulatory regime is one of the most difficult problems facing developing countries and the transition economies at the present time (Parker and Kirkpatrick, 2003).

"Good" Regulation, Regulatory Governance and Development Outcomes

To decide whether a system of economic regulation is "good", or in need of reform, it is necessary to identify the criteria for assessing regulatory quality. Regulation quality can be judged in terms of two main criteria – the quality of the outcomes and the processes of regulation.

The outcome of a regulatory system can be assessed against the yardsticks of effectiveness and efficiency. Effective regulation achieves the social welfare goals set down by the government for the regulatory authority. In developing countries the social welfare objectives of regulation are likely to be not simply concerned with the pursuit of economic efficiency but with wider goals to promote sustainable development and poverty reduction. Efficient regulation achieves the social welfare goals at minimum economic costs. The economic costs of regulation can take two broad forms: (1) the costs of directly administering the regulatory system, which are internalised within government and reflected in the budget appropriations of the regulatory bodies; and (2) the compliance costs of regulation, which are external to the regulatory agency and fall on consumers and producers in terms of the economic costs of conforming with the regulations and of avoiding and evading them (Guasch and Hahn, 1999).

The criteria for assessing the quality of regulatory processes will be derived from the arguments that are commonly used to "legitimate" regulation (Baldwin and Cave, 1999: 77). Parker (1999: 224) argues that a well-functioning regulatory system is one that balances accountability, transparency and consistency. Accountability requires the regulatory agencies to be accountable for the consequences of their actions, to operate within their legal powers, and to observe the rules of due process when arriving at their decisions (e.g. to ensure that proper consultation occurs). Transparency relates to regulatory decisions being reached in a way that is revealed to the interested parties. The third process which provides regulatory legitimacy is consistency. Inconsistent regulatory decisions undermine public confidence in a regulatory system. Inconsistency leads to uncertainty for investors, which raises the cost of capital and may seriously damage the willingness to invest. Since political intervention tends to undermine regulatory consistency, and politicians may be prone to alter the regulatory

rules of the game for short-term political advantage, consistency is a primary argument for some kind of "independent" regulator.

This discussion suggests that the capacity of the state to provide strong regulatory institutions will be an important determinant of how well markets perform. An economy with a developed institutional capacity is more likely to be able to design and implement effective regulation, which should contribute to improved economic growth. Good governance is "epitomized by predictable, open and enlightened policy making; a bureaucracy imbued with a professional ethos; an executive arm of government accountable for its actions; a strong civil society participating in public affairs, and all behaving under the rule of law" (World Bank, 1997). Weaknesses in institutional capacity to deliver "good governance" may be predicted to affect adversely economic development (World Bank, 2002).

Regulatory institutions are a relatively recent addition to the institutional structure in developing countries and evidence on the quality of regulation is therefore limited. The evidence that is available, however, suggests that the results of post-privatisation regulation have been disappointing. Where research has occurred, it has exposed a number of regulatory failures. A study of 12 infrastructure industries across six developing Asian economies found much variation in practices and a considerable short-fall from regulatory best practice, as understood in the UK and USA (Stern and Hodder, 1999). Cook (1999), based on case studies of utility sector reforms in developing countries, concludes that creating effective regulation and a competitive environment is at best a difficult and slow process. In the context of Africa, it was found that "regulation is being examined as part of individual sector initiatives, but these efforts are uncoordinated, and implementation is being left to follow privatization instead of being put in place concurrently" (Campbell-White and Bhatia, 1998: 5). Water sector reforms in a number of countries have been associated with second best outcomes and inefficiencies brought on by the institutional context within which reform has been attempted, especially a failure of the government machinery (Dinar, 2000; Estache and Kouassi, 2002). In India, regulatory structures are associated with acute failures in institution building and with a bureaucratic approach that curtails enterprise (Lanyi, 2000). South Africa's proliferation of regulatory bodies is associated with a lack of clarity about roles and responsibilities and with the adoption of policy-making roles independent of government (Schwella, 2002: 3). In Malawi, the electricity industry regulator remains closely connected to the state electricity industry, compromising any notion of real regulatory independence and

encouraging capture[1]. Chang (2002) identifies similar weaknesses in the regulatory institutions for telecommunications in Guyana. In Sri Lanka, the policies governing the regulatory process are judged to have been *ad hoc* and based on short-term political interests, with deficiencies apparent at each stage of the process (Knight-John, 2002). Experiences in the transitional economies also demonstrate much variability in the performance of the newly established regulatory institutions (Cave and Stern, 1998).

