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Beyond the Financial Crisis: Critical Factors Binding Economic Growth

A Survey of African Growth Diagnostics

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ABSTRACT

Since the development of the Growth Diagnostics approach pioneered by Ricardo Hausmann, Dani Rodrik, and Andrés Velasco (HRV 2005), fifteen countries in Africa have implemented this framework to identify the most binding constraints to economic growth. This paper collects the findings that emerge from these applications and assesses their implications for economic policy in the aftermath of the financial crisis. The survey finds a consistent relationship between the "binding constraints" identified under HRV and country characteristics, such as level of income, landlocked geographies, and post-conflict environments. Most countries in Africa are constrained by low social returns, which are accentuated in landlocked geographies. As countries start to achieve modest to rapid growth rates, the nature of the factors constraining growth are attributable to inadequate appropriability of returns, particularly in post-conflict environments. Only after countries have overcome these set of constraints do problems relating to lack of access to finance start to hamper growth. Therefore, on the basis of findings from Growth Diagnostics applications, the current concerns on the impact of the financial crisis on African growth decelerations may be overstated. African countries should look beyond the financial crisis and focus their efforts on growth policies that address the constraints to higher social and private returns.

I. Introduction

With the demise of the Washington Consensus as a policy plank for growth, African countries have been groping for alternative strategies that are tailored to their specifique, and often unique, circumstances. The recent experiences of developing countries[2] has solidified the sentiment that sustained economic growth cannot be attained through standard policy packages applied uniformly to heterogeneous socio-economic and institutional settings. In this content, the 'Growth Diagnostics' framework developed by Hausmann, Rodrik, and Velasco (HRV 2005) has offered a refreshing approach for thinking about a country's growth problems that is practical in its orientation and context-specific in its application.[3] Incarnated in a problem-tree structure, HRV emanates from a Ramsey growth model which I used to guide the identification of the most "binding constraints" – that is to say, the constraints the removal of which will yield the largest pay-offs in terms of growth.

African economies face a myriad of constraints that have been greatly aggravated with the advent of a global financial crisis. Notwithstanding the impact of the current crisis, it could be misleading to bias policy efforts towards palliating the effects of external finance constraint in the presence of other critical factors that are binding growth. Indeed, removing secondary external constraints in the presence of more binding domestic ones may not propel the desired economic outcomes. If there is a lesson that can be forcefully distilled from the recent crisis it is precisely the importance of promoting domestic drivers of growth. Moreover, given the second-best interactions that prevail in African economies, undertaking partial reforms can results in unanticipated (and even unwarranted) consequences. According to the theory of second best, removing some bottlenecks while leaving other distortions in place can have large, small, or even negative effects on economic growth and welfare. Hence the importance of targeting those constraints that will yield a sizeable (positive) impact that can counter-act any second-best interactions.

Within the Growth Diagnostics approach, the process of development can be described as an iterative quest to release a succession of binding constraints: When a binding constraint is removed or ameliorated, the economy will experience growth until a new constraint limits the growth process again, and once this one is relaxed, a

[2] See World Bank (2005) *Economic Growth in the 1990s: Learning from a Decade of Reform* .
[3] Hausmann, R., Rodrik, D. and A. Velasco, "Growth Diagnostics," Harvard University, March 2005.

new one will emerge. In sum, the practice of development consists of sequentially identifying and tackling each of the binding constraints in the development process. The task is to figure out which bottleneck is most severely precluding or binding growth in a particular setting and point in tome—and to institutionalize this process over time. In this context, the question arises as to how binding the external finance constraint was in African economies at the time of the international crisis, in order to assess the shadow price of palliating the crisis with remedial actions.

This aim of this paper is to conduct a stock-taking survey review of the existing applications of Growth Diagnostics in Africa, with a view to distilling observations on the most binding constraints to growth prior to and during the crisis. The remainder of the paper consists of two parts. The first section provides a literature review of the Growth Diagnostics framework, highlighting the main criticism and evolving practices in this analytical approach. The second section surveys the main conclusions on the binding constraints from a sample of 15 African countries which have conducted a Growth Diagnostic following the HRV approach. Some concluding remarks synthesize the implications that these results may suggest for short-term policy-making in the aftermath of the financial crisis. For reference, the annex contains a brief overview of the Growth Diagnostics methodology.

II. Literature Review: Criticism and Evolving Practices

The recent applications of the Growth Diagnostics framework have generated a lively discussion in the literature, both from the academic and the practitioner's perspectives. The ongoing debate and evolving analytical practices reflect that there is no recipe or cookie-cutter approach to performing a Growth Diagnostics. On the contrary, the original framework presented in Hausmann et al (2004, 2005) has undergone several iterations of testing, re-thinking, and contextualizing in different economic contexts. As a result, the methodology has been substantially clarified, prodded, and extended to incorporate new hypotheses tests, scopes of application, and techniques (Hausmann et al 2009) that are suited to various contexts. This process of metamorphosis highlights that Growth Diagnostics is an open discipline, not a clear-cut technique. As any discipline, therefore, it will continue to mature and grow as its possibilities are exploited and more case study evidence becomes available.

The emerging criticism and lines of debate can be divided broadly into three main camps: What is the objective of a Growth Diagnostic inquiry—just growth, or something more? What is the desirable methodological balance between its flexibility and standardization—just art or science? To what extent should it remain a technical exercise or account for implementation—just technical, or feasible? Each discussion is taken in turn below, with a view to pondering the implications that the literature raises for the practice of Growth Diagnostics in an African context.

