

Assessing Export Supply Constraints: Methodology, Data, Measurement

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1. Introduction

Low-income countries appear especially constrained in their ability to take advantage of trade opportunities. Export volumes are generally small and concentrated in a few products, frequently in natural resources, and they commonly have more difficulties than middle-income countries shifting resources into new export activities, as adjustment is hampered by primitive transportation systems, inadequate public institutions, underdeveloped financial systems, low levels of human capital, and weak or nonexistent safety nets, which make people particularly vulnerable to shocks. Consequently, despite some success with trade reform, export supply response in many low-income countries has been disappointing, particularly in the area of non-traditional exports.

This paper develops a research framework to assess the constraints to export supply in low-income countries in sub-Saharan Africa. It begins with a review of theory and evidence on export development in low-income countries in section 2. It then sets out a research agenda for assessing constraints to export development, ranging from national price competitiveness to microeconomic supply-side constraints and problems with institutional support for trade promotion and diversification, in section 3. Throughout the discussion particular attention is paid to research methods and to providing guidance on questions of obtaining data and measurement of key variables.

2. Determinants of Export Supply in Low-Income Countries: A Review of Theory and Recent Empirical Research

2.1 What's so interesting about Exports?

Why the fascination with exports in preference to other economic activities? Arguments in favor of promoting and diversifying exports in low-income countries emphasize that exports are special and more valuable than other economic activities. Among the most prominent reasons cited for this point of view are that (a) exports generate scarce foreign exchange, (b) exports, and more broadly international trade, promote growth, and (c) export diversification, particularly into more sophisticated products, such as manufactures, generates strong externalities, which not only raise

current growth but significantly enhance prospects for future growth. Is there sound support for these ideas?

Exports Generate Scarce Foreign Exchange

Exports do have great value because they generate foreign exchange and allow a country to buy more imports, which, in turn, make possible a higher standard of living. But, the economy's need for foreign exchange (to buy additional imports or increase international reserves) is reflected in the exchange rate, which provides the correct signal about the social value of exports. At the equilibrium exchange rate the marginal social value of resources used in exporting is equal to the marginal social value of resources used in other economic activities. As the exchange rate converges on its equilibrium level, then, promoting more exports would generate more foreign exchange, but it would also result in a sub-optimal allocation of resources and a lower level of economic welfare. There can be circumstances, of course, where the market determined level of the exchange rate may be socially inefficient – for example, where there are market failures or macroeconomic imbalances. Where such a disequilibrium persists and, for example, where there is a loss in competitiveness, the marginal social value of using resources in exporting would be higher than in other activities. The best approach to dealing with such an inefficiency, according to the dictates of optimum policy intervention, would be to improve macroeconomic management to restore equilibrium or to institute taxes or subsidies to address the market failure and increase the supply of exports.

Trade Promotes Growth

Conventional wisdom is that trade promotes greater efficiency via greater competition and thus growth. It is also sometimes argued that growth is enhanced because trade provides a window on the world and thus a channel through which more advanced technology (knowledge) gets transmitted to the country. These views find support in the fact that openness to trade has been an element of the growth strategies of virtually all successful economies. In all countries that have sustained growth, the share of trade in GDP has increased and trade barriers have been reduced (World Bank 2005). Several studies also document a rise in the share of trade in GDP during growth accelerations of periods up to 8 to 10 years in duration (Jones and Olken 2005; Hausmann, Pritchett and Rodrik 2005).

But the link between trade and growth is not simple. A good deal of evidence indicates that, although trade integration has helped growth in some successful cases, it has not spurred growth in others. This outcome is not surprising as economic theory predicts that trade can encourage growth and it can discourage growth, it depends on the circumstances (Helpman 2004). Growth economics has also had a difficult time nailing down the link between trade and growth. One problem is that trade volumes depend on endowments, technologies, preferences, and market structures, and on how these variables differ across countries. As a consequence, the volume of trade will be high in some countries and low in others even if all countries engage in free trade. Therefore, it is not evident that growth rates should be positively correlated with trade volumes across

countries. Moreover, even if one believed that trade promotes growth, one would not necessarily conclude that larger trade volumes promote faster growth (Helpman 2004).

In addition, much of the empirical work that has found a positive correlation between trade and growth has been criticized for failing to account for the endogeneity of trade flows and for the fact that exports are part of GNP. Also, correlation does not prove causation. Researchers have had a difficult time confirming the direction of causality: it may well run from growth to trade. Furthermore, the studies which have tried to examine the trade and growth link through the indirect relationship between trade policy and growth have found, too, that the outcome of policy is contingent on many factors – in some countries a restrictive trade policy may spur growth; in others it may retard it (Rodriguez and Rodrik 2000).