In the financial sector, limited regulatory capacity contributed to the instability of the financial sector during the 1997 Asian crisis (Brownbridge and Kirkpatrick, 2000). Similarly, liberalisation of the financial sector in sub-Saharan African economies has exposed the weakness of financial regulation and has resulted in widespread bank failure and systemic weaknesses (Maimbo, 2002; Brownbridge and Kirkpatrick, 2002). In recognition that not all is well, the World Bank (2001: v) has stressed the importance of "improving regulatory regimes and building institutions and capacity effectively to supervise the private sector". The Asian Development Bank (2000: 18) has also emphasised the need for improved regulation.

Several papers have identified the causal effects of better governance on higher per capita incomes in the long run, using regressions with instrumental variables on a cross-section of countries (Barro, 1997; Hall and Jones, 1999; Kaufmann and Kraay, 2002). The causal chain between governance and economic outcome has also been examined. Some studies find that the quality of governance and institutions is important in explaining rates of investment, suggesting that one way in which better governance can improve economic performance is by improving the climate for capital creation (Clague et al., 1995; Keefer and Knack, 1995; Mauro, 1995; World Bank, 2003). Rajkumar and Swaroop (2002) show that differences in the efficacy of public spending can be explained by the quality of governance. Using cross-country data, they find that public health spending lowers child and infant mortality rates in countries with good governance, and that as countries improve their governance, public spending on primary education becomes effective in increasing educational attainment. Olson et al. (1998) find that productivity growth is higher in countries with better institutions and quality of governance. Kaufmann and Kraay (2002) reinforce these findings relating the quality of governance to economic outcomes using a data set covering 175 countries for the period 2000-01.

Measures of Regulatory Governance

The literature suggests, therefore, that the ability of the state to provide effective regulatory institutions will be an important determinant of how an economy performs. The major variable of interest is the quality of regulatory governance. Other researchers have operationalised the broad concept of governance using two different groups of variables. The International Country Risk Guide (ICRG) is produced by a private company for sale to firms and portfolio managers who are considering foreign investments. The ICRG data set is produced annually and covers three aspects of government – bureaucratic quality, law and order and corruption (Political Risk Services, 2002; King and Zeng, 2000 for ICRG data covering 1989-95). Each variable is measured on a points scale with higher points denoting better performance with respect to the variable concerned. The assessment is based on expert analysis from an international network and is subject to peer review. The ICRG variables have been used as proxies for the quality of governance (Neumayer, 2002; Olson et al., 1998).

The second set of governance variables comprises a set of six aggregate indicators developed by the World Bank and drawn from 194 different measures (Kaufmann and Kraay, 2002). These indicators are based on several different sources (including international organisations, political and business risk rating agencies, think tanks and non-governmental bodies) and a linear unobserved components model is used to aggregate these various sources into one aggregate indicator[2]. The indicators are normalised, with higher values denoting better governance. The six indicators provide a subjective assessment of the following aspects of a country's quality of governance:

- Voice and accountability: respect for political rights and civil liberties, public participation in the process of electing policy makers, independence of media, accountability and transparency of government decisions.
- Political instability: political and social tension and unrest, instability of government.
- Government effectiveness: perceptions of the quality of public provision, quality of bureaucracy, competence of civil servants and their independence from political pressure, and the credibility of government decisions.
- Regulatory quality: burden on business via quantitative regulations, price controls and other interventions in the economy.

- Rule of law: respect for law and order, predictability and effectiveness of the judiciary system, enforceability of contracts.
- Control of corruption: perceptions of the exercise of public power for private gain.

In this study we focus on the regulatory quality and government effectiveness variables in the World Bank data set, which is more suitable than ICRG data for our purposes. These two variables are the closest to capturing the nature of the aspects of regulatory governance discussed above, which can be summarised under the headings of regulatory quality and process. Regulatory quality is taken as a proxy for the quality of the outcomes of applying regulatory instruments. Government effectiveness proxies the process dimensions (consistency, accountability, transparency) of regulatory governance. All six World Bank indicators, however, are closely related, as indicated by the extent of the bivariate correlation between them shown in table 1.

Table 1: The Correlation Coefficients Between the Institutional Indicators

Variables:	GE	Graft	PI	RQ	RL	VA
Government Effectiveness (GE)	1					
Control of Corruption (Graft)	0.94	1				
Political Instability (PI)	0.81	0.78	1			
Regulatory quality (RQ)	0.69	0.64	0.71	1		
Rule of Law (RL)	0.90	0.90	0.90	0.70	1	
Voice and Accountability(VA)	0.75	0.76	0.73	0.70	0.75	1

The variable listings vertically define the listings horizontally.
See text for a brief explanation of each of these variables; for fuller details and information on their construction see Kaufmann and Kraay (2002).