A. Objective: Is it Growth or Poverty?

One of the main criticisms that has been leveled at the Growth Diagnostics framework is that if focuses exclusively on economic growth, bypassing other important dimensions of development, notably poverty reduction and equity. In response to this, there has been a consistent effort to more directly address poverty and social equity outcomes in growth analytics. A large strand of literature has emerged on the topic of "pro-poor growth," although there is yet no uniformity in the use and understanding of this concept.[4] Some authors define the "pro-poor" metric in terms of a reduction of relative inequality (White and Anderson 2000, Kakwani and Pernia 2000), while others focus on the fall of poverty levels or human development indicators regardless of distributional outcomes (Ravaillon and Chen 2003, Kraay 2004). In any case, the objective of the inquiry shifts from maximizing private investment to minimizing poverty or inequality. Although these are not mutually exclusive—and should indeed be reinforcing—, the HRV Growth Diagnostic departs from a growth model and may not be well suited as an analytical framework to look at poverty. It is also worth acknowledging that there can be tensions (at least in the short run) between optimizing the "pro-poor" and "growth" variables, and that these may be better conceived separately rather than as a unified objective.

An integrated pro-poor framework developed by SIDA (2006) departs from the premise that employment and the income derived from employment is the variable of interest. Hence, the focus becomes to remove binding constraints to the increased employability and productivity of the poor. Building on the SIDA framework, the "shared growth" or "inclusive growth" approach by the World Bank similarly undertakes an employability analysis—covering both wage- and self employment—,

[4] For a survey of the literature on pro-poor growth, see Lopez (2005)

and places the poor individual rather than the firm or investor as the relevant economic agent. The framework has been trialed for the case of Zambia (Ianchovichina and Lundstrom, 2008). Removing constraints on those sectors that employ the poor is an important focus from a subsistence perspective. Growth in some sectors (notably, agriculture) will contribute more directly to increasing the incomes of poor households. But 'pro-poor' sectors (many of which are informal) may not represent the greatest potential for economic take-off. Again, it is important to note that there ca be a conflict of interests in addressing poverty with a growth tool.

This literature serves as a useful reminder that while growth is important (and necessary) for development, it is not always the prime objective of a society. Arguably, for some countries in Asia that have sustained very high growth rates over decades (e.g., India), human development indicators may deserve greater attention from policy-makers than private investment. For countries in Latin America that enjoyed high growth (e.g., Brazil), social equity and distribution of income has also become a more pressing objective. Even in the case of Africa, where private investment have not soared, it is worth emphasizing that there may be other welfare--enhancing objectives which may deserve priority and which may or may not be directly related to growth, such as resolution of peace from conflict or environmental protection against climate change. In South Africa during the 1980s, for instance, the objective society chose was the empowerment of the blacks, not growth. In these cases, the Growth Diagnostic tool may not be well suited for policy-making.

In most of Sub-African countries, given the low-income levels, economic growth is a reinforcing (and in all likelihood, necessary) component to enhance the achievement of other important objectives. But each objective needs to be addressed with a precise and separate strategy that caters to that goal. As with any model, it is important to understand what problem is being explicitly addressed – and what issues are not, and to use it for that purpose. The HRV is a diagnostic for 'growth' strategies and emanates from a balanced-growth equation which does not incorporate the pro-poor variables cited in the literature. Hence, it is ill suited to diagnose poverty. Rodrik (2008) contends that the best way to achieve poverty reduction is to maximize growth (in the absence of consideration on distribution, human development, employability) and deploy a social (or other) policy to address other variables.

But even when the societal objective is growth, the question arises as to what is the correct growth model to use for that particular society. The HRV framework

rests on a Ramsey neoclassical growth model, and as such, the usual criticism applies. A point that has come to bear is that technology is not endogenously determined, although productivity is prominently addressed in the HRV. Given that it is a short-run model, for most countries in Africa it is not unrealistic to believe that technology will remain constant. It is also a static model, whereas development is a dynamic process. Some authors (Felipe and Usui 2008) have argued that the HRV is more appropriate for igniting growth than for sustaining growth, and the method should not apply to rapidly growing economies. Yet, this view is countered by other authors (Leipziger and Zagha 2006) who argue that the question of increasing the growth rate should be no different in a stagnant or rapidly growing economy. That is, elevating growth from 0 to 3 percent is akin to increasing it from 6 to 9. It is useful differentiate between the stage of economic growth, but the method is just as valid for all stages—from poverty traps to steady growth (Pritchett 2008). Most Africa countries are in the former trend rather than the latter, the criticism is less relevant.

A more pressing question seems to be whether the problem formulated at the top of the HRV diagnostic tree—"low levels of private investment and entrepreneurship"—is the key issue. Is the root of the tree the main driver of growth? Should this be conceived as a cause or a symptom of low growth? In either case, Felipe and Usui (2008) show that there is not a clear statistical association between investment shares and growth rates. There is no denying that the role of private sector is important for Africa's development, but so is the role of public investment, particularly given the importance of infrastructure and the provision of basic public goods (such as health and education). Arguably, private and public investments can have different dynamics and incentives, and the framework is Moreover, Fernandez-Arias (2007) raises the distinction between low investment or poor quality investment, pointing to the fact that the Growth Diagnostics objective function at the outset of the tree would emphasize the quantity, and not the quality, of investments. In some instances, lower investment but with more direct contributions to human capital accumulation, or to productivity growth, is better for growth.

