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RETHINKING THE GROWTH DIAGNOSTICS APPROACH: QUESTIONS FROM THE PRACTITIONERS

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The growth diagnostics methodology pioneered by Hausmann *et al.* (2005) is becoming a key component of the toolkit for donor agencies to formulate their operational strategies. This paper aims at clarifying the primary objectives of the approach, and at highlighting some limitations for operational use. The key to benefiting from the full potential that this approach offers lies in a proper understanding of what it does. This requires being forewarned about the indiscriminate application of the approach to any developing country, irrespective of its circumstances, for it can lead to misguided conclusions.

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JEL Classification: A11, B41, O10, O20

1. Introduction

For decades the emphasis of development policy shifted depending on what economists believed should be the best course of action for the developing countries, in particular to achieve high and sustained growth that would help catching up with the developed countries. Many economists in the newly formed nations following de-colonisation after World War II (WWII) implemented planning and import substitution strategies in the 1950s and 1960s. While for some time these strategies seemed to work, they ran out of steam. Likewise, institutions like the World Bank started recommending market and outward-oriented approaches that emphasised the virtues of the price mechanism. By the late 1980s, the different market-oriented views and policies were consolidated into the so-called Washington Consensus reform package. However, towards the end of the 1990s, it became clear that the reform package advocated by the Washington Consensus could not work without being supplemented by a solid governance and institutional foundation.

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The initial reform list advocated by supporters of the Consensus was augmented with a series of so-called second-generation reforms that emphasised the role of institutions and governance. However, the augmented Washington Consensus reform package did not work either, as evidence showed that countries that adopted and implemented comprehensive reform packages reaped small benefits (for a recent analysis of the Washington Consensus, see Birdsall *et al.*, 2010). Rodrik (2006) argues that "the question now is not whether the Washington Consensus is dead or alive; it is what will replace it" (p. 2). In recent years, economists have observed that countries that implemented well-focussed reforms in key areas saw their growth rates accelerate (Hausmann *et al.*, 2006). The People's Republic of China (PRC), India, and Viet Nam are good examples. Likewise, the discontent with empirical work based on cross-country regressions for policy analyses led many authors to question their usefulness (Felipe and McCombie, 2005).

In this context, Hausmann *et al.* (2005) proposed a growth diagnostics approach as an analytical tool to identify binding constraints for formulating growth strategies. This approach is becoming part of the toolkit used by donor agencies for purposes of formulating their "well-focussed" operational strategies in developing countries. The theoretical underpinnings of this approach as well as its application to dozens of countries are being the subject of a lively debate among development economists, in particular in international financial institutions.

This paper aims at clarifying the primary objectives of the growth diagnostics approach and what in our view are some limitations for operational use. We emphasise that the key to benefiting from the full potential that this approach offers lies in a proper understanding of what it does; and in being forewarned about the indiscriminate application of the approach to any developing country, irrespective of its circumstances, for it can lead to misguided conclusions. Our intent is to raise several issues to elicit further productive discussion to develop the growth diagnostics approach into an effective tool both for policy makers in developing countries and development agencies. The rest of the paper is structured as follows. In Sec. 2, we summarise the main features of the growth diagnostics approach. Section 3 raises a number of questions about this approach. Section 4 provides some final thoughts.

2. What is the Growth Diagnostics Approach?

The growth diagnostics approach provides a framework for formulating hypotheses on what may be constraining a country's growth. It focusses exclusively on economic growth. Hausmann *et al.* (2005) indicate that "while development is a broad concept entailing the raising of human capabilities in general, we believe increasing economic growth rates is the central challenge that developing nations face" (p. 1). This is an important statement because as a result of focussing on economic growth the approach places other important policy objectives of the government — including poverty,

income distribution, environmental protection, and basic human needs — outside the scope of the approach.

The growth diagnostics approach views economic growth as the result of an optimisation process under constraints, and seeks to identify the factors that are the most binding, in the sense that their removal would allow a growth spurt. It assumes a simple growth model whose production function depends on factors such as physical and human capital, governance, institutions, infrastructure, and geography. The objective is to identify the binding constraints by estimating shadow prices — a higher shadow price reflecting scarcity of the resource, thus indicating that the resource constrains growth. Hausmann *et al.* (2005) propose a methodology based on a decision tree where low levels of private investment and entrepreneurship are seen as the key problem (Fig. 1).

The decision tree that Hausmann *et al.* (2005) propose is based on a standard Euler equation, the result, as noted above, of a dynamic optimisation problem, namely, $\frac{\dot{c}_t}{c_t} = \frac{\dot{k}_t}{k_t} = \sigma[r(1-\tau) - \rho]$, where variables are defined as follows: c is per capita consumption, k is per capita capital, σ is the elasticity of inter-temporal substitution of consumption, r is the rate of return to capital, τ is the tax rate on capital, and ρ is the world rate of interest. A dot over a variable denotes the rate of change over time. Further, the rate of return to capital is defined as $r = r(a, \theta, x)$, where a is
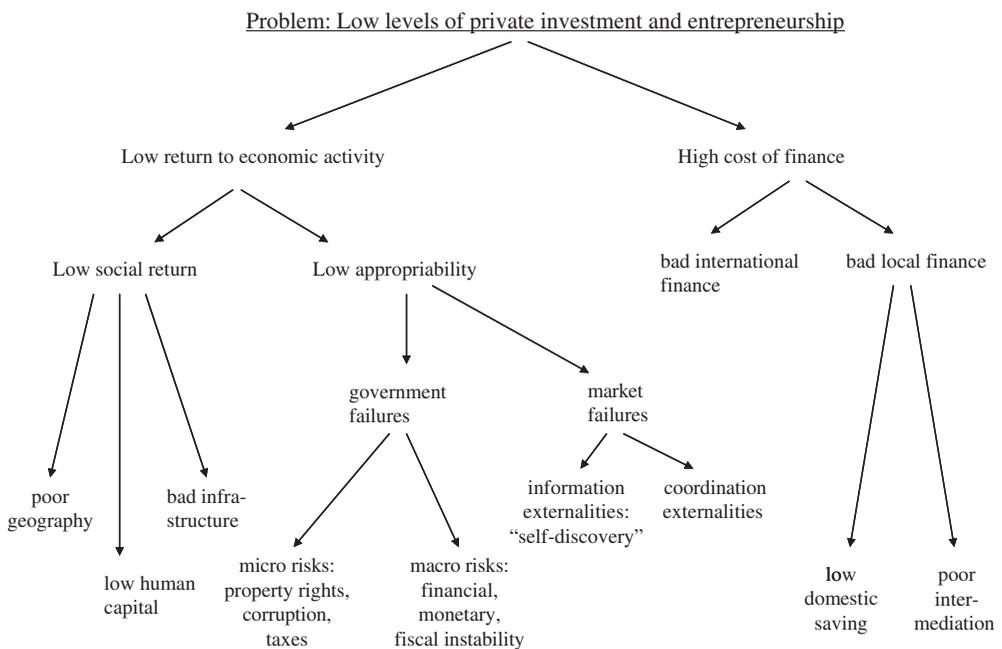

Figure 1. Growth diagnostics decision tree
Source: Adapted from Hausmann *et al.* (2005).

an indicator of total factor productivity, θ denotes the availability of complementary factors of production, and x is an index of externality. The tree takes researchers through different branches (starting with two options: high cost of finance, or low returns) in order to determine the root causes of the problem, i.e., the binding constraints to economic growth.[1]

In the growth diagnostics approach of Hausmann *et al.* (2005), the focus is on identifying the binding constraints for purposes of policy reform. The underlying idea is that removal of a supposedly low number of key constraints (i.e., focussed intervention) will have a larger impact on growth than the traditional approach based on a long list of reforms associated, correctly or incorrectly, with the so-called Washington Consensus, which intended to remove all distortions at the same time. Therefore, there is a connection between the theory of unbalanced growth and growth diagnostics, in that both propose focussed interventions. According to Hausmann *et al.* (2005), countries that have conducted well-targeted reforms to remove the most severe binding constraints, such as the PRC in 1978 and India in 1980, display better growth performance than those countries that undertook comprehensive economic reforms, e.g., Latin American countries. The growth diagnostics approach also takes the view that each country has its own binding constraints. This is also in sharp contrast with the traditional approach of directing the same Washington-consensus-style reforms in all countries.