The objective of the empirical analysis reported below is to test for a causal link between regulation and economic performance. The approach is to adopt a growth accounting framework, where economic growth is used as the measure of economic performance and regulation is entered as an input in the production function.

Neoclassical growth modelling began with the work of Solow (1956), who employed a neo-classical production function to explain economic growth in the USA during the first half of the twentieth century. Important assumptions of this approach are constant returns to scale and diminishing returns to investment, which imply that for a given rate of saving and population growth economies move towards their steady-state growth path. This can be extended to differences in income levels between countries, to argue that in the long run income per capita levels will converge. A lack of empirical support for convergence and the presence of a large, unexplained "residual" factor in the function estimates have presented a major challenge to these models.

The endogenous growth theory put forward by Romer (1986) and Lucas (1988) led to renewed interest in economic growth analysis. An important advantage of endogenous over traditional growth models is that, through the assumption of constant or increasing returns to a factor input, in particular human capital, it is possible to explain a lack of growth and income convergence between countries and helps account more fully for the residual factor in Solow-type analyses. The "growth accounting" exercises, popularised by Barro and others (Barro, 1991, 2000; Barro and Salai-i-Martin, 1999) fall within the generalised Solow-type growth model. An important characteristic of this approach is the inclusion of various indicators of economic structure. Most empirical research using this approach has found evidence of "conditional" convergence, where convergence is conditional on the level or availability of complementary forms of investment, including human capital and a supportive policy environment. This suggests that the failure of developing countries to converge on the income levels of developed countries may be attributed, at least in part, to institutional factors[3]. The importance of institutional capacity to design and implement effective economic policy has been demonstrated in various empirical studies of cross-country growth, for example Sachs and Warner (1995) and Barro (2000). A similar approach is adopted in this study, to examine the role of regulatory institutional capacity in accounting for cross-country variations in economic growth.

An issue that needed to be addressed at the outset is causality. It could be argued that instead of regulatory quality determining economic growth, regulatory quality could be determined by the economy's growth rate. Economies that grow faster are able to generate higher levels of income and are therefore able to support the development of better institutions. Or, alternatively, there may be a level of simultaneity, in the sense that institutional quality

generates more sustained economic growth, which in turn supports more and better regulatory institutions.

The Granger causality test is commonly used in empirical work to establish the direction of causation. However, this test is sensitive to the length of lags of variables used and therefore requires a relatively long time series dimension to be able to select the right length of lag and to be relatively confident about the conclusion drawn. The problem we face is that the time dimension of most variables in our data set is rather limited; in the case of regulatory governance we only have one observation per country. We were therefore unable to apply the Granger causality test. Instead, and less formally, we note that the existing literature is consistent with institutional change leading to economic growth. For example, Olson et al. (1998) argue that causation runs from institutional change to economic change using the examples of China, Korea, Taiwan, Indonesia and Chile. They conclude that 'Simultaneity bias appears to be a theoretical, but not a realistic, possibility' (p.33). Kaufmann and Kraay (2002) implement an empirical procedure for testing for causation, which leads to the identification of strong positive causal effects running from better governance to higher per capita incomes, but weak and even negative causation in the opposite direction from per capita incomes to governance. The latter result, they argue, may be the consequence of elites with rising incomes using laws and regulations for their own rather than the social benefit. We proceed, therefore, on the assumption that the causation is from regulatory quality to economic performance.

THE MODELLING

The approach used in the modelling is to assume that each country's production possibility set, in common with most literature in this area, is described by a Cobb-Douglas production function:

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} \qquad (1)$$

where Y is the output level; A, level of productivity; K, stock of capital; and L, stock of labour - 'i' and 't' stand for country and time respectively. Assuming that the production function exhibits constant return to scale with respect to physical inputs, (2) can be written in per capita terms as:

$$y_{it} = A_{it} k_{it}^{\alpha} \quad (2)$$

where small letters refer to per capita units. Assume a simple Keynesian capital accumulation rule according to the following specification:

$$dk / dt = sy - (n + \delta)k \quad (3)$$

where dk/dt is the rate of change of the per capita capital stock, which is assumed to be equal to the flow of saving (equal to investment) minus capital depreciation and the growth of the labour force. In this equation s is the share of gross saving in output per capita, δ is the depreciation of capital and n the rate of growth of population as a proxy for the growth of the labour force. Setting (3) equal to zero gives us the steady state solution for the stock of per capita capital; k=sy/(n+δ). Taking the logarithm of both sides of equation (2) and replacing the steady state solution for k from above into (2) gives the steady state solution for output per capita, which is as follows:

$$ln(y_{it}^{*}) = [1/(1-\alpha)][ln\, A_{it} + \alpha ln(s_{it} /(n_{it} + \delta_{it})] \quad (4)$$

Where (*) above the variable signifies the steady state solution.