B. Method: Is it Art or Discipline?

One of the main criticisms levered at the method is that there is no scientific formula in the procedural application of the Growth Diagnostic framework. Hence, the identification of the binding constraint can sometimes be perceived to be arbitrary

and left to the discretion of the analyst. Echoing this point, Nobel Prize Laureate Mike Spence has called the HRV framework "a disciplined art." As opposed to growth regressions, in Growth Diagnostics methods the hypotheses and their empirical verification are much more open-ended (Zagha *et al*. 2006). This has generated pleas on the part of researchers for more clear-cut and pre-defined analytical procedures. Among these, Santor (2007) proposes a "scientific" Growth Diagnostics, and envisions guidelines drawing on the method used in the Currency Crisis Early Warning Systems. In response, Edgar-Favalo (2007) and Hausmann et al (2008) have attempted to provide 'how to do it" guides to assist practitioners and researchers – although it resolved the "mind" set rather than the "tool" set in Growth Diagnostics.

The absence of a formulaic procedure to diagnose a country's growth problems is at the heart of the Growth Diagnostics approach. Granting that an open-ended detective process may prove more challenging, it forces the analyst to confront the particularities of each situation without relying on a set of ready-made, delimited hypotheses and testing criteria. More importantly, the built-in flexibility of the methodology ensures that the Growth Diagnostics framework remains relevant to every country in so far as it gives the analyst the opportunity to tailor the diagnosis to specific circumstances. This should not preclude the possibility of developing a more systematic template to guide the application of Growth Diagnostics analytics in Africa which responds to the availability of data, feasibility of policy instruments, and other contextual considerations. For instance, the identification of binding constraints is closely linked to the shadow prices of resources, which make sense in theoretical grounds, but can be difficult to translate into actual evidence. In practice, price signals are used to evidence the relative scarcity during the diagnostic. Yet, in the presence of numerous distortions, which is the case in most African countries, price signals will likely do a poor job at reflecting relative scarcities.

Another recurring topic of discussion is whether there is indeed a single 'binding constraint," and more importantly, whether the branches of the framework are independent and mutually exclusive. Some authors (Dixit 2006) have argued that several constraints may be interacting simultaneously. Hence, the solution to the problem of igniting growth may involve relaxing more than one constraint at the same time. Rodriguez (2005) conceives Growth Diagnostics as a non-linear programming model, which may require several solutions to solve. In practice, the findings of a Growth Diagnostic rarely exhibit the uniqueness of the binding constraint. This is

particularly true for least-developed countries or post-conflict settings that prevail in Africa. In response to this argument, Venables (2008) has developed a variation of a Growth Diagnostic framework, translating the problem tree into a matrix of constraints which does not lead to an early elimination of multiple constraints.

C. Implementation: Is it a Technical or Feasible?

The most recent line of discussions has to do with the implementation of Growth Diagnostics, that is, moving from the exercise of identifying binding constraints to identifying growth policies that will alleviate those constraints. Pritchett (2008) has coined the term "Growth Therapeutics" to describe the transition from diagnosing the malady to finding a cure in terms of specific reforms that are credible and actionable given the capabilities and context of a given country. He emphasizes the distinction between *de jure* and *de facto* policy as a key to understanding growth analytics. Investors' expectations of profitability are formed on the basis of the firm's beliefs on policy implementation, that is, not the notional policy but the actual policy action that affects the private agent's profitability. Therefore, a complete policy specification needs to include not only the notional policy, but also a coherent behavioral model of the actions of agents implementing the policy and a specification of the mechanisms influencing the incentives affecting these agents (Pritchett 2008). What matters are the actions that can initiate, sustain, or enhance growth given a country's current circumstances and capabilities.

There are two strands of criticism that have emerged around the discussion of how the Growth Diagnostic can better inform policy actions. At the notional level, there is a sentiment that the Growth Diagnostic does not provide much clarity or specificity on the reforms that should follow from the identification of binding constraints. Indeed, the binding constraints of the HRV problem tree are quite generic and broad in nature, failing to suggest a clear mapping of economic policy options to overcome these constraints. One of the cited weaknesses of the HRV approach is that it does not sufficiently appreciate where the market or government failure lies, and hence does not offer clues on the corresponding interventions that should be pursued (Booth and Willem te Velde 2008). Most of Growth Diagnostic analyses are silent on policy recommendations to relive the identified constraints to growth.

To a certain extent, the agnosticism behind the policy reform agenda in the HRV exercise is reflective of its "experimentalist" (rather than "presumptive") approach in devising policies. For each 'binding constraint,' case study evidence suggests that there are innumerable policies that can effectively address a given syndrome. Many of the solutions tend to be unorthodox in nature and most of them cannot be predicted ex-ante. It is also a cautionary note that the diagnostic needs to verified during the implementation process. If the constraint is indeed binding, small relaxations of that constraint triggered by modest reforms should produce notable movements in the economy (Pritchett 2008). Hence, it forces each country to engage in a "trial-and-error" of what reforms work in a given context and whether their initial target is indeed a binding constraint in the economy. Nevertheless, and without loss of this goal, there is a need to provide more clues on the 'trials' that should be attempted, in particular by making explicit the specificities of market/government failures that are underlying each of the binding constraints.

Other than the notional level, there is a large discussion on the feasible assessment of policies aimed at supporting the growth agenda. In other words, what is the viability of relaxing the binding constraints identified in the Growth Diagnostic? Trying to answer this question leads to a realization of the importance on governance and underlying political economy factors, as well as the role of second-best policies A recent report by the Growth Commission (2008) recognizes and inter-dependence between governance and growth, and a several authors have offered reflections on this relationship (North et al 2008; Rodrik 2007). While there is no conclusive evidence as to whether "better governance" leads to higher growth rates, or to the reverse, whether fast growth rates can cause or aggravate a period of turmoil, there is widespread consensus on the notion that at least some form of "good enough governance" is needed to implement reforms (Grindle 2007).

