Robust Methodology for Investment Climate Assessment on Productivity: Application to Investment Climate Surveys from Central America

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Abstract

Developing countries are increasingly concerned about improving country competitiveness and productivity, as they face the increasing pressures of globalization and attempt to improve economic growth and reduce poverty. Among such countries, Investment Climate Assessments (ICA) surveys at the firm level, have become the standard way for the World Bank to identify key obstacles to country competitiveness, in order to prioritize policy reforms for enhancing competitiveness. Given the surveys objectives and the nature and limitations of the data collected, this paper discusses the advantages and disadvantages of using different productivity measures. The main objective is to develop a methodology to estimate, in a consistent manner, the productivity impact of the investment climate variables. The paper applies it to the data collected for ICAs in four countries: Costa Rica, Guatemala, Honduras and Nicaragua.

Observations on logarithms (logs) of the variables are pooled across three countries (Guatemala, Honduras and Nicaragua). Endogeneity of the production function inputs and of the investment climate variables is addressed by using a variant of the control function approach, based on individual firm information, and by aggregating investment climate variables by industry and region. It is shown that it is possible to get robust results for 10 different productivity measures. The estimates for the four countries show how relevant the investment climate variables are to explain the average level of productivity. IC variables in several categories (red tape, corruption and crime, infrastructure and, quality and innovation) account for over 30 percent of average productivity. The policy implications are clear: investment climate matters and the relative impact of the various investment climate variables indicate where reform efforts should be directed in each country. It is argued that this methodology can be used as a benchmark to assess productivity effects in other ICA surveys. This is important because ICA surveys are available now for more than 65 developing countries.

**JEL Classification:** D24, L60, O54, C01.

**Keywords:** Total factor productivity, investment climate, competitiveness, firm level determinants of productivity, robust productivity impacts.

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1 We are indebted to Jorge Pena, Heisnam Singh and Rodolfo Stucchi for their excellent research assistance. This paper is an extension of Escribano and Guasch(2005). We have benefited from the suggestions and questions from Paulo Correa, Juan Miguel Crivelli, Pablo Fajnzylber, Luke Haggarty, Danny Leipziger, Eduardo Ley, Marialisa Motta, Jose Guillherme Reis, Isabel Sánchez and Stefka Slavova, and from participants at a World Bank seminars, CORE (UCL) seminar and the American Association meetings in Chicago, January 2006.

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INTRODUCTION

As developing countries face the pressures and impacts of globalization, they are seeking ways to stimulate growth and employment within this context of increased openness. With most of these countries having secured a reasonable level of macroeconomic stability, they are now focusing on issues of competitiveness and productivity through microeconomic reform programs. From South East Asia to Latin America, countries are reformulating their strategies and making increased competitiveness a key priority of government programs.

A significant component of country competitiveness is having a good investment climate or business environment. The investment climate, as defined in the World Development Report (2005), is “the set of location-specific factors shaping the opportunities and incentives for firms to invest productively, create jobs and expand.” It is now well accepted and documented, conceptually and empirically, that the scope and nature of regulations on economic activity and factor markets - the so-called investment climate and business environment - can significantly and adversely impact productivity, growth and economic activity (see Bosworth and Collins, 2003; Dollar et al., 2004; Rodrik and Subramanian, 2004; Loayza, Oviedo and Serven, 2004; McMillan, 1998 and 2004; OECD, 2001; Wilkinson, 2001; Alexander et al., 2004; Djankov et al., 2002; Haltiwanger, 2002; He et al., 2003; World Bank, 2003; and World Bank, 2004 a,b).

Prescott (1998) and Parente and Prescott (2002) argue that to understand large international income differences, it is necessary to explain differences in productivity (TFP). His main candidate to explain those gaps is the resistance to the adoption of new technologies and to the efficient use of current operating technologies, which in turn are conditioned by the institutional and policy arrangements a society employs (investment climate variables). Recently, Cole et al. (2004) also have argued that Latin America has not replicated Western economic success due to the productivity (TFP) gap. They point to competitive barriers (investment climate variables in our analysis) as the promising channels for understanding the low productivity observed in Latin American countries.

Figures 1a to 1c plot the evolution of the GDP-per capita, of labor productivity and labor force participation in Costa Rica, Guatemala, Honduras and Nicaragua, relative to the values of the US. Since the relative labor force participation of each country is stable since 1975, the decline in GDP per capita is mainly due to the observed decline in labor productivity, indicating that the gap in both series, relative to the US, is increasing.
through time (divergence). Therefore, it is clear that these countries have a serious productivity problem. In this paper we want to study the elements related to the investment climate of those three Caribbean countries in order to identify the bottlenecks for productivity growth in the areas of; infrastructure, red tape and corruption and crime, finance and corporate governance and, quality, innovation and labor skills.

Government policies and behavior exert a strong influence on the investment climate through their impact on costs, risks and barriers to competition. Key factors affecting the investment climate through their impact on costs are: corruption, taxes, the regulatory burden and extent of red tape in general, input markets regulation (labor and capital), the quality of infrastructure, technological and innovation support, and the availability and cost of finance.