We adopt the Mankiw et al. (1992) assumption that economies move towards their steady state solution according to the following approximation:

$$ln\, y_{it} - lny_{i0} = \lambda(lny_{it}^{*} - lny_{i0}) \quad (5)$$

where y_0 stands for the initial level of per capita income, and $\lambda = (1 - e^{-\eta t})$ is the adjustment dynamic towards steady state, where $'\eta'$ is the speed of convergence. From (5) we can solve for the growth of per capita output, which is as follows:

$$g_{it} = (\lambda / t)(lny_{it}^{*} - lny_{i0}) \quad (6)$$

Replacing (lny_{it}^{*}) by its equivalent from (4), gives us a relationship for actual growth of per capita output:

$$g_{it} = (\lambda / t(1-\alpha))[ln\, A_{it} + \alpha ln(s_{it} /(n_{it} + \delta_{it})] - (\lambda / t) lny_{i0} \qquad (7)$$

As far as total factor productivity growth is concerned, we assume that its dynamic takes the following form:

$$A_{it} = A_{i0} e^{\gamma_i t} \qquad (8)$$

Where A_{i0} specifies the initial level of productivity and 'γ' its rate of growth per period. Substituting for A from (8) into (7), per capita growth of output (*g*) is represented by the following relationship:

$$g = \phi_1 ln\, A_{i0} + \phi_2 \gamma_i + \phi_3 ln(s_{it} /(n_{it} + \delta_{it})) - \phi_4 lny_{i0} \qquad (9)$$

where $\phi_1 = \lambda / t(1-\alpha),\ \phi_2 = \lambda /(1-\alpha),\ \phi_3 = \lambda\alpha / t(1-\alpha),\ and\ \phi_4 = \lambda / t.$ Adding some control and qualitative variables as well as a stochastic term to (9) provides the model which we use to assess the role that regulatory quality plays in economic growth.

In this model differences in total factor productivity growth rates are related to regulatory quality and control variables. Variables added to equation (9) broadly follow the growth empirics literature, such as Barro (1991, 2000), Mankiw et al. (1992) and Islam (1995). Amongst the control variables included in most empirical research are initial conditions, both in terms of the level of development (as proxied by GDP per capita) as well as human capital and institutions. Most also include proxies for the macroeconomic environment such as inflation, trade openness and the government's involvement in economic activities. Qualitative variables can also be added to account for specific events in a country, as well as data heterogeneity when panel data are used. In our analysis, depending on the nature of data set constructed, we make use of all or some of these variables to make sure that our regressions are fully specified.

Total productivity growth, 'γ', is expected to play an important role in total growth within an economy. In the context of our specification in (9) we make the additional assumption, drawing on the literature relating to regulation in developing countries reviewed earlier, that productivity growth 'γ' directly varies with the quality of regulatory institutions in the country. Those countries with good institutions in place can design and implement policies that allow them to continue with their future growth. If instead the country in question lacks or has a weak institutional structure, its growth potential is likely to be diminished because the design and implementation of appropriate policies are then adversely affected. In the case of developing countries, in particular, to be able to benefit from being a latecomer in terms of industrialisation and grow at a high speed to "catch up", it is important that institutional supports are present to realise the potential for income convergence.

We assume that 'γ' in (9) varies directly with institutional quality. In the absence of better information about the initial institutional quality, we adopted educational attainment as a proxy variable. At first blush this may seem an unusual choice, but our proxy, secondary school enrolment, is highly correlated with the regulatory governance variables we are using (see Table 3 below), supporting its choice as a sound proxy for initial institutional quality in general[4]. The finding that education is highly correlated with our regulatory variables is an interesting finding in itself and one worthy of further exploration in future research. We do not pursue it further here.

We apply two methods of estimation to the model specified by equation (9). One is based on cross-section analysis, in which we attempt to measure *directly* any possible impact that regulation has on economic growth. The second is based on panel data, in which we *indirectly* estimate the growth contribution of regulation. The reason for applying different estimation procedures is due to our data on the indexes of regulation; we have only one observation per country. Therefore, for the cross-section regression we average the relevant data over the period 1980-1999 and combine the result with the regulation data. This allows a direct measure of the possible role that regulation plays in growth, using equation (9) as a base to estimate ϕ_2. In the second method we adopt a variant of the one applied by Olson et al. (1998) and apply the fixed effects technique[5] to the panel data constructed. This data set combines cross-section and time-series data for the countries included in the first data set.