Considering these complications and fine distinctions in the research results, trade is probably best viewed as an opportunity for (not a promise of) greater efficiency and growth. Trading opportunities available through globalization are pretty much universal, but growth has been highly particular, across countries (even where liberalization has occurred) and within countries, over time. Countries differ in important dimensions, and it is these particular local conditions that determine whether universal trade opportunities lead to growth. The relationship between trade integration and growth has been shown to be conditional on features, such as country size (Alesina, Spolaore, and Wacziarg 2003; Ventura 1997), composition and concentration of exports (Sachs and Warner 1995; Rodrik 2006), and soundness of the economic environment and quality of institutions (Wacziarg and Welch 2003, Baldwin 2003, Bolaky and Freund 2004).

Export Diversification Produces Externalities

While there has been some difficulty nailing down the link between trade volumes and growth, research shows that export diversification into higher-end products is an important source of growth-generating learning externalities. Put simply, what you export matters for successful development. Low-income countries produce and export a narrow range of unsophisticated products and those among them with the ability to diversify into non-traditional, higher-productivity tradables will grow faster. Hausmann, Hwang and Rodrik (2006) find that the sophistication of a country's current export bundle is a good predictor of future growth, holding other things constant, such as human capital levels and the quality of institutions. Imbs and Wacziarg (2003) provide support for this conclusion that diversification is a vital process in economic growth. They show that, as income rises, economies become more diversified until they reach a level of per capita income of about \$20,000 when they again begin to specialize. Moreover, according to Klinger and Lederman (2004), export data indicates the same thing: the number of new export products follows an inverted U-shaped curve in income.

This outcome is not so surprising especially in the case small developing countries. It has been known for some time that small developing countries can grow faster through trade diversification. Growth is limited by the degree of diminishing returns in a domestically oriented economy, because as the capital-labor ratio rises, the increasing

capital stock contributes to output at a diminishing rate and the incentive to invest falls. But export diversification permits small developing countries to escape the adverse effects of diminishing returns and grow faster (Ventura 1997). Small countries have terms of trade that are not sensitive to the size of their capital stock or to the magnitude of their exports on world markets. In economies of this type, the effects of diminishing returns from capital accumulation can be offset by shifts in specialization toward sectors with ever higher capital intensity, as the marginal productivity of capital declines only during the transition from one region of diversification to the next. Such countries follow a development path on which the sectoral composition of output shifts toward more capital intensive or human capital intensive products, as seen in the East Asian NICS. A large country has difficulty following such a development path because whenever it expands the supply of one of its products it thereby depresses the product's price on world markets, causing its terms of trade to decline.

Thus, when all's said and done, one does find support for the proposition that exporting generates singular benefits. In particular, export diversification appears to be a formidable driver of structural transformation and development. Accordingly, export development strategies should put particular emphasis on promoting non-traditional, higher-productivity exports, in activities, such as manufacturing and non-traditional agriculture, where learning and productivity externalities are greatest. Modernization of traditional agriculture, of course, can generate export gains, too, but historically the biggest spillovers and most rapid growth has come from promoting manufactured exports. One reason for this is that a specialization pattern based on manufactures presents a better platform for taking advantage of new economic activities that have unexploited productivity potential (Hausmann and Klinger (2006).

2.2 The Main Determinants of Export Supply?

What does theory and evidence say about the determinants of export supply and the types of policies that might be successful in expanding and diversifying exports?

Comparative Factor Advantage

As Ricardo made clear almost 200 hundred years ago, a country's pattern of trade and specialization is determined by its comparative advantage. The principle of comparative advantage stipulates that a country's international trade success in various industries is explained by how relative costs of production differ from those in the rest of the world. These differences in relative costs are related to differences in productivity levels across industries (in the Ricardian model of trade) or to differences in relative factor endowments across countries (in the Heckscher-Ohlin model of trade). Thus, for example, in the Heckscher-Ohlin model of trade, countries have comparative cost advantage in products that make use of the factors they possess in abundance. These are the products they export, and they import those products for which they have a comparative factor disadvantage. In the Ricardian model, the emphasis is on relative labor productivities and unit labor costs (defined as wages divided by labor productivity).

Countries export those products where their relative productivity advantage is greatest (or unit labor cost is lowest).

Much of the international trade in low-income countries can be seen to be driven by just such enduring national differences in factor advantages and costs. Rwanda is a coffee exporter because of its soil and climate, Nigeria is an oil exporter because of geology, Tanzania is a tourism destination because of its climate and abundant wildlife, Uganda is an exporter of maize because of the abundance of land relative to labor, and Lesotho exports clothing because of its low unit labor costs brought about by its relatively abundant labor. Because of the importance of such costs to these revealed trade patterns, the comparative factor advantage view of trade has been the focal point of policies toward “competitiveness” in most developing countries.