For example, Kasper (2002) shows that poorly understood “state paternalism” has usually created unjustified barriers to entrepreneurial activity, resulting in poor growth and a stifling environment. Kerr (2002), shows that a quagmire of regulation which is all too common, is a massive deterrent to investment and economic growth. As a case in point, McMillan (1988) argues that obtrusive government regulation before 1984 was the key issue in New Zealand’s slide in the world per-capita income rankings. Hernando de Soto (2002) describes one key adverse effect of significant business regulation and weak property rights: with costly firm regulations, fewer firms choose to register and more become informal. Also, if there are high transaction costs involved in registering property, assets are less likely to be officially recorded, and therefore cannot be used as collateral to obtain loans, thereby becoming “dead” capital.

Likewise, poor infrastructure and limited transport and trade services increase logistics costs, rendering otherwise competitive products uncompetitive, as well as limiting rural production and people’s access to markets, which adversely affects poverty and economic activity (Guasch, 2004).

The pursuit of greater competitiveness and a better investment climate is leading countries -often assisted by multilaterals such as the World Bank - to undertake their own studies to identify the principal bottlenecks in terms of competitiveness and the investment climate, and to evaluate the impact these have, to set priorities for intervention and reform. The most common instrument used has been firm-level surveys, known as Investment Climate surveys (ICs), from which both subjective evaluations of obstacles and objective hard-data numbers with direct links to costs and
productivity are elicited and imputed. Such surveys collect data at firm level on the following themes: infrastructure, bureaucracy and corruption, technology and quality, human capital, corporate governance, crime and security, and financial services.

While the ICs are quite useful in identifying major issues and bottlenecks as perceived by firms, the data collected is also meant to provide a quantitative assessment of the impact or contribution of the investment climate (IC) variables on productivity. In turn, that quantified impact is used in the advocacy for, and design of, investment-climate reform. Yet providing reliable and robust estimates of productivity estimates of the IC variables from the surveys is not a straightforward task. First, ICs do not provide balance panel-type data on all the variables. Second, the production function is not observed; and third, there is an identification issue separating Total Factor Productivity (TFP) from the production function inputs. When any of the production function inputs is influenced by common causes affecting productivity, like IC variables or other plant characteristics, there is a simultaneous equation problem. In general, one should expect the productivity to be correlated with the production function inputs and, therefore, inputs should be treated as endogenous regressors when estimating production functions. This demands special care in the econometric specification for estimating those productivity effects and in the choice of the most appropriate way of measuring productivity.

There is an extensive literature discussing the advantages and disadvantages of using different statistical estimation techniques and/or growth accounting (index number) techniques to estimate productivity or Total Factor Productivity in levels (TFP) or in rates of growth (TFPG). For overviews of different productivity concepts and aggregation alternatives see, for example, Solow (1957), Jorgenson, Gollop and Fraumeni (1987), Hall (1990), Olley and Pakes (1996), Foster, Haltiwanger and Krizan (1998), Batelsman and Doms (2000), Hulten (2001), Diewert and Nakamura (2002), Jorgenson (2003), Barro and Sala-i-Martin (2004) and Van Biesebroeck (2007).

In this paper we discuss the applicability of some of these techniques to the problem at hand and present adaptations and adjustments that provide a best fit for the described objective: estimating robust productivity impact of IC variables collected through firm-level surveys across countries; investment climate surveys.

The development of a consistent econometric methodology to be used in most developing countries as a benchmark for evaluating the impact of IC variables on productivity at the firm level is the main objective of this paper. To illustrate its
applicability and usefulness, the methodology is used to assess the productivity impact in four different countries, Costa Rica, Guatemala, Honduras, and Nicaragua, with the ICs data collected for 2001 and 2002 (Guatemala, Honduras, and Nicaragua) and 2002, 2003 and 2004 (Costa Rica).

Using a common productivity methodology is essential for benchmarking and for cross country comparisons of the empirical results. This methodology is intended to give robust empirical results and aims at explaining the reasons why different research groups addressing common issues might reach opposite conclusions, even sharing the same data set. At the same time, in support of diversity and cross fertilization, having alternative econometric approaches should help identifying limitations, advantages or disadvantages of each approach. Those productivity results that are robust to different approaches should play a key role in the formulation of clear policy recommendations for developing countries. This robust econometric approach can be justified using the statistical sensitivity analysis discussed in Magnus and Vasnev (2007).

This paper is structured as follows. Section 2 introduces the concepts of productivity and discusses general productivity measures based on levels versus differences. We conclude that, given the fixed effect nature of IC variables obtained form ICs, it is better to analyze productivity in levels (or log-levels) rather than rates of growth of productivity. This section also introduces a consistent econometric methodology for the selection of IC and firm explanatory variables for different productivity measures. This econometric strategy is applied to study the investment climate determinants of productivity in Costa Rica, Guatemala, Honduras and Nicaragua. Section 3, describes in detail the estimation issues and presents the results. This section also suggests evaluating the country specific contribution of IC variables to average productivity, if we have estimated common elasticities by pooling the data from several countries. Section 4 compares our empirical results with the results form using other methods suggested in the literature to estimate production functions. Finally, section 5 presents a summary of the econometric methodology and of the main conclusions. All the figures and tables with the definitions of the variables used and with the panel data estimation results are included in the appendix.