This procedure, which essentially involves including a dummy for every country in the estimated equation, produces consistent estimates even where data are not available for some time-invariant factors that affect growth. The fixed effects estimator does require, however, that each included variable varies significantly within countries. Clearly, even if available, the regulatory variables may not satisfy this requirement since institutions usually change slowly. The estimation procedure, therefore, involves two stages. We first regress GDP per capita growth in each country per period, g_{it} *on* $\ln(s_{it}/(n_{it}+\delta_{it}))$ plus a set of country dummies. The coefficient on the country dummies reflects the effect on growth of all the time-invariant variables, including regulatory institutions. In the second stage we use the coefficients of the country dummy as the dependent variable and regress them on the measures of regulatory quality and control variables. The coefficients on the measures of regulatory quality in the second stage regression reflect the impact of regulation on GDP per capita growth after controlling for capital accumulation and certain other variables.

THE DATA AND THE REGRESSION RESULTS

Data for the regulatory quality measures were set out in Kaufmann and Kraay (2002) and are available for downloading on the World Bank web site[6]. As discussed earlier, the two regulation indicators used from this study are regulatory quality and government effectiveness measures (the other regulation indicators included in Kaufmann and Kraay being highly correlated with these two). Other data required for the regression analysis were taken from the World Bank's *World Development Indicators*.

The data set used in the analysis covers 84 countries for the cross-section regression and 80 for the panel version of the regression (for a full list of the countries see the Appendix). Although the main focus of the study is the impact of "good" regulation on economic performance in developing countries, a heterogeneous data set was used including some transitional and advanced countries as well as developing ones. The reason for including some non-developing countries was to improve the statistical reliability of the results by including more countries with regional dummies used to capture the differing levels of economic development. As information on regulatory governance is only available for one period, as referred to earlier, in the cross-section model all other variables were converted into one period by averaging for 1980-99. Initial effect variables relate to 1980. For the panel version, the data cover the period 1980-1999. However, the time series dimension is

not complete for a number of the countries in the data set and therefore the panel data are unbalanced, containing 313 observations.

Tables 2 and 3 provide summary statistics and the correlation coefficient matrix respectively for the key variables used in the study.

Table 2: Summary Statistics

Variable*	GDP per capita	GE	RQ	Log NFCF	Log Initial GDP per capita	Log Schooling	Trade	Inflation	Government expenditure
Maximum	8.62	2.08	1.24	2.27	9.59	99.70	306.11	4010.70	29.10
Minimum	-8.28	-1.77	-2.34	0.81	5.91	2.70	2.46	0.51	4.53
Mean	1.40	0.12	0.29	1.53	7.77	47.85	35.59	95.39	14.12
Std. Deviation	2.30	0.90	0.65	0.35	1.05	28.87	44.56	460.75	4.98
Skweness	-0.71	0.41	-1.24	-0.11	-0.01	0.17	4.00	7.60	0.65
Kurtosis - 3	3.39	-0.56	2.37	-0.66	-1.06	-1.23	19.01	60.86	0.25
Coefficient of Variation	1.64	7.63	2.27	0.23	0.13	0.60	1.25	4.83	0.35

GDP per capita = GDP per capita growth (% per annum);
GE = Government effectiveness;
RQ = Regulatory quality;
LogNFCF = Logarithm of net fixed capital formation as a % of GDP;
LogInitial GDP per capita = Logarithm of initial (1980) GDP per capita;
LogSchooling = Initial (1980) secondary school enrolment (%);
Trade = Exports +imports as a percentage of GDP;
Inflation = Rate of inflation using country GDP deflators;
Government expenditure = General government consumption expenditure as a percentage of GDP.
Value figures were standardised to US$ valuations using purchasing power parities.

Table 3: Correlation Coefficient Matrix

Variable*	GDP per capita	GE	RQ	Log NFCF	Log Initial GDP per capita	Log Schooling	Trade	Inflation	Government expenditure
GDP per capita	1								
Government effectiveness	0.38	1							
Regulatory quality	0.44	0.69	1						
LogNFCF	0.31	0.35	0.25	1					
LogInitial GDP per capita	0.13	0.73	0.66	0.33	1				
Schooling	0.15	0.71	0.59	0.55	0.81	1			
Trade	0.18	0.54	0.40	0.30	0.40	0.38	1		
Inflation	-0.48	-0.26	-0.43	-0.14	-0.06	-0.09	-0.12	1	
Government exp.	-0.05	0.45	0.26	0.17	0.42	0.47	0.16	-0.05	1

GDP per capita = GDP per capita growth (% per annum);
GE = Government effectiveness;
RQ = Regulatory quality;
LogNFCF = Logarithm of net fixed capital formation as a % of GDP;
LogInitial GDP per capita = Logarithm of initial (1980) GDP per capita;
Schooling = Initial (1980) secondary school enrolment (%);
Trade = Exports +imports as a percentage of GDP;
Inflation = Rate of inflation using country GDP deflators;
Government expenditure = General government consumption expenditure as a percentage of GDP.