It is important to note that, by focussing on investment, the growth diagnostics approach acknowledges the fact that developing countries' main problem is the shortage of capital equipment and productive capacity (the latter understood as potential production). In terms of the production possibility frontier, the problem of many developing countries is that some of the available resources are not fully utilised (e.g., people are unemployed). Under these circumstances, it is clear that growth requires higher utilisation of the country's production capacity. The country, therefore, has to try to get closer to the transformation curve.

Some developed and semi-industrialised economies possess a level of capital equipment that is adequate for the existing labour force. This allows them to generate high labour productivity and, consequently, a high income per capita, provided capital is fully utilised and is used productively. The problem in many developing countries is different. It is true that their capital equipment, however small, may be underutilised. The issue, however, is that even in case the equipment were fully utilised, it would not be capable of absorbing the available labour force, leading to low capital–labour ratios, a form of underemployment. In other words, the problem of many developing countries is the *deficiency* of productive capacity rather than the *anomaly* of its

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[1] To a certain extent, the growth diagnostics philosophy is reminiscent of Hirschman (1958) theory of *unbalanced growth*. Hirschman argued that, in the absence of sufficient resources, especially capital, entrepreneurs, decision makers and, above all, the means and ability to bring them all into play, policy makers have to choose the projects that will make the greatest contribution to development, relative to their cost.

underutilisation (Kalecki, 1966). Hence, most developing countries are often below full employment. Most likely, the poorer the country, the more important the problem of lack of productive capacity will be; while the more advanced the country, the more important the problem of lack of effective demand will be. From this point of view, the objective of development is to increase productive capacity, and the process of economic development may be described as a generalised process of capital accumulation.

Therefore, from the point of view of the national economy as a whole, the major obstacle to the development of many poor countries is the shortage of productive capacity. This is obvious in policy discussions in countries like India, Pakistan, or the Philippines, where there are constant references to the "low investment" problem. This constraint (i.e., low investment) lowers growth and prevents the elimination of unemployment and underemployment, even when an increase in demand would make the expansion of output profitable.

This view of the role of capital in development is not, however, universally accepted. Lewis (2004) has argued that "the way capital affects economic performance is not well understood" (p. 247). He further elaborates: "Differences in labour productivity arise because of the different ways firms have chosen to organise their labour and capital… those choices are heavily influenced by the nature of competition, which is determined primarily by government rules and regulations" (p. 247–248). We shall expound upon the implications of Lewis's views in the next section.

Allocative efficiency problems are also present in developing countries. That is, a country may not be on the transformation curve and, moreover, the combination of goods and services that it produces probably is often not the one that maximises the value of output at the prevailing prices. Growth will occur then by producing a different combination of goods, even with a constant productive capacity. Think, for example, of problems in the agricultural sector when prices are highly regulated. Removal of this constraint will allow a significant adjustment in farmers' production, as they will respond to price signals. Growth in this case is said to be due to improvements in allocative efficiency. This is a problem that affects the developed countries mostly. Their efforts are directed toward eliminating this inefficiency, e.g., reforms in product and factor markets.

Likewise, the above does not mean that developing countries do not suffer from inadequacy of effective demand. Indeed they do. Effective demand problems are not entirely absent in developing countries and they can even become the binding constraints on production in developing countries at a fairly advanced stage of industrialisation (e.g., PRC, Malaysia, Thailand). Effective demand problems (i.e., lack of demand) can be the result of, for example, being balance-of-payments constrained (McCombie and Thirlwall, 1994). Certainly the problem of markets may limit developing countries' growth rates. For example, the export sector of developing countries could be expanded by bringing in foreign capital. Or, it could also be argued that, in the countryside, the capacity for producing goods is so variable, and can be

expected to be so responsive to increases in demand that it can be thought of as being demand-determined.[2]

Overall, we believe that the growth diagnostics methodology can be a useful tool for policymakers to formulate a focussed development strategy in the presence of limited resources. It can also be a great help for donor agencies in order to set up priorities in their operations, therefore maximising the impact of their assistance to the recipient countries. Even if we have comprehensive sector assessments for all major sectors, it is not feasible to determine priorities among the sectors for operational purposes. The lack of systematic assessment of binding constraints has, at times, resulted in fragmented or not well-focussed operational strategies and programs. Therefore, donor agencies have "bought" the new approach and undertaken pilot testing exercises of this new approach in some countries.[3]

3. What Are the Limitations of the Growth Diagnostics Approach?

The growth diagnostics approach has, in our view, some limitations. This does not mean that the approach is incorrect or wrong. Indeed, quite the opposite. The approach provides a well-structured methodology to think about why some countries do not appear to take off, and forces policy makers to seriously think about what prevents a poor country from growing faster. What we argue, as practitioners, is that the implementation of the growth diagnostics methodology is not a straightforward process; and second, that policy makers have to be aware of what we believe are some important issues in deciding whether this methodology is appropriate, given the problem(s) of the particular country under study. As development practitioners, we believe that the work of Hausmann *et al.* (2005) is only the start. The methodology has to be further improved, as there are a number of loose ends. A total of ten issues are discussed below.

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[2] For productive capacity to be fully utilised there must be sufficient effective demand. Classical (and neoclassical) economists believed this to be the case due to their belief in Say's Law (i.e., supply creates its own demand) and the neglect of demand factors. Hence, they concluded that the level of production would correspond to productive capacity. The belief in Say's Law ultimately derives from the view that markets function efficiently and competitively so that the prices of all factors and goods speedily adjust to their equilibrium level at which demand equals supply. On these assumptions, all factors of production are fully utilised. Moreover, market forces allocate the resources available at any time in such an optimal manner that the total value of all goods and services produced in an economy is the maximum that can be attained.

[3] Leipziger and Zagha (2006) report that the World Bank conducted 12 pilot studies (Armenia, Baltic countries, Bangladesh, Bolivia, Brazil, Cambodia, Egypt, India, Madagascar, Morocco, Tanzania, and Thailand) in 2005. The Asian Development Bank also conducted such exercise for the Philippines, Nepal, and Indonesia (see http://www.adb. org/Documents/Studies/Indonesia-Critical-Development-Constraints/Main-Report-Indonesia-Critical-Development-Constraints/default.asp), last accessed on May 03, 2011. The World Bank reports are available in the World Bank PREM website: http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/ORGANIZATION/EXTPREM-NET/0,contentMDK:20606439~menuPK:4833683~pagePK:64159605~piPK:64157667~theSitePK:489961,00.html, last accessed on May 03, 2011.

3.1. *The neoclassical approach*

As discussed earlier, the growth diagnostics approach is based on a neoclassical growth model, in the sense that the constraints on growth are on the supply side. This is obvious in their formulation of the problem. We think this is problematic for two reasons. First, because it ignores demand constraints, in particular that growth can be ultimately demand and not supply-constrained.[4] Indeed, growth can be determined by constraints on demand before supply constraints bite. Often, a market economy does not create a level of aggregate demand consistent with full employment. In this case, low economic growth and high unemployment are the result of lack of effective demand. And second, because it is not clear whether the authors assume that resources are always fully utilised, especially labour. Unemployment and underemployment have always been a major cause of poverty. In Keynesian analyses, demand plays a central role in setting the overall level of economic activity, and the objective of policymaking is the achievement of full employment.