In an effort to more closely integrate feasibility filters into the HRV analytical framework, Booth and Willem te Velde (2008) proposes a method that estimates the political probabilities and the economic effects of relaxing each identified constraint. In this approach, the prioritization of policies is not just made on the basis of the relative 'bang' from relaxing binding constraint, but also on the likelihood of effectively carrying our the requisite reform given the political economy. While its is very difficult to associate numbers to economic outcomes and political viability, these should not be taken or presented as descriptively true, but rather, as a means of

focusing on what is actionable politically as well as desirable economically. Fritz (2008) develops a framework for thinking about governance factors in Growth Diagnostic work, based on an analysis of the private actions and government actions that need to be realized to remove each identified binding constraint. Yet, this effectively creates two diagnostic analysis -- a purely "technical diagnostic" and a "governance and political economy diagnostic tree."

In this regard, there is some digression on whether the feasible and the technical diagnostics should follow separate (but parallel) routes, or if they should be integrated and subjected to one another. On the one hand, the preferred approach is to not filter the findings through the feasibility lens, so as to not compromise the quality of the technical recommendations. Hence the idea of carrying out two different diagnostics. From another perspective, however, some critics claim that the soundness of any technical advice is dependent upon whether the recommendation is indeed implementable, that is, whether it can garner political support as well as the requisite human, institutional, administrative, and financial resources to become a realized policy. This has led to a general preference of integrating both technical and feasibility (second-best) considerations in a unified analysis. This approach should be undertaken with caution, given that it requires in-depth knowledge of a country's stakeholder dynamics which is often not available to the external analyst.

III. Survey of Growth Diagnostics: Where are the Binding Constraints?

While the application of the Growth Diagnostic tool in Africa is still in its early days, there are a total of fifteen GDs that have been applied in the African continent. This section takes stock of the findings from fifteen available studies that have utilized the HRV as the main method to identify binding constraints to growth in African countries. Several caveats are in order which call for caution in the interpretation and comparability of findings. First of all, the depth and rigor with which the Growth Diagnostic framework has been utilized varies considerably across this sample of studies. Moreover, a few studies present slight variations or extensions of the original HRV in order to contextualize the framework to a particular economy or question of interest. This is the case of the "inclusive" optic applied in a few countries, such as Zambia and Benin. Finally, it is important to recall that binding constraints are dynamic and change over time. Therefore, the findings of the reports

are specific to that particular country at the time in which the diagnostic was performed, implying that the identified constrains may or may not continue to bind growth depending on recent policies and changes in the economic environment. That said, there are several lessons and reflections that can be distilled from the se case studies, both in terms of the findings and methodology.

At the heart of the HRV problem tree is the notion that private investment in fixed capital formation is key to igniting, accelerating, or sustaining economic growth. Starting from the premise that private investment is lower than then socially optimal level, the first question that is investigated is whether the problem of low entrepreneurship accrues to low returns to capital accumulation or to a high cost of financing such accumulation. In other words, do private agents under-invest because they don't find enough profitable economic activities in which to invest, or rather, because they cannot access finance at reasonable costs to undertake these opportunities? Once this distinction is established, the second-order factors that are behind these conditions are explored. The sections below reports the results on whether growth in the sampled countries is constrained by finance, availability of complementary factor, or market-or government-induced failures.

A. Is it High Cost of Finance?

The first line of inquiry is whether the cost of financing private investments is too high, either because investors cannot access international financial markets (and domestic savings are too low), or because there are problems in domestic financial systems—such as poor intermediation, high risk, or low competition. From the 15 applications of Growth Diagnostic in African countries, it is remarkable that while they certainly recognize problems in this area, none of them identify finance as the binding constraint to economic growth. Proxying the opportunity cost of capital, interest rates and spreads do not appear to be particularly high, except for the case of Malawi; in fact, most countries have seen a marked reduction in real lending rates, and yet, this has not spurred an increase in private investments. In addition, there appears to be a very low correlation between credit/GDP and investments in the sample of countries. Although the business perceptions do point to finance as a critical constraints (as reflected in ICA surveys), the complaints don't appear to be

Growth Diagnostics in Africa: Where are the Binding Constraints?