The first data column in Table 3 shows the simple correlation coefficients between the dependent variable, GDP growth per capita, and possible explanatory variables. The correlation coefficients have the expected signs, including a slight suggestion that lower government consumption expenditure is associated with higher GDP growth but not with improved regulation. The correlation coefficients between the indicators of regulatory governance, namely government effectiveness and regulatory quality, and GDP per capita growth have the expected positive sign. The bivariate correlations between inflation and the regulatory proxies used are negative, supporting the proposition that economies with better regulatory governance are also better able to design macroeconomic policies that stabilise the economy and control inflation. There is also a high correlation between the logarithm of initial GDP per capita and initial secondary school education, both of which are in turn correlated with the various proxies for regulatory governance[7]. This suggests that, included in the same regression, parameter estimates for these variables may not be individually reliable, due to multicollinearity. This is also the case with the two regulatory proxies that we intend to use in the analysis, namely government effectiveness (GE) and regulatory quality (RQ). These two are highly correlated and therefore cannot be included in the same regression in order to estimate each variable's contribution. For this reason we considered first the contribution of each of these proxies to growth in separate regressions, and then combined them by addition to form a composite regulation variable (RQGE).

The results reported in Table 4 are based on the model specified in equation (9) using OLS and cross-country data, as detailed above. Table 4 reports eight regressions containing different combinations of the independent variables from our data set. The economic variables in the full set of regressions tested included the variables derived from the model itself, as specified in equation (9), and measures for general inflation, trade, government expenditure, as well as the regional dummies.

Table 4: Cross-country Analysis of the Determinants of Economic Growth (Dependent variable is growth of GDP per capita)

Variables:	1	2	3	4	5	6	7	8
C	4.10**	5.03**	7.52*	5.27**	5.59**	3.90**	0.87	-1.87*
	(1.71)	(1.98)	(3.12)	(1.67)	(2.67)	(1.87)	(0.36)	(2.16)
Schooling							-0.03*	-0.03*
							(2.28)	(3.60)
RQ	2.15*							
	(3.14)							
GE		1.44*						
		(3.91)						
RQGE			1.22*	1.20*	1.19*	0.91*	1.02*	0.90*
			(5.43)	(6.00)	(6.11)	(4.29)	(4.82)	(4.81)
LogNFCF	1.87*	1.54*	1.53*	2.01*	2.00*	1.93*	2.58*	2.68*
	(2.17)	(2.22)	(2.38)	(3.29)	(3.31)	(3.35)	(4.10)	(4.28)
LogInitial GDP per capita	-0.79*	-0.79*	-1.15*	-1.05*	-1.08*	-0.82*	-0.39	
	(2.25)	(2.52)	(3.74)	(3.03)	(4.00)	(2.97)	(1.21)	
Inflation						-0.001*	-0.001*	-0.001*
						(2.88)	(2.68)	(2.99)
Africa				0.13				
				(0.14)				
Asia				2.16*	2.08*	1.96*	1.99*	2.03*
				(2.75)	(4.38)	(4.30)	(4.49)	(4.58)
Latin America				1.45*	1.38*	1.31*	1.26*	1.17*
				(2.07)	(3.10)	(3.07)	(3.05)	(2.86)
Others				-1.91**	-1.98*	-2.14*	-1.99*	-2.02*
				(1.88)	(2.23)	(2.51)	(2.39)	(2.42)
No. of observations	84	84	84	84	84	84	84	84
Adjusted R^2	0.28	0.22	0.32	0.50	0.51	0.55	0.57	0.57

C is the intercept term;
Schooling = Initial (1980) secondary school enrolment (%);
RQ = Regulatory quality;
GE = Government effectiveness;
RQGE = Combined regulatory variable (GE+RQ)
LogNFCF = Logarithm of net fixed capital formation as a % of GDP;
LogInitial GDP per capita = Logarithm of initial (1980) GDP per capita;
Trade=Exports +imports as a percentage of GDP;
Inflation = Rate of inflation using country GDP deflators;
Africa, Asia, Latin America and Others (other regions) are regional dummies.