3.2. *Not all countries can grow at the same rate*

The "growth problem" in the growth diagnostics approach is formulated as if all countries could achieve a higher growth rate provided the identified binding constraint could be relaxed. It seems that higher growth is both desirable and possible, and has no consequences. This ignores the fact that countries have different *natural rates* of growth (in Harrod's terminology) that provide the maximum sustainable rate of growth that technical conditions make available to the economic system as a whole, i.e., it defines the growth rate of productive capacity or the long-run full employment equilibrium growth rate. And second, static equilibrium in an economy requires that plans to invest equal plans to save. This leads to the following question: what must be the growth of income in a growing economy for plans to invest to equal plans to save to give a moving equilibrium through time? Moreover, is there any guarantee that this required rate of growth, which Harrod called the *warranted* rate, will prevail and, if not, what will happen? The answer is that there is no guarantee, and that if the two growth rates diverge there will be dynamic instability. The long-run question for an economy lies in the relation between natural growth rate and the warranted growth rate.[5] This means that without an analysis of a

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[4] This is not to say that the authors do not refer to the demand side or even to demand-side problems. Their references to the demand side, however, are not what we mean here when we say that an economy can be demand-constrained. Hausmann *et al.* (2005) model is a neoclassical model. For example, it does not have an independent investment function (that depends, in particular, on the emergence of new markets and the expansion of old ones, since no firm will expand capacity unless it believes that there will be a market for what it produces). In the spirit of the endogenous growth models, growth is endogenous in the sense that it is not simply exogenously determined by the effective labour supply, but not in the sense that growth is endogenous to demand.

[5] When the natural growth rate is smaller than the warranted growth rate, full employment will prevail, but with accelerating inflation. This case will result in a chronic tendency toward depression as the actual rate of growth is not sufficient to stimulate investment demand to match the amount of saving at full employment equilibrium. But when the natural rate exceeds the warranted rate, the economy will be growing at an ever-increasing rate of unemployment, with a tendency toward demand inflation because the actual rate of growth will tend to exceed investment to match saving. As the growth of the capital stock falls short of the growth of the effective labour force, unemployment will surface. This seems to be the historical experience of many developing countries (i.e., the growth of population and labour-augmenting technical progress exceeds that of capital accumulation).

country's natural and warranted rates of growth, recommendations to increase the growth rate of output are problematic.

3.3. *The difficulties in identifying price and non-price signals*

Although the underlying idea is itself quite clear, in practice, it is not easy to find signals that guide the diagnostics process. The approach requires searching for both price and non-price signals. Price signals in this context are the shadow prices of resources. If the shadow price of a certain resource is high, it is inferred that growth is constrained by the resource. However, in practice, it is not easy to measure shadow prices. It is thus inevitable for researchers to rely on theoretical grounds and indirect evidence for judging the scarcity of a resource. Moreover, even if we could measure the equilibrium price of a resource, this may not necessarily reflect a constraint on growth. Aghion and Durlauf (2007) explain this problem by discussing low interest rates under credit rationing.[6]

The authors of the growth diagnostics approach also recommend researchers to check non-price signals, since, when a constraint binds growth, it generally results in activities and arrangements designed to get around the constraint. Strict government controls, for example, can lead to high informality in economic activities. The lack of adequate legal mechanisms can create informal mechanisms of conflict settlement. Application of this approach, therefore, requires in-depth knowledge of the economy being analysed as well as the ability to rank interventions. This implies that it is possible for two researchers applying the growth diagnostics methodology to reach different conclusions.

3.4. *Private investment as the key to economic growth*

The growth diagnostics approach assumes — at least judging from the original work of Hausmann *et al.* (2005), as well from applications of the approach to some economies — that private investment is the key to economic growth. Certainly we do not accuse the authors of being "capital fundamentalists". Our point is simply that we find it surprising that the problem, in every single case analysed, is the same, namely lack of private investment.[7] Earlier, Rodrik (1999) had emphasised the central role of private investment in order to achieve a higher growth rate, based on the assessment of the successful developing economies. He argued that "the key is to induce the private sector to invest by enhancing the perceived returns to private investments and to generate a virtuous cycle of profits, investments, and capacity expansion"

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[6]Credit rationing appears when financial institutions decide not to increase interest rates despite a higher demand for loans. This is done in order to avoid a higher default risk (or government regulations). Aghion and Durlauf (2007) argue that, with a high degree of credit rationing, a higher supply of loanable funds can result in a lower equilibrium interest rate. This implies that a low interest rate does not mean that the credit market is not constrained.

[7]As of May 2011, there were 33 growth diagnostics exercises uploaded in Dani Rodrik's website (http://www.hks. harvard.edu/fs/drodrik/GrowthDiag.html), last accessed May 03, 2011. All the exercises set private investment as the key problem for growth.

(Rodrik, 1999: 64). From this assessment, it is clear that the growth diagnostics approach is based upon Rodrik's observation about the long-term growth performance of the successful countries.

The decision tree used in all studies so far conducted regards "low levels of private investments and entrepreneurship" as the key problem. Based on this assumption, these analyses try to identify the root causes of low private investment, and, hence, low growth. There is no single case where a different decision tree has been developed to analyse growth.[8] This is consistent with the arguments in the introduction, namely, that the objective of most developing countries is to increase productive capacity. Likewise, focussing on investment brings to mind Lewis' idea that "the central fact of economic development is rapid capital accumulation" (Lewis, 1954), and that the process of development is one of transforming a country from being a 5 percent saver and investor to a 12 percent saver and investor (Lewis, 1955).[9] In the same vein, Rosenberg (1960) argued that "One need not subscribe to a monocausal theory of development to argue that an increase in the percentage of annual output devoted to investment is an urgent and indispensable prerequisite to a long-term rise in real per capita incomes.… A central question in a theory of development, then, is: Why are rates of capital formation as low as they apparently are in most underdeveloped countries?" (Rosenberg, 1960: 706–707). Rosenberg also argues that there are two main factors explaining capital deficiency, namely, low saving propensities and weakness in the inducement to invest. This is very much reminiscent of Hausmann *et al.* (2005) decision tree.

The relevance of investment is most likely true in the context of *igniting* growth. Indeed, there is no doubt that some critical level of (private) investment is needed to jump-start growth. However, once a country is growing, a high and increasing investment share may not be a necessary requirement in order to continue growing or even to accelerate growth. Indeed, historically, there are many countries that have achieved high growth without a high investment share. It is worth noting that Hausmann *et al.* (2006) work on growth accelerations shows that, although these are correlated with increases in investment (i.e., growth accelerations seem to require more investment), the latter are not a predictor of growth transitions (their regressions do not show this variable; we take this to imply that it was statistically insignificant).

Figure 2 shows the scatter plot of average GDP growth during five sub-periods: 1960–1969, 1970–1979, 1980–1989, 1990–1999, and 2000–2004; and the investment share in GDP (also average for each of the five sub-periods) for 157 countries (this excludes the OECD countries, except Korea), corresponding to a total of 595 data points (there is no data for some countries in some sub-periods). The vertical and

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[8] See Boyer (2006), who has developed a different decision tree to analyse unemployment, i.e., what are the factors limiting employment?