Country (Year)	Is it High Cost of Finance?		Is it Low Social Returns?		Is it Low Appropriability?	
	International Finance	**Local Finance**	**Infrastructure**	**Human Capital**	**Government Failures**	**Market Failures**
Benin (2008)	[X] Increase in finance do not spur growth	[X] Significant increase in credit to private sector.	[√] Poor roads, power supply, telecommunications	[X] Public spending on education doubled, without GDP growth	[√] High tax rates result in large informal economy	[~] Self-discovery problem, decline in number of new exports
Burundi* (2009)	[X] Relatively high domestic credit to GDP	[X] Real interest rates not high; relatively high domestic credit to GDP	[X] Low level of complaints; good air transport that is underused	[X] High drop outs, migration of skilled workers	[√] Low security, fears on destruction assets, hiring insurgents relatives	[~] Increasing returns to scale for some industries
Egypt (2007)	[X] Recent FDI surge, high level of foreign credit	[X] Stock exchange boom, reasonable interest rates	[X] Infrastructure compares favorably in rankings and perception surveys	[X] Very low returns to education (Mincer)	[√] Complex regulations and inefficient government services	[X] No market failures reported
Ghana* (2009)	[X] High levels of foreign transfers	[X] Improvements in domestic finance,	[X] Growth of infrastructure-intensive sectors (e.g. cocoa, timber)	[X] Low returns to education, high migration of skilled labor	[X] Good performer in macro and fiscal policy; good governance indicator	[√] Failure to discover new markets and products
Kenya (2008)	[X] Low level of demand for finance	[X] Relatively low interest rates	[√] Costly & unreliable infrastructure and logistics	[X] Skill supply not a constraint to business	[√] High micro rinks due to lack of security	[X] Good evolution of export diversification
Malawi (2009)	[X] High levels of overseas transfers do not spur growth	[~] Highest interest rates and spreads in the region	[~] Power. High sales losses due to outages; firms without autonomous energy closed. Deforestation.	[~] High returns to education; low primary & tertiary completion and extremely poor quality.	[√] Overvalued fixed exchange rate; ease of trading very poor	[X] High EXPY once tobacco is factored out
Morocco (2006)	[X] Available domestic finance	[X] Low, decreasing interest rates and high domestic savings	[X] Adequate infrastructure reported on business surveys	[X] Low and declining returns to education	[√] Labor rigidities , corporate taxes, high protectionism, fixed RER	[√] Information & training externalities, coordination failures
Namibia (2008)	[X] High credit to GDP ratio	[X] High level of domestic savings	[X] Infrastructure-intensive industries such as tourism are registering rapid growth; few business complaints	[√] Very high returns and low unemployment for post-secondary education	[X] Macro policies stable low corruption, favorable investment climate	[X] Concentration not due to self-discovery ext. or coord. problems

Note: Countries marked * denote that the Growth Diagnostic exercise is ongoing and hence the findings reported are tentative and subject to revision.
Legend: [√] Binding Constraint [X] Discarded Constraint [~] Constraints that will possibly bind in the near future

about credit availability or its cost per se as much as they relate to procedural issues, such as cumbersome credit applications or high collateral requirements.

The general finding that finance is not constraining growth masks some realities in which inadequate finance can be imminently binding. In most African countries there are large sectors of the population that don't have formal access to finance, in particular in rural areas, so that this could be precluding profitable opportunities. Similarly, small and medium enterprises often don't have the requirements (e.g. collateral) to be eligible to domestic finance arrangements. Given the high portion of population that is non-bankable, other modalities of finance—notably, remittances—can play a prominent role in small-scale investments. Hence, it is worth exploring what portion of remittances goes to consumption or savings/investment. In addition, another variable that deserves greater attention in the finance branch is overseas development assistance, which is partly devoted to investment projects (particularly in post-conflict states). Finally, it is worth investigating the impact of recent foreign loans, such as Chinese, in investments.

The overall result that finance does not bind growth in the sample of African deserves careful reflection in light of the recent financial crisis. From one standpoint, these results might suggest that a temporary lack of finance accruing to the external crisis should not be a great source of concern, given that the binding constraints which are hampering private investments are not related to finance. Hence, lack of finance will not be the key decelerator of private investments unless the economy has already released the identified binding constraint and thereafter generates a higher demand for finance. From another vantage point, however, if access to finance is suspended for a prolonged period of time in the aftermath of the global crisis, the diagnostic may well need to be revisited by virtue of its dynamic nature, as sharp movements in key variables such as interest rates would suggest that finance has become constraining. At the time of writing of this paper, however, there have not been noticeable shifts in these symptoms that would alter the underlying syndromes in the diagnosis.

B. Is it Low Social Returns?

Having dispelled financial issues from the radar of binding constraints, the next line of inquiry is whether there are not enough profitable opportunities in the economy from a social perspective. The HRV framework posits that the low level of

social returns accrues to the inadequate availability of complementary factors of production (natural/geography, physical/infrastructure, and human/skills) that depress the general productivity of economic activities. From the sample of fifteen Growth Diagnostics in Africa, none of them find that geography is a binding constraint. That said, the treatment of geography in HRV analysis is unclear and often undifferentiated from other constraints in the tree: if a country has a landlocked or sea-locked geography, the problem is ultimately in infrastructure; if abundance of natural resources is an issue, the root of its problem emanates from a government failure of public management. An area that is not systematically covered and is indeed a geographical constraint which directly depresses the productivity of factors relates to environmental issues afflicting the African continent, such as climate change or deforestation. Arguably, this is a slow-moving and largely exogenous variable, but it would still deserve to be brought to the core of the analysis.

Another telling finding from the collection of African Growth Diagnostics is the low prevalence of human capital as a syndrome. Indeed, only two out of fifteen countries identify human capital as a binding constraint: the remaining conclude that although the level of skills is inadequate, the Mincerian returns to education (which proxy a marginal improvement of relaxing this constraint) are generally low. This conclusion is not so striking when one considers the low level of sophistication of its output and export basket, which are relatively less intensive in skills. Yet, its policy implications are revealing to the extent that they forcefully counter the majority of poverty-reduction strategy papers which focus heavily on education. It is also worth considering that while the human capital analysis is focused primarily on skills and education, in an African context other dimensions may deserve greater attention, in particular HIV/aids and malaria and ethnic fragmentation. It is important to factor these in and so as to not dismiss the constraint on the basis of educational variables alone. Furthermore, a more complete analysis of the human capital component would benefit from encompassing the informal sector and migration flows, both of which may alter the valuation of household decision on human capital.