Values in parenthesis are t ratios.
* *Statistically significant at 5% significance level*
** ***Statistically significant at 10% significance level***

The regional dummies are used to test the hypothesis that different regions may have characteristics that affect growth differently. This is validated with respect to Asia and Latin

America, indicating that these two regions had, on average, performed better with respect to economic growth than other regions. A dummy for Africa was found to be statistically insignificant; whereas the one covering other countries, principally developed and transition economies, was statistically significant and negative[8]. The initial level of GDP per capita has a negative sign and usually is statistically significant at the 5% level, confirming "conditional" convergence. Other studies, including Barro (2000), Islam (1995) and Mankiw et al. (1992) also confirm conditional convergence. Amongst other variables included in the full set of regressions were proxies for government expenditure, openness of the economy (Trade), as well as inflation. Except for inflation, which we found to be negative and statistically significant, these other variables were found to be statistically insignificant at the 10% level or better and are therefore not reported here. We also included the initial level of human capital as a proxy for the initial level of "institutions". This variable, as indicated in Table 3, is highly correlated with initial GDP per capita. When the two appear in the same regression (column 7 in Table 4) the level of significance and magnitude of the initial GDP per capita variable are adversely affected, which is a symptom of multicollinearity. The initial level of human capital, as proxied by secondary schooling, has the expected negative sign and is statistically significant. This again confirms the conditional convergence hypothesis.

The regulatory variables are correctly signed and statistically significant in all cases. The sign and level of significance of the parameter estimates for these regulatory proxies indicate that they have a statistically significant and positive effect on growth. Based on the estimates for the combined regulatory variable (RQGE), a unit change in the quality and effectiveness of regulation is, on average, associated with approximately a unit increase in growth, everything else remaining equal.

Table 5: Alternative Cross-country Analysis of the Determinants of Economic Growth (Dependent variable is estimate of country dummies)

Variables	1	2	3
C	-0.90*	-2.55*	-1.24**
	(3.98)	(5.66)	(1.76)
RQGE		0.41*	0.21*
		(4.87)	(2.16)
Inflation			0.001*
			(2.97)
Africa			-1.18*
			(2.11)
Asia			1.40*
			(2.62)
Latin America			-0.65
			(1.18)
Others			-0.52
			(0.62)
No. of observations	80	80	80
Adjusted R^2	0.13	0.22	0.45

C is the intercept term.
RQGE = Combined regulatory variable (GE+RQ)
LogNFCF = Logarithm of net fixed capital formation as a % of GDP;
LogNFC = Logarithm of net capital formation as a % of GDP;
LogInitial GDP per capita = Logarithm of initial (1980) GDP per capita;
TRADE=Exports +Imports as a percentage of GDP;
Inflation = Rate of inflation using country GDP deflators;
Africa, Asia, Latin America and Others (other regions) are regional dummies.

Values in parenthesis are t ratios.
* *Statistically significant at 5% significance level*
** ***Statistically significant at 10% significance level***

Table 5 reports results based on the second method of estimation, which, as discussed earlier, involves two stages. In the first stage, by applying a fixed effect technique to the panel data we arrive at the following regression results:

GDP per capita = 1.25 Log Net fixed capital formation + Country Dummies
(2.80)

Adjusted R^2 =0.32; no. of observations=313.

The figure in brackets is the t-ratio. From the above, the regression parameter estimate associated with the country dummies is saved and used as the dependent variable in the regressions reported in Table 5. For reasons of space we report only a sub-set of the full results. We exclude reporting regressions including the full set of independent variables used, as detailed in Table 2, because a number of them proved to be statistically insignificant. Also, only the results for the combined regulatory variable are reported - estimates including the regulatory quality and regulatory effectiveness variables separately were consistent with these results[9].

Our main interest in the regression results reported in Table 5 is with the role that the regulatory proxies are playing in explaining the variation in the country dummies. These results are consistent with those reported in Table 4. Even though the coefficient values for the regulatory variable are lower, the finding is that regulatory governance still significantly affects the growth performance of an economy. Also, there is no evidence of conditional convergence in this case and while the Asia regional dummy is as before, namely statistically significant and positive, the African dummy is now significantly negative (previously it was insignificant), while the Latin America and Others (other countries) dummies are now statistically insignificant (previously they were statistically significant and positive and negative, respectively)[10]. These changes in the results were investigated and seem to reflect the differences in the modelling methods used, suggesting that in this type of research the precise modelling used can affect the results. Nevertheless, the overall picture that emerges is that the quality and effectiveness of regulation has a positive effect on growth using both approaches to the modelling.

CONCLUSIONS

The provision of a regulatory regime that promotes rather than reduces economic growth is an important part of good governance. The ability of the state to provide effective regulatory institutions can be expected to be a determinant of how well markets and the economy perform. The effectiveness of regulatory institutions will depend on both the *efficiency* of the regulatory policies and instruments that are used and the *quality* of the governance processes that are practised by the regulatory authorities, as discussed in the early part of this paper.