[9] Lewis (1955) indicated that "the countries which are now relatively developed have at some time in the past gone through a rapid acceleration in the course of which their rate of net investment has moved from 5 percent [of national income] or less to 12 percent or more."
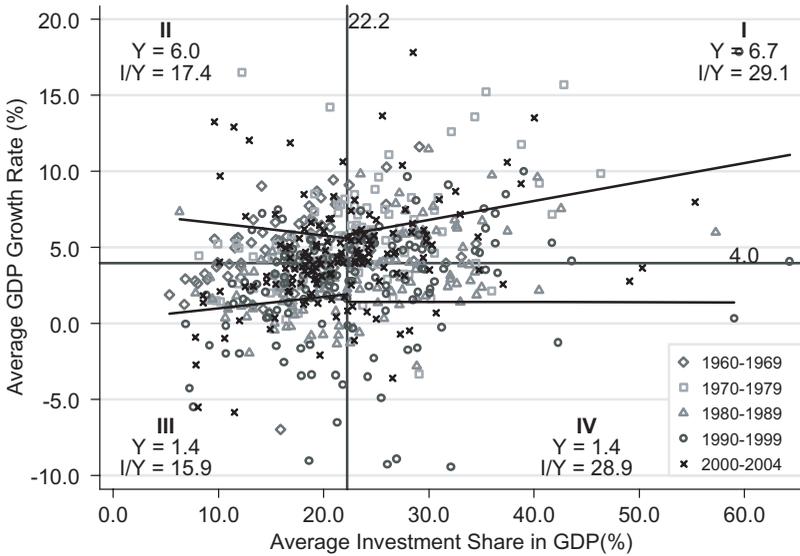
Figure 2. Growth and investment
Pooled data: 157 countries, 1960s, 1970s, 1980s, 1990s, 2000–2004
Source: Authors' estimates based on the World Bank's World Development Indicators.

Dependent: Average GDP growth

	Coef.	t	P > t
Investment share in GDP	0.124	2.60	0.01
Dummy (quadrant 2)	4.265	2.28	0.02
Dummy (quadrant 3)	−2.828	−1.88	0.06
Dummy (quadrant 4)	−1.643	−0.94	0.35
Dummy (quadrant 2) * Investment share in GDP	−0.202	−2.35	0.02
Dummy (quadrant 3) * Investment share in GDP	−0.049	−0.76	0.45
Dummy (quadrant 4) * Investment share in GDP	−0.125	−2.04	0.04
Constant	3.080	2.34	0.02

$R^2 = 0.53$
No. of observations $= 595$

horizontal lines that divide all cases are the overall mean investment share (22.2 percent) and the overall mean growth rate (4.0 percent). These two lines therefore divide the countries into four groups: first quadrant (I), countries with both above-average growth rates and investment shares; second quadrant (II), countries with growth rates above the world average but investment shares below the world average;

third quadrant (III), countries with both growth rates and investment shares below the average; and fourth quadrant (IV), countries with growth rates below the average but investment shares above the average. Figure 2 also shows the mean growth and mean investment share for the countries in each quadrant. The average investment share in the first and fourth quadrants is about the same and more than 10 percentage points higher than the average investment shares in the second and third quadrants. The average growth rate in the first and second quadrants is about 4–5 times higher than the average growth rate of the countries in the third and fourth quadrants.

The following can be concluded:

(i) The relationship (correlation) between investment share and growth is positive and statistically significant (bottom of Fig. 2).[10] We tested for the difference in the slope among the four quadrants. This is positive (with a slope of 0.124) in the case of the first quadrant, the default quadrant in the regression; marginally significant for the countries in the third quadrants (with a slope of 0.075); and statistically insignificant for the other two quadrants (i.e., the slope is not different from zero). This indicates that the positive relationship between investment share and growth rate often found in various studies is driven by the countries in the first and third quadrants.

(ii) The growth diagnostics methodology, as conceived initially by its proponents, should apply only to the countries in the third quadrant (III), i.e., countries with both investment share and growth rate below the mean. Figure 3 shows the position of countries in 2000–2004, and Annex Table A.1 provides the list of countries by quadrants in 2000–2004. The objective of the methodology is to identify why countries are in this quadrant and consequently, propose policies so that they can shift to the first quadrant (high investment share and growth rate). Where do the Asian countries lie? Most of them lie in the first or second quadrants.[11] Therefore, unless one chooses a criterion different from ours to classify countries, one cannot think that developing Asian countries suffer from a problem of low growth due to a low investment share.

(iii) Again in reference to Fig. 3, one could ask the following question: which of the countries in the third quadrant (III) in 2000–2004 had both *low* below-average growth rate and investment share? After all, the growth diagnostics methodology does not provide a benchmark to establish when a given investment share is low. We define *low* growth rate and *low* investment share as the (overall) mean minus one standard deviation, that is, 0.5 percent average growth rate, and 13.9 percent average investment share. These countries were Central African Republic (-0.9

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[10] However, when the average growth of GDP was regressed on the average investment share lagged one period (i.e., one decade), the coefficient of the latter was statistically insignificant, the same finding reported by Easterly (2002: p. 39).

[11] Brunei Darussalam, Fiji, Papua New Guinea, Solomon Islands, and Vanuatu are in the third quadrant; Nepal, Sri Lanka, and Tonga are in the fourth quadrant.
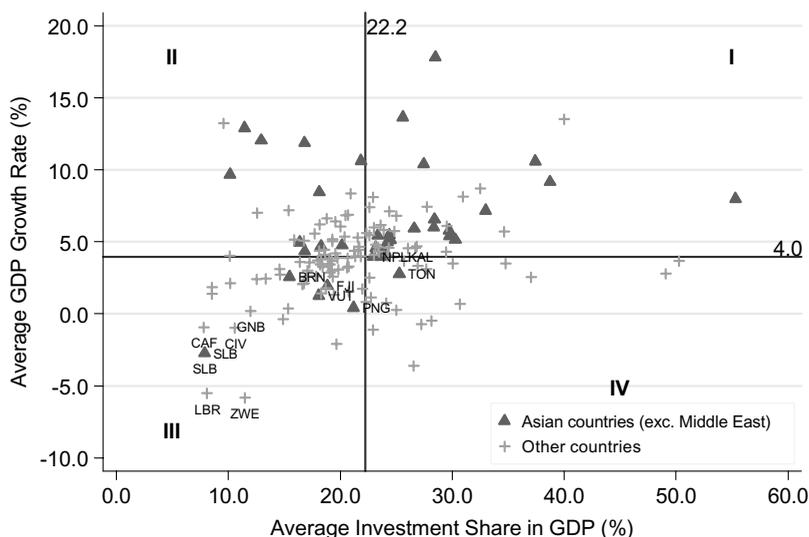
Figure 3. Distribution of Countries, 2000–2004
Source: World Bank, World Development Indicators.

percent growth, 7.8 percent investment share); Cote d'Ivoire (−1.0 percent growth, 10.6 percent investment share); Guinea-Bissau (0.2 percent growth, 12.0 percent investment share); Liberia (−5.5 percent growth, 8.1 percent investment share); Solomon Islands (−2.7 percent growth, 7.9 percent investment share); and Zimbabwe (−5.8 percent growth, 11.5 percent investment share).[12] These are the *only* countries to which, strictly speaking, the growth diagnostics approach applies.

(iv) Countries in the fourth quadrant in Fig. 2 cannot be said to be constrained by low investment as their average investment share is about the same as that of the countries in the first quadrant.

(v) Countries in the second quadrant have achieved average growth that is not much lower than that achieved by the countries in the first quadrant, but this was associated with a far lower investment share, hence they were more "efficient".[13] Some of the countries that belonged to the second quadrant in Fig. 2 are Korea, Malaysia, Singapore, and Thailand in the 1960s; Indonesia in the 1970s; and the Philippines in 2000–2004. It is worth noting that Singapore and Thailand achieved their highest growth rate in the 1960s (9.5 percent and 7.8 percent, respectively), while they had the lowest investment share (20.9 percent and 21.1 percent, respectively). In particular, Singapore's investment share increased during the last decades by more than twofold, although its growth rate is lower

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[12] Admitting that in the case of these six countries the binding constraint to higher growth may be low investment, the broader question is: at what rate of growth and investment share does the growth diagnostics methodology become relevant? This is very sensitive and each researcher will have to decide.