Finally, and perhaps reassuringly, infrastructure emerges as the binding constraint in the vast majority—nine out of fifteen—of African Growth Diagnostics. In particular, poor supply of energy is found to be the main culprit increasing production costs, followed by transportation (namely roads). As expected, the importance of infrastructure is heightened in the cases of landlocked countries. Yet,

Growth Diagnostics in Africa: Where are the Binding Constraints? (Cont.)

Country (Year)	Is it High Cost of Finance?		Is it Low Social Returns?		Is it Low Appropriability?	
	International Finance	Local Finance	Infrastructure	Human Capital	Government Failures	Market Failures
Nigeria (2007)	[X] No shortage of liquidity from domestic banks	[X] Banks are highly liquid, low spread and external debt	[√] Poor electricity generation, self-generation and output loss	[X] Low and decreasing returns to education	[√] High macroeconomic volatility from oil revenue & microeconomic risks	[X] Recent success in new manufacturing clusters (Nwewi)
Rwanda* (2008)	[X] Large flows of official transfers.	[X] Investment is high; business surveys don't see finance critical.	[√] Extensive use of generators, high electricity costs; boost rural output after completion roads	[X] Low average use of skilled workers, flexibility in labor market, low complaints in surveys	[X] Good macro-management, property rights, low corruption	[~] Lack of information
Senegal* (2009)	[X] Available domestic finance	[X] Growing account balance; decreasing spreads and interest rates	[√] Energy: twice as higher electricity price; growth in imports of generators	[~] Low returns to skills, wage premium is low; labor rigidities	[X] Macro stability and reasonably good governance indicators	[X] Emergence of new export products not previously existing
South Africa (2007)	[X] Not considered binding (evidence not discussed)	[X] Not considered binding (evidence not discussed)	[X] Not considered binding (evidence not discussed)	[X] High unemployment (unskilled); contraction of skill-intensive sectors	[√] Appreciated RER and tariffs on inputs; labor rigidities	[√] 'Open forest' is low relative to GDP pc points to externalities
Tanzania (2005)	[~] Low access to domestic credit	[~] Low access to credit for large part of economy	[~] Poor energy and transport.	[X] Not discussed as prevalent constraint	[X] Not discussed as prevalent constraint	[X] Not discussed as prevalent constraint
Uganda (2007)	[X] Low demand for international credit	[X] Low demand for domestic credit	[√] Transport & energy infrastructure correlated with returns to capital	[X] Low unemployment for skilled labor	[X] Low taxation & adequate rule of law (perceptions/benchmark)	[X] Large incidence of product discovery (97 non-traditional exports)
Zambia (2008)	[X] Improvements in finance do not reduce poverty in rural areas	[X] Improvements in banking not accompanied by rural poverty reduction	[√] Infrastructure and basic services (energy, telecom, water) high indirect costs	[√] Low secondary education and HIV/AIDS constrain labor demand	[X] Better macro management (inflation) does not coincide with growth episode	[X] Number of goods products increased by a third; Herfindahl Index halved in the nineties

Note: This survey includes all available Growth Diagnostics undertaken in the African region as of September 2009. Countries marked * denote that the Growth Diagnostic exercise is ongoing and hence the findings reported are tentative and subject to revision.

Legend: [√] Binding Constraint [X] Discarded Constraint [~] Constraints that will possibly bind in the near future

before drawing definitive conclusions, it should be borne in mind that—unlike in the case of finance or human capital—the infrastructural constraint is not eliminated on the basis of price signals, given that it is hard to proxy the shadow price of marginal improvements in the supply of energy. Instead, the criteria used involves indirect sources of evidence (often "cammel" analogies), such as observations of companies using private generators to overcome or adapt to the energetic constraint. In this regard, the infrastructure constraint may be somewhat of a residual in the problem tree—that is, a default conclusion that is arrived to by elimination of all other constraints. In addition, the decision is not taken on a net benefit valuation; that is to say, the analysis does not take into account the cost of relaxing the binding constraint, which is potentially very high for infrastructure. A final comment relates to the emphasis on hard physical infrastructure, whereas the problems are just as paramount on the more intangible regulatory issues. Once cost is factored in, the biggest bang for the buck of reform may well be in the soft rather than in the hard infrastructure.

C. Is it Inadequate Appropriability?

The remaining stream of inquiry postulates whether a low level of appropriability discourages private investments regardless of the level of returns. From the standpoint of an entrepreneur, it is not enough to generate a profit from a social perspective, but ultimately to be able to put a reasonable portion of that profit in the private pocket. It may be the case that an economy offers many opportunities, but if the private agent perceives that he will not able to appropriate the returns his investment generates, he will not be compelled to incur in the effort of investing in the first place. That is, if the wedge between the social and private valuations is too high, investment will be severely hampered in the economy. The drives of this wedge may be government- or market-induced failures, each with multiple root causes.

In the sample of the fifteen Growth Diagnostics surveyed in Africa, government failures are the prevailing source of distortion (in seven Growth Diagnostics). In a few cases, the nature of the problem relates to macro-risks which induce growth collapses, for instance fixed appreciated exchange rates or volatile terms of trade. Similarly, in one or two occurrences the constraint presents a micro-risk that lowers growth, such as inadequate property protection. Yet, the overriding problem in this regard relates to lack of security, civil strife, and high crime. Hence,

the nature of the risk in the business environment stems more from the condition of conflict and post-conflict, rather than a particular government intervention that is distorting investment decisions at the macro or micro levels.