This paper has tested the hypothesis that the quality of regulation affects the economic performance of an economy drawing on data in Kaufmann and Kraay (2002) and World Bank

data. Two proxies for regulatory quality were included separately and then combined as determinants of economic growth performance, using both cross-sectional and panel data methods. The results from both sets of modelling suggest a strong causal link between regulatory quality and economic growth and confirm that the form of regulation matters for economic performance. The results are consistent with those of Olson et al. (1998), who found that productivity growth is strongly correlated with the quality of governance, and Kaufmann and Kraay (2002), who found that the quality of governance has a positive effect on incomes.

The challenge in international business is to provide an environment conducive to mutually beneficial trade and investment. In the specific context of developing countries, the challenge is to build effective regulatory institutions that have the capacity to provide regulatory processes that stimulate inward investment and trade, while meeting the particular structural characteristics and developmental needs of the economy. As we highlighted earlier, the proxies we use for regulatory governance are correlated with a number of other institutional proxies. One could argue therefore, that what we have established could equally hold for the link between institutional capacity in general and economic performance. However, the literature reviewed earlier in the paper is consistent with institutional capacity playing a strong and complementary role in regulatory governance. Also, the ability to model separately institutions in general and regulatory institutions or governance in particular remains problematic because of their complementarity. Our results are best interpreted as demonstrating the importance of regulatory quality for economic growth in the context of wider institutional capacity building. Finally, we acknowledge that the direction of causation between economic growth and regulatory quality deserves further investigation. We believe that there are good a priori grounds for assuming that better regulation leads to faster economic growth, but recognise that there could be some feedback from economic performance to regulatory quality. Nevertheless, despite these caveats, our results are consistent with the view that "good" regulation is associated with higher economic growth, which in turn is conducive to the expansion of international business.

Notes

1. One of the authors of this paper has been involved in the design of regulatory institutions for Malawi.
2. This expresses the observed data in each cluster as a linear function of the unobserved common component of governance, plus a disturbance terms to capture perception errors and sampling variation in each indicator (Kaufmann, et al., 1999).
3. However, neither neoclassical nor endogenous growth theory gave regulation an explicit role. By assuming that output is at the limit provided by the available factor inputs and technology, neoclassical growth theory implicitly assumed optimal regulation.
4. Benhabib and Spiegel (1994) argue that the initial level of human capital can affect the growth path of productivity. Olson et al. (1998) also use secondary school enrolment as a proxy explanatory variable in their growth study.
5. There are two estimation procedures for panel data, fixed and random effects. In our case, the fixed effect method is the most appropriate one to use for the following reasons: (a) a priori we expect that regulatory governance proxies to be correlated with the intercept term for each country; those with a poor or weak regulatory governance are also expected to perform relatively badly in terms of economic performance; (b) we are interested in measuring differences between countries included in our data set; the parameter estimate for country dummies (the intercept term for each country) is a proxy for these differences. Intercepts in turn are used as a dependent variable in the second stage regression to establish the link between regulatory governance and country characteristics captured by the intercept term. The fixed effects method allows us to do this; (c) in small samples, similar to the one we are using here, there may be practical problems preventing parameter estimation when the random effect model is applied; this is not the case with the fixed effect model. For a more detailed discussion of these issues, see Verbeek (2000).
6. The series constructed are composite indexes, which are based on a number of variables generated at different points in time, mainly in the 1990s. Information for each country on these proxies, therefore, generally relates to a period rather than a specific year. Kaufmann and Kraay (2002) highlight certain issues relating to the quality of the data used, particularly when it is utilised for making comparisons across countries. However, we are not aware of better regulatory quality data, while conceding that better quality data could reveal different results to those reported here. Nevertheless, based on the significance level of the relevant variables in our regressions, we are fairly confident that any differences in the results would relate to the magnitude of these effects rather than their sign.
7. A number of the explanatory variables were logged. In the literature the basic growth accounting model is generally exponential (eg Cobb-Douglas), once logged, it becomes a linear relationship which can then be estimated. For the other explanatory variables in our model, logging helped to solve problems of serial correlation and heteroscedasticity.
8. The transition economies of Central and Eastern Europe suffered from a large fall in GDP during the 1990s and this helps to explain this result.
9. This is unsurprising given, as noted earlier, the degree of multicollinearity between the regulatory variables.
10. In this model the regional dummies identify whether there are regional similarities or differences as far as the country dummies are concerned.

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Appendix

List of countries included in the regressions:

Argentina, Australia, Austria, Bangladesh, Belgium, Benin, Bolivia, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Finland, France, Gabon, Gambia, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Islamic Rep., Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Rep., Latvia, Lesotho, Luxembourg, Malawi, Malaysia, Mali, Mauritius, Mexico, Morocco, Mozambique, Netherlands, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Senegal, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Tunisia, United States, Uruguay, Venezuela, Zambia, Zimbabwe.