[13] We are not implying that being in this quadrant is necessarily "better" than being in quadrant I. Some of the countries in this group be may have achieved consumption-led growth combined with low productivity in agriculture and services, which requires little capital formation.

than what it achieved during the 1960s when its investment share was at the lowest. Malaysia achieved the highest growth rate in the 1970s (7.7 percent) and an investment rate of 22.9 percent, well below the investment shares of the 1980s and 1990s when its GDP growth was lower. The Indonesian and Korean cases are similar to that of Malaysia.[14]

(vi) There is only one country in our sample whose growth rate in each of the five sub-periods was above the world mean of 4.0 percent and whose investment rate was below the world mean of 22.2 percent (i.e., that has always been in the second quadrant): Pakistan. Pakistan's average investment share for 1960–2004 is 17.7 percent (4.5 percentage points below the world average), and the average growth rate for the same period is 5.4 percent (1.4 percentage points above the world average). It is therefore difficult to argue that investment is a binding constraint on growth in Pakistan. It is true that when Pakistan is compared with the most successful countries in Asia in terms of growth, its performance is not as stellar. But when placed in the world context, its performance is not disastrous. Moreover, when we graphed Pakistan's annual growth rate since the 1960s, a number of important features led to further questioning of the thesis that Pakistan's problem is how to ignite growth. These are: (a) the economy is characterised by boom-bust cycles; (b) average growth, as noted above, during the last 40 years has been 5.4 percent; (c) there has not been a single year of negative growth; (d) important decelerations in growth are related to poor performance of the agricultural sector; and (e) the largest contributor to output growth is the service sector. We concluded that Pakistan's key (macro) problem is not how to ignite growth, but how to avoid boom-bust cycles and how to industrialise. Moreover, any useful analysis of Pakistan's economy has to be framed in the context of the country's social backwardness, or what Easterly (2003) calls "the political economy of growth without development."[15]

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[14] Obviously, if we had used decadal averages instead of the average growth rate and investment share for the whole period, results would have been slightly different. In the 1960s, the average growth rate was 4.9 and the average investment share was 17.5 percent. Among the fast growing Asian economies, only Indonesia was in the third quadrant. Hong Kong, China; Korea; Malaysia; Philippines; Singapore; and Thailand were in the first quadrant. In the 1970s, the average growth rate and average investment share were 5.6 percent and 22.9 percent, respectively. Indonesia was in the second quadrant, while Hong Kong, China; Korea; Malaysia; Philippines; Singapore; and Thailand were in the first quadrant. In the 1980s, the average growth rates were 3.2 percent and 23.8 percent. Hong Kong, China; Indonesia; Korea; Malaysia; Singapore; and Thailand were in the first quadrant while the Philippines was in the third quadrant. In the 1990s, average growth rates were 2.6 percent and 23.2 percent. Hong Kong, China; Indonesia; Korea; Malaysia; Singapore; and Thailand were in the first quadrant while the Philippines was in the second quadrant. Finally, in 2000–2004, average growth rates were 4.4 percent and 21.9 percent. Indonesia; Korea; Malaysia; Singapore; and Thailand were in the first quadrant while the Philippines was in the second quadrant and Hong Kong, China was in the fourth quadrant. This does not invalidate our general point that a high investment share does not lead to or is associated with a high growth rate.

[15] Easterly (2003) argues that two possible theories in the field of political economy that might help explain Pakistan's situation are: (i) the dominance of an elite that does not support human capital investment in the masses; and (ii) the link between ethnic fractionalisation and poor public service and institutional outcomes. Prichett (2003a, Table 5.1) argues that Pakistan (and a series of similar countries) is a country that is neither a technological leader nor an advanced industrial country, and is not in a poverty trap. It registers self-sustaining moderate growth. He asks: "Why do countries not have quite rapid convergence to the leaders in the absence of growth impediments?" (Prichett, 2003a: 130).
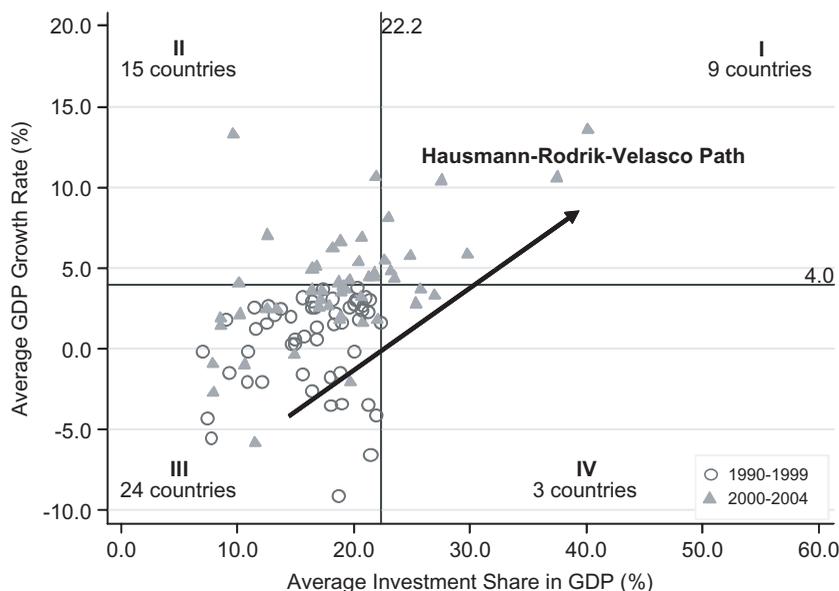
Figure 4. Transition paths — where did the countries in quadrant III in the 1990s move to in 2000–2004?
Source: World Bank, World Development Indicators.

(vii) Figure 4 shows the transition path of the 53 countries that were in the third quadrant in the 1990s. Annex Table A.2 provides the list of countries that belonged to quadrant III in the 1990s. We inquired where they shifted to in 2000–2004. Twenty-four countries remained in the third quadrant. Nine countries shifted to the first quadrant. These are the countries that followed what we call the "Hausmann-Rodrik-Velasco path", since they achieved a higher growth by (among other things) increasing their investment share. The other 18 countries shifted either to the second or to the fourth quadrants. We refer to the 15 countries that shifted to the second quadrant as "efficient countries", as they achieved a growth rate about the same as that of the countries in the first quadrant but with the need of a significantly lower investment share. The key finding here is that the Hausmann-Rodrik-Velasco path, assumed in the growth diagnostics approach, is only one option for countries to improve their growth performance. Growth is possible without a higher investment share. For these countries, the problem, if any, is not investment, but something else (we must note that in 2007, the Philippines achieved a growth rate of 7.3 percent without increasing private investment. In fact, there was an increase in public invest-ment). And finally, four countries shifted to the fourth quadrant. We call these the "inefficient countries", since they failed to accelerate growth even with a higher investment share.

3.5. *Capital accumulation as the key to growth and development*

As noted in the Introduction, Lewis (2004) has challenged the view that capital accumulation is the key to growth and development, as well as the public debate around the prescription that what poor countries need is more capital. He makes two crucial points: (i) capital *does not* automatically increase labour productivity; and (ii) what capital *does* is to increase the capacity for growth. This means that developing countries could increase their performance dramatically without any significant increase in capital. To become rich, however, they need additional capital. The problem in most developing countries is in the efficiency with which they use existing capital.

To see this, one can think of the role of capital accumulation in a growth accounting exercise. The growth rate of the capital stock ($\hat{K}$) can be written as $\hat{K} = (\dot{K}/K) = (I/K) = (I/Y) \times (Y/K)$, where (I/Y) is the investment share and (Y/K) denotes capital productivity. This means that capital accumulation depends on two factors: one is the amount of investment (as a share of output), and the other one is the productivity with which this capital is used. This implies that two different countries could achieve the same growth rate of the capital stock with different investment shares, depending on the productivity of capital. Lewis (2004) point is that developing countries' performance could improve substantially by working on this second factor. Lewis insists that "improving the rules and regulations governing competition would improve not only labour productivity *but also capital productivity*" (p. 251; emphasis added). Naturally, in the long run, and in order to become a rich country, developing countries with spare labour capability (i.e., labour surplus), need to build offices and manufacturing plants where these workers can work. That is, countries need to increase the capacity to produce goods and services. Lewis remarks: "Of course, the total capital required to increase capacity depends on the efficiency with which the capital is employed" (Lewis, 2004: 250). It therefore seems that Lewis reverses the role of capital for purposes of igniting and sustaining growth, i.e., in the short run, developing countries do not need more capital; what they need is to use more efficiently the one they have. To achieve this, reforms of rules and regulations governing competition is the key. However, in the long run, and to become rich countries, developing countries will need more capital.[16] This view is in line with that of Easterly (2002), who concluded that in the short run "…there is no evidence that investment is either a necessary or a sufficient condition for high growth […] empirically, *increases* in investment are neither necessary nor sufficient for *increases* in growth over the short to medium run (p. 40; italics added). This agrees with Hausmann *et al.* (2006) work on the role of investment in growth accelerations referred to above.