It is noteworthy that market failures are identified as a binding constraint in only two of fifteen African Growth Diagnostics. This is in stark contrast to the findings from Latin America, where this is a far more prevalent problem afflicting growth. Yet, it is worth recalling that the HRV problem tree emphasizes two market failures—information externalities (or self-discovery) and coordination failures—, and this is neither an exhaustive list nor necessarily a representative one for African economies. For instance, most African economies display a clear absence of structural transformation, and yet self-discovery does not emerge as a prevailing market failure. Indeed, most Growth Diagnostics report a relatively high level of products that are discovered, but which are not sustained over time. Because new products do emerge, the cost discovery externality cannot represent the crux of the problem. This may well be the source of market failure for more technologically advanced countries, where the cost of innovation is higher. In contrast, the problem of lack of diversification in Africa is more one of premature deaths, due to other market failures such as lack of new markets, information asymmetries, or increasing returns to scale.

IV. Final Remarks

The reasons afflicting private investments in Africa are multiple, to be sure, and may often be complementary, but the analysis strives to identify which constraint or which set of constraints are *binding* to economic growth. Notwithstanding the country- and time-specificity of binding constraints, which cautions us against the external validity of the diagnostic, some noticeable patterns emerge from a survey of the findings. A general observation relates to the multiplicity of constraints that are found in the diagnosed countries: from a bench-marking perspective, there are significant gaps for almost all nodes of the problem tree. And yet, just as a great number of distortions and imperfections are found to co-exist, it is also evident that not all of them are simultaneously binding. Most exercises are successful, if not in finding an ultimate binding constraint, at least in iteratively eliminating a set of bottlenecks that do not elicit a high shadow prices. Only a few studies single out a uniquely binding constraint, which confirms that most countries are held back by

multiple inter-related constraints. But the diagnostic process reduces an initial laundry list to a few key areas, which asserts its usefulness as a tool for prioritization.

For Sub-Saharan Africa, the reason behind under-investments has to do with low social returns, and in particular, with the lack of complementary factors. This is in stark contrast with the majority of findings from other regions, such as Latin America or Asia, where the problems that prevail pertain to the inadequate appropriability of the returns generated. The only countries in Africa that display this binding constraint profile are Egypt, Morocco, and South Africa. This pattern suggests that at lower levels of development the lack of complementary factors is the most binding constraint to growth, and once this is overcome, government and market failures inhibiting the appropriability of profits become the constraining factors. It is revealing to note the non-binding nature of financial constraints in all the African Growth Diagnostics reviewed. While most studies acknowledge how shallow and imperfect financial markets are, and many of them show evidence of low aggregate savings and limited access to capital, this is only found to be imminently binding for one country's growth (Malawi), and not even a secondary constraint for others. Hence, on the basis of the findings from the Growth Diagnostic applications, it is unlikely that the tightened external constraint in the aftermath of the global financial crisis will decelerate growth in African countries in the short run.

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ANNEX I. Overview of the Growth Diagnostics

The Growth Diagnostic approach posits that there 'binding constraints' to growth, namely, constraints with a relatively high shadow price. How does one go about identifying these binding constraints in a country at a given point in time? A three-pronged process requires starting from the proximate determinants of growth, figuring out which of those poses the greatest impediments to higher growth, and identifying the specific distortions behind each of these impediments. The recommended strategies will target these distortions as directly as possible.

(i) Growth Inquiry: Describing the Growth Process

At the center of the Growth Diagnostics, the key problematic being posed relates to the under-supply of private investments from a socially optimal level. Why do developing countries exhibit low rates of private investment? What impediments and disincentives are holding up productive investments?

The point of departure to this inquiry is a simple model in which growth is a function of three components, namely (a) a country's accumulation of assets, (b) the social returns to those assets, and (c) the private appropriability of the social returns generated by these assets. From this model, the HRV framework departs from the equation for the constrained balanced growth path on the return of capital (k):