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[16] Rodrik (1999) emphasised the key role of private investment for achieving a higher long-term growth rate, based on an assessment of the long-term growth performance of a number of successful economies. However, Hausmann *et al.* (2005) seem to shift focus: the key to igniting growth is now private investment, while the key to sustaining growth in the long term is improvement in the quality of governance and institutions. In our view, this change in their position can be one of the sources of confusion about the objective of the growth diagnostics methodology.

However, Prichett (2003b) argues that the role of physical investment in growth is clear.

3.6. *Static nature of the problem*

Another problem with the methodology lies in its *static* nature. It focusses on constraints that are binding today, but not necessarily in the future. In this sense, the approach was originally designed to detect binding constraints to "initiating growth" for stagnant economies. However, the problem of many economies, particularly in Asia, is not how to start growth but how to sustain their strong growth performance in the medium and long term.

Rodrik admits that "a policymaker interested in igniting economic growth may be better served by targeting the most binding constraints on economic growth — where the bang for the reform buck is greatest — than by investing scarce political and administrative capital on ambitious institutional reforms. Of course, institutional reform will be needed eventually to sustain economic growth. But it may be easier and more effective to do that when the economy is already growing and its costs can be spread over time" (p. 12). It is clear that for Rodrik, sustaining growth requires long-term institutional changes so that economies can absorb shocks and promote diversification (Rodrik, 2005).[17] But this is different from the requirements to ignite growth. Hausmann (2006) argues that "accelerating growth and sustaining high growth require very different approaches. If you have a country that is not growing much, the strategy to get it to grow fast should be to remove the most binding constraint. When the country is already growing fast, the challenge is to remove the future constraints as they become actually or potentially binding." For the originators of the growth diagnostics approach, growing economies are outside the scope of the growth diagnostics.

A related problem is the lack of distinction between the implementation of certain policies at a point in time, and the result of these policies, which may surface as a binding constraint later on. For example, following the Washington Consensus approach, a country may have been advised to cut its fiscal spending. This could result in underinvestment in infrastructure, which the binding constraints approach may later on identify as a binding constraint.

3.7. *Today's binding constraints, or tomorrow's?*

Some recent growth diagnostics exercises, such as that of the World Bank (2006) for Morocco, argue forcefully the importance of targeting "constraints that might become potentially binding in the future but may require action now" (p. 26). Indeed, Leipziger and Zagha (2006) argue that "even though the framework focuses on short-run

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[17] Hausmann *et al.* (2005) also argue that "Igniting economic growth may not require the infinite laundry list of reforms that have become the current consensus on best practices. But once the economy is on the path of growth, the onus is on policymakers to solve the institutional and other constraints that will inevitably become more binding" (p. 24).

considerations, it does not ignore constraints that will emerge in the long run". Zettlemeyer (2006) also challenges the principle of focusing only on the currently binding constraints: focusing on today's binding constraints is not enough if new binding constraints can appear within a few years. Therefore, efforts by policymakers to remove today's constraints also need to consider the constraints that can bind the economy's growth in the near future. However, application of the growth diagnostics in this direction faces the significant risk of losing its genuine value as a tool for prioritising policy reforms. Empirical evidence about today's binding constraints may be found; but it is much more difficult, perhaps impossible, to find evidence on what tomorrow's binding constraints might be. Once one starts considering future possible binding constraints without having clear assessing criteria (i.e., diagnostics signals), almost all interventions and reforms can be easily justified, resulting in not well-focussed strategies. Understanding this problem is of significant importance for making this new approach operational and for a correct formulation of strategies. In this sense, one needs to recognise that the growth diagnostics approach is a tool to prioritise policy reforms needed for igniting growth in stagnant economies.

In their analysis of the growth diagnostics methodology, Lin and Monga (2010) also see this problem and propose a modification of the Hausmann *et al.* (2005) methodology, based on a two-step process, "much easier to implement" (in the words of Lin and Monga (2010), footnote 34). Given the critical importance of structural transformation in the development process, the first step is to identify new industries in which the country may potentially have comparative advantage. This shows that they are most likely thinking about future constraints. The second step is to remove constraints that prevent the emergence of the new potential industries.

3.8. *Sequencing policy reforms*

While the question of how to sequence projects was a key issue in Hirschman (1958) unbalanced growth theory, the growth diagnostics approach does not deal, at least directly, with the sequencing of policy reforms. Instead, the approach suggests that policy makers should tackle current binding constraints. This can be easily understood by considering a simple case. Assume that the growth diagnostics exercise has identified poor banking intermediation as a key binding constraint. This means that policy makers should focus on banking sector reforms. However, in formulating a plan and strategy for reform, for example, to be undertaken during the next 5 years, policy makers may consider reforms not just in the banking sector, but overall in the financial sector. Policy makers (and donors) would therefore lay out a reform plan for the medium and long term, including second-generation reforms (e.g., capital markets). The initial growth diagnostics approach, however, did not contemplate this longer reform sequence. The problem is that if one starts considering the sequence of reforms in the overall financial sector, the value of the growth diagnostics approach vanishes, since the decisions about what to reform next (i.e., after the banking sector) are not

based on a growth diagnostics exercise. Moreover, if after the banking sector reforms have been implemented, another growth diagnostics exercise were to be undertaken, this may or may not indicate that the new binding constraint is in the financial sector.

3.9. *Independence of decisions and branches*

A critical assumption in the growth diagnostics approach is the independence of the branches in the decision tree. For example, the two upper branches of Hausmann *et al.* (2005) decision tree, namely, high cost of finance and low private economic returns, may not be independent, i.e., probably the same forces that explain one cause also explain the other one. Indeed, the savings rate can be low due to lack of investment opportunities; and investment opportunities can be limited due to low saving. This implies that high cost of finance and low return to investment (the starting point of the tree diagram) cannot be treated as causes of low investment. Dixit (2005) argues that, in reality, each case of development failure may have multiple causes acting simultaneously. He proposes a framework for narrowing down or identifying the causes of failures, but it remains at the conceptual level.[18] This also implies that once one opts for one branch then all other possible causes associated with the other branches are automatically discarded. For example, if early on the problem seems to be high cost of finance, then coordination externalities or bad infrastructure would never be considered in the analysis.

3.10. *Igniting versus sustaining growth*

The approach does not explain what is the relationship between igniting growth and the policies associated to it (i.e., investment), and sustaining growth and the corresponding policies (i.e., development of institutions). How does the transition from one stage to the next occur? Are they unconnected problems? Moreover, how do we know when a country shifts from one phase into the next? While the authors, in particular Rodrik ((2007), Section B), elaborate upon how to design institutions for sustaining growth during the second stage, the transition path from the first stage remains vague. In our view, the authors implicitly assume that adequate policies and reforms at each stage are totally independent and do not have any interconnection. Thoma (2007), however, argues: "I would like to see the connections between the two stages, particularly how to set conditions in the first stage so as to make the second stage more likely, explored in more depth" (p. 21). Zettlemeyer (2006) also challenges the growth diagnostics approach for its lack of clear strategy for improving institutions that are

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[18] This problem may appear in other parts of the tree. For example, and in the context of the Philippines, the high cost of external finance during 2002–2006 was due to the perceived fiscal crisis and the high public debt burden. Also, the boom-bust cycles that characterise the performance of countries like Pakistan or the Philippines could be related to the current account (or investment–savings) deficits during periods of high growth, which put a break on the acceleration of growth. The current account deficit may be due to the inability to promote export growth, itself related to problems of self-discovery and an overvalued currency.

needed for sustaining growth. As discussed in Hausmann *et al.* (2006), the first phase of igniting growth seems to be much easier than getting to the sustaining process at the second stage. We thus should know more about the transition path to situate the growth diagnostic approach into a broad development strategy for developing countries.

Take a country like the Philippines, for years labeled the "sick man of Asia". The diagnostic for a long time was that chronic underinvestment, corruption, economic mismanagement, large budget deficits, and political instability prevented it from matching the performance of its regional peers. However, as noted earlier, in 2007, the Philippines achieved a growth rate of 7.3 percent, the highest rate in three decades. Does this mean that policy makers removed successfully the most binding constraints? Can we take this to mean that the country has shifted from the phase of igniting growth to that of sustaining it? (see Bocchi, 2008).

There seems to be considerable confusion among researchers on this issue. For example, Leipziger and Zagha (2006) argue that "the growth diagnostics framework applies to stagnant as well as rapidly growing economies" and that "conceptually, the question relates to the increase in the growth rate. Asking whether a zero growth rate can be increased is no different from asking whether a positive growth rate can be increased". We think this is misleading. How can policies and reforms needed to initiate growth in a stagnant African country be same as those required to further increase the PRC's already high growth rates (or even to prevent them from falling)?

A possible reason for this unfortunate confusion can be that, in their original paper, Hausmann *et al.* (2005) did not elaborate upon the difference between "igniting growth" and "sustaining growth". They chose three countries as case studies, namely Brazil, the Dominican Republic, and El Salvador. Figures 5(a)–5(c) show the transition paths of these three countries. Their intention to apply the growth diagnostics approach to Brazil and El Salvador was to show that their decision tree (starting from low private investment) could lead to different outcomes at the end of the decision tree. According to their exercises, El Salvador's growth is constrained by high discovery costs; and Brazil's by high cost of finance.

Why then did the authors need to refer to the Dominican Republic? In our view, it is of critical importance to understand this case in order to recognise the difference between *igniting* and *sustaining* growth. Although Hausmann *et al.* (2005) discussed the Dominican Republic, they did not apply the decision tree. They argued that the country's recent economic stagnation was an inevitable result of policymakers' failure to invest resources in institutional reforms and good governance when the country enjoyed favorable growth in the 1970s. In their argument, institutional reforms and good governance are key ingredients for sustaining growth. The Dominican Republic should have invested more in institutions and governance for sustaining growth when the economy enjoyed a high growth rate. We think that the authors may intentionally have picked the experience of the Dominican Republic to show the difference between igniting growth and sustaining growth. However, an unfortunate confusion was created by their failure to provide a thorough explanation of this case, which led to a series of
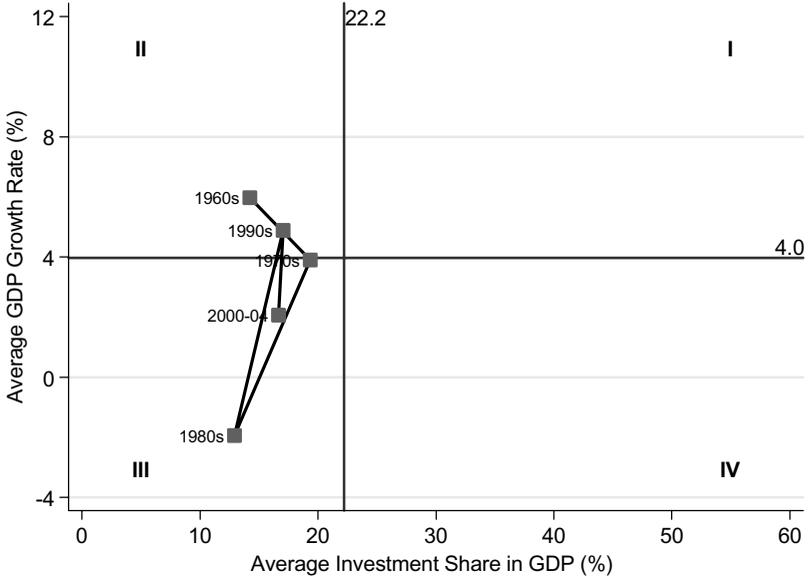
(a)
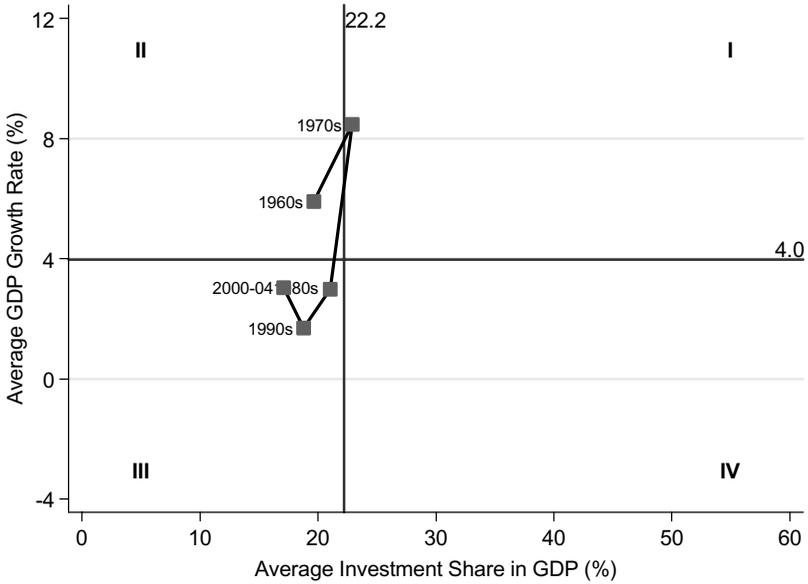
(b)

Figure 5. (a) Transition path of El salvador, (b) Transition path of Brazil, and (c) Transition path of the Dominican Republic
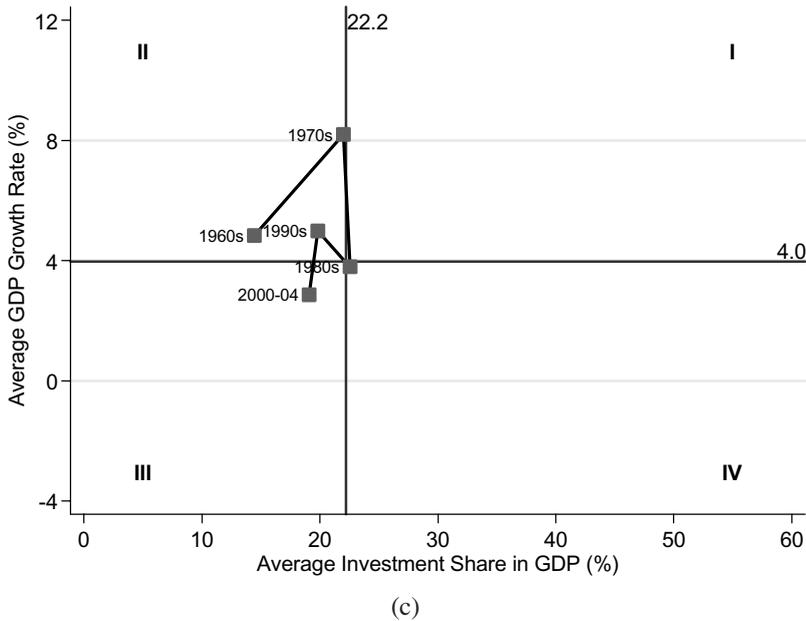*Source*: World Bank, World Development Indicators.