$$\frac{\dot{k}_t}{k_t} = \sigma\left[r(1-\tau) - \rho\right],$$

$$r = r(\alpha, \phi, \chi)$$

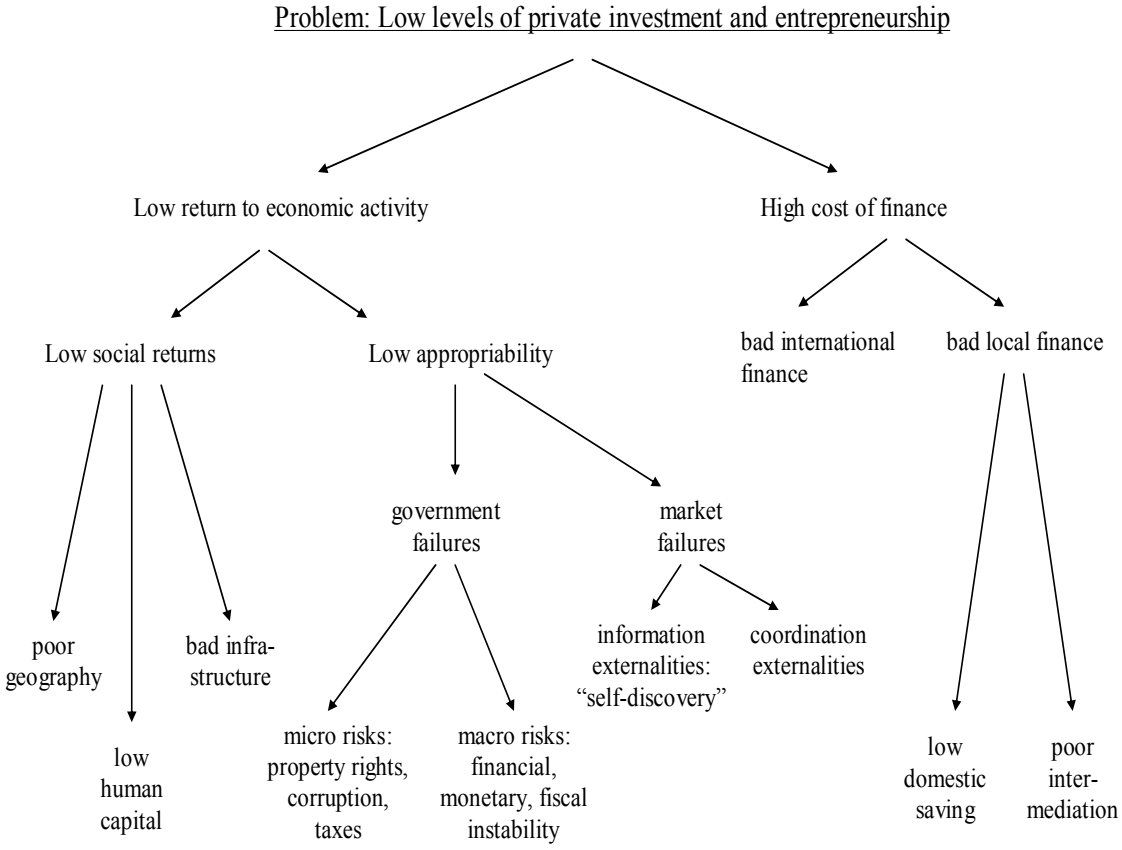
Where:

σ =elasticity of inter-temporal substitution of consumption
r =social rate of return on capital
τ =tax rate on capital, including 'informal' taxation
ρ =cost of financing capital accumulation
α =total factor productivity
ϕ =index of externalities
χ =availability of complementary factors of production

In the context of these three drivers of growth–-social returns on accumulation assets, appropriability of social returns, and cost of financing accumulation of assets--the first step of the analysis is to describe the growth problematic in a particular country, considering long-run growth patterns, notable events (accelerations and collapses), and other relevant information. What has been the nature of growth in the country? This sets the stage for the growth narrative that will evolve with the diagnosis.

(ii) Growth Hypotheses: The Decision Tree Approach

One of the practical features of the framework is that it translates the above equation into an intuitive and user-friendly problem tree, which is used to guide the formulation of growth hypotheses. The problematic is examined through a grid of diagnostic nodes, which start from very broad classes of constraints in each category, and sequentially refine them as one goes down. The exploratory exercise moves downwards in the problem tree, rather than upwards or sideways—that is, the diagnosis evolves by a process of eliminating constraints, rather than by considering them all one by one.



Starting from the top of the tree, the question posed is whether private under-investment is due to the country facing a high cost of financing domestic investment, or due to the country facing low returns to domestic investment. The latter, in turn, leads to sub-branches examining the potential of domestic investment in terms of social returns, and the degree of appropriation of the private returns from domestic investment. Each branch of the tree takes the analysis towards greater specificity:

- If the *cost of finance* appears to be high, is the problem related to low propensity to save in the country, poor intermediation in the financial domestic market, or inadequate access to and integration with international financial markets?

- If *social returns to investment* appear to be low, is the problem related to the scarcity or quality of human capital, infrastructure, poor geography, or the manner in which these complementary factors of production are combined?

- If there are disincentives to investment due to *inadequate appropriations*, then a wide range of government failures and market failures that may be responsible for this are analyzed, including externalities which are not being internalized.

Following this discipline of questions, supply-side and demand-side problems are scrutinized, and a host of hypothetical causes for these problems are identified--be it related to government failures, market failures, and problems in other markets. The HRV framework rests on the notion that a well-targeted country strategy will directly address these root causes, rather than their symptoms. A set of hypothetical constraints is formulated with testable implications regarding the 'binding nature' of the posited constraints.

(iii) Growth Diagnostics: Testing for Binding Constraints

The objective of this section is to use all the available evidence in the country to submit to rigorous examination each of the hypotheses, with a view to assessing the relative extent to which each of the identified potential constraints is binding growth in the country. The analysis thus moves from the question of what is constraining growth, to why—or why not—such a bottleneck constitutes the most binding force to the country's growth potential.

This process involves testing each constraint against the implications that would need to hold if the constraint were binding. Thus, for each of the hypothetical bottleneck, the question formulated is: What symptoms should we observe if a given constraint X is binding? For example, if posited that a given economy was constrained by savings, the economy should be running against its external balance constraint and interest returns must be high; if what is binding is human capital, the skill premium must be rising while returns to complementary factors remain depressed. All in all, a constraint binds when the evidence demonstrates that shadows prices are high

The HRV method draws heavily on evidence of relative actual prices and shadow prices as the prime indicators to identify the distortions; this is also combined by quantity data (Klenow-Rodriguez application of the model) to produce prima facie evidence of what constraints are binding. A key feature of the analytical process is that it looks not only at market prices as the key indicators to identify biding distortions but also at social rates of return, which are particularly relevant where appropriability problems prevail or the existence of other externalities drives a wedge between net social and private returns. Survey-based evidence, both of enterprises and households, are frequently deployed. Finally, where data are not available, indirect evidence–the formulation of the hippos and the camels syndromes —are used to reject hypotheses.