(c)

Fig. 5. (*Continued*)

indiscriminate applications of the growth diagnostics approach to also growing economies, whose challenge is how to sustain their growth.

Moreover, the analyses of El Salvador and Brazil seem to disregard that these economies were, like the Dominican Republic, in the first and second quadrants in the previous decades. While El Salvador and Brazil were in quadrant III in 2000–2004, suggesting that the growth diagnostics approach can be applicable to accelerate their growth rates, the long-term growth paths of the two countries indicate that they achieved higher growth in the 1960s and 1970s, when they were in quadrants I and II. This implies that by looking at these two countries at only one point in time, the authors lost the historical perspective and seem to have missed the point that one or two decades earlier they had achieved faster growth, and not necessarily with a higher investment share. Analysis of the reasons for why these countries' performance worsened during the 1980s may have led to a different decision tree or to an altogether different type of study (one cannot ignore, for example, the civil war in El Salvador, and the impact of the debt crisis on Brazil).

4. Conclusions

The growth diagnostics approach represents a very serious challenge to how economists, and in particular development economists, have traditionally thought and conceptualised problems. In the words of Rodrik (2010), "They [development economists] should be diagnosticians" (p. 35). The approach opens the door to less

dogmatism in prescribing recipes for development and avoids the problems inherent in cross-country regressions analyses and investment climate surveys, especially for policy advice.[19]

In this paper, we have highlighted and discussed a number of issues that many economists have raised during the last few years in their attempts to apply to methodology. Lin and Monga (2010) concur with us that its application "is not always straightforward" and is "imprecise in its links to the institutions that facilitate the growth process" (p. 22). The methodology needs further improvements and clarifications. To some extent, the growth diagnostics approach represents the opposite of the much-criticised Washington consensus approach to reforms. If the latter suffers from the "laundry-list" problem (i.e., reform everything), it is difficult to believe that one can single out *the* most binding constraint to growth. Growth is a very complex phenomenon that cannot be reduced to one single cause. Moreover the model underlying the growth diagnostics framework is macroeconomic. However, microeconomic analyses of growth have shed light on important productivity questions. For this reason, the growth diagnostics framework must be complemented with other macro and micro tools to identify constraints.

The growth diagnostics approach is a methodology devised to uncover the key problem that constrains investment and, therefore, prevents igniting growth by increasing the rate of accumulation. But for countries already growing (like most Asian countries), the basic question is different. In most cases, it is how to sustain it; therefore analyses should concentrate on reforms. For these countries, researchers must design their own growth diagnostics exercise through a completely different decision tree, as there are many different ways in which one can proceed and conceptualise the problems affecting each country. Therefore, the question asked cannot be *how to ignite growth*, and the decision tree (if any) cannot start on a low investment rate. The route taken will depend on the question of interest. The latter should be either an important feature about a country's growth profile (e.g., what causes boom-bust cycles?); and/or a question with policy relevance (e.g., why has the country failed to industrialise?). Finally, there is no reason why researchers cannot apply a combination of approaches that will yield different but complementary views of the question being addressed.

Acknowledgment

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[19] It is worth noting that Rodrik (2010) shows a reformulated diagram, different from the original one.

of the Asian Development Bank, its executive directors or the countries that they represent.

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Annex. Table A.1. Distribution of countries by quadrants in 2004

Quadrant I	Quadrant II	Quadrant III	Quadrant IV
Albania	Afghanistan	Argentina	Antigua and Barbuda
Algeria	Angola	Barbados	Bahamas, The
Azerbaijan	Armenia	Bolivia	Dominica
Bangladesh	Bahrain	Brazil	Eritrea
Belarus	Benin	Brunei Darussalam	Gabon
Belize	Bosnia and Herzegovina	Burundi	Grenada
Bhutan	Bulgaria	Central African Republic	Guyana
Botswana	Burkina Faso	Colombia	Haiti
Cape Verde	Cambodia	Comoros	Lesotho
Chad	Cameroon	Congo, Dem. Rep.	Mauritania
China	Chile	Costa Rica	Mexico
Congo, Rep.	Cuba	Cote d'Ivoire	Nepal
Croatia	Gambia, The	Cyprus	Nicaragua
Ecuador	Kuwait	Djibouti	Seychelles
Estonia	Kyrgyz Republic	Dominican Republic	Slovenia
Ethiopia	Lithuania	Egypt, Arab Rep.	Sri Lanka
Georgia	Macao SAR, China	El Salvador	St. Kitts and Nevis
Ghana	Myanmar	Fiji	St. Lucia
Honduras	Namibia	Guatemala	St. Vincent and the Grenadines
Hong Kong, China	Pakistan	Guinea	Tonga
India	Philippines	Guinea-Bissau	West Bank and Gaza
Indonesia	Romania	Israel	
Iran, Islamic Rep.	Russian Federation	Kenya	
Jordan	Rwanda	Lebanon	
Kazakhstan	Senegal	Liberia	
Korea, Rep.	Serbia	Libya	
Lao PDR	Sierra Leone	Macedonia	
Latvia	Sudan	Madagascar	
Malaysia	Suriname	Malawi	
Maldives	Tajikistan	Malta	
Mali	Tanzania	Montenegro	
Mauritius	Turkey	Niger	
Moldova	Uganda	Oman	
Mongolia	Ukraine	Panama	
Morocco	Uzbekistan	Papua New Guinea	
Mozambique	Yemen, Rep.	Paraguay	
Qatar	Zambia	Peru	
Singapore		Poland	
Thailand		Saudi Arabia	
Timor-Leste		Solomon Islands	

Annex. Table A.1. (*Continued*)

Quadrant I	Quadrant II	Quadrant III	Quadrant IV
Trinidad and Tobago		South Africa	
Tunisia		Swaziland	
Turkmenistan		Syrian Arab Republic	
United Arab Emirates		Togo	
Vietnam		Uruguay	
		Vanuatu	
		Venezuela	
		Zimbabwe	

Annex Table A.2. Countries that were in quadrant III in the 1990s: Transition in 2000–2004

	Country	2000–2004		Country	2000–2004
1	Albania	Q1	28	Macedonia	Q3
2	Angola	Q2	29	Madagascar	Q3
3	Armenia	Q2	30	Mauritania	Q4
4	Azerbaijan	Q1	31	Niger	Q3
5	Barbados	Q3	32	Peru	Q3
6	Brazil	Q3	33	Poland	Q3
7	Bulgaria	Q2	34	Puerto Rico	—
8	Burundi	Q3	35	Rwanda	Q2
9	Cameroon	Q2	36	Saudi Arabia	Q3
10	Central African Republic	Q3	37	Senegal	Q2
11	Chad	Q1	38	Serbia	Q2
12	Colombia	Q3	39	Sierra Leone	Q2
13	Comoros	Q3	40	Slovenia	Q4
14	Congo, Dem. Rep.	Q3	41	Solomon Islands	Q3
15	Cote d'Ivoire	Q3	42	Somalia	—
16	Croatia	Q1	43	South Africa	Q3
17	Cuba	Q2	44	Suriname	Q2
18	Djibouti	Q3	45	Swaziland	Q3
19	Ecuador	Q1	46	Tanzania	Q2
20	Ethiopia	Q1	47	Togo	Q3
21	Fiji	Q3	48	Tonga	Q4
22	Gambia, The	Q2	49	Trinidad and Tobago	Q1
23	Georgia	Q1	50	Uruguay	Q3
24	Kazakhstan	Q1	51	Venezuela	Q3
25	Kenya	Q3	52	Zambia	Q2
26	Kyrgyz Republic	Q2	53	Zimbabwe	Q3
27	Lithuania	Q2			

Note: Puerto Rico and Somalia were in quadrant III (Q3) in the 1990s, but there is no data for these two countries for 2000–2004.