Policymakers recognize that interventions can influence factor advantage either across the economy or in specific sectors. Accordingly, governments, rightly or wrongly, frequently introduce policies designed to improve comparative advantage by reducing the relative factor costs (or improving factor quality) of the country’s firms compared with those of its trading partners. Some examples of these policies are subsidies for raw materials and particular production activities, reductions in interest rates and other types of special financing for exporters, programs to keep wage costs from rising, currency depreciations that try to influence relative prices, and special depreciation allowances. In addition, there have been concerted public investments to change the country’s endowments via large infrastructure projects – roads, ports, bridges and so on.

Creating Comparative Advantage

Trade patterns in many manufactured products, particularly in products with a higher level of sophistication, are harder to explain by comparative factor cost models of trade, where comparative advantage is exogenously given. There are many examples of industries in various countries gaining comparative advantage in manufactured product areas through higher quality and product differentiation rather than solely by factor cost advantages. And often, any cost advantages grow more from efficient-to-manufacture designs and innovative process technology than they do from factor costs. Most important is the fact that, in many cases, industries seem to create their own comparative advantage, via a process of positive feedback, rather than the other way around (Krugman 1990).

The process of creating comparative advantage begins when a country establishes, for one reason or another, a strong position in some industry.¹ Establishing this position may then produce externalities (specifically, Marshallian externalities) that work to

¹ One reason a country may establish a strong position in an industry is early home demand for a particular product. Vernon’s (1966) famous “product-cycle” theory for why the USA was a leader in so many advanced products in the 1960s argued that it was because of early home demand for advanced products in the American home market. Porter (1990) also cites home market demand as an important element in his country case studies of the development of competitive advantage.

reinforce and build the industry's strength (see Rosenthal and Stranger 2004 for empirical evidence of the existence such externalities). These externalities are of two types. Technological economies can be produced by knowledge spillovers between firms in the industry, as they learn from each other. This can give rise to a national knowledge base that feeds back to reinforce the industry's competitive advantage. Pecuniary economies can be produced as the industry grows, offering a large market for specialized labor and suppliers. This increases the availability of a flexible supply of skilled labor and an efficient supplier base, which also work to reinforce the industry's competitive strength.

In cases where externalities are strong, specialization and trade patterns can have a large degree of indeterminacy or arbitrariness. This was emphasized by the so-called "new international economics" literature in the 1980s, which is reviewed in Krugman (1990). It is not at all clear in the presence of such spillovers which nation's firms will be successful in competing in international markets and in what industries. In the early stages of development of an industry, or during a transition period when technological change or shifts in market demand are overthrowing existing patterns of advantage, a country may develop an important advantage in an industry because of historical accident or because of government support. Once this superior competitive position is gained, it becomes self-reinforcing and endures.

The importance of Marshallian externalities is obvious in international specialization in many high-tech industries, as evidenced by the IT industry in Silicon Valley in the USA and Bangalore in India. But high-tech industries are not the only activities where external economies can help to create comparative advantage. Many other industries have been shown to exhibit the self-reinforcing effects of externalities. Porter (1990) provides a number of examples of the significance of such externalities in the development of competitive advantage across a range of industries and industry segments in advanced countries and Fairbanks and Lindsay (1997) present similar case examples for industries in developing countries. Successful industry "clusters" in products as far a field as pianos in Korea, ski boots and ceramic tiles in Italy, biscuits in Britain, and flowers in Columbia are shown in these studies to reflect the effects of externalities, rather than simply underlying factor advantages, in their competitive positions in international markets.

The fact that in many cases comparative advantage arises from self-reinforcing externalities rather than as a result of underlying factor advantages is particularly important for developing countries. It allows for a broader competitiveness agenda than the comparative factor advantage view of trade provides. Given the evidence that the dominant process in economic development is not specialization but diversification, it provides policy space for developing countries to pursue this goal through concerted effort to expand capacities across a wider range of products. Factor endowments do not have to condemn a country to specialize only in primary products. *In principle*, clever policy intervention can create an advantage in international markets by establishing a presence in an industry and finding ways to support its development.

These ideas find empirical support in the recent empirical work of Hausmann, Hwang and Rodrik (2006), noted earlier. They document that the sophistication of a developing country's export bundle is not well explained by factor endowments and most other economic fundamentals: only the level of human capital shows up as a weak predictor. This suggests that, while the sophistication of a country's exports is determined in part by its current productive capacity and its human resources, there is plenty of room for determined government policy to make a difference.

Consider the examples of the Asian Tigers, and China, Vietnam, and Chile more recently, whose policy interventions accelerated the diversification and upgrading of their economies much faster than the free market would have. In addition, Rodrik (2006b) argues that Bangladesh's relative factor endowments are similar to China's – abundant labor and scarce human and physical capital. But China has an export bundle that is 50 percent more sophisticated than Bangladesh, a differential that must have a lot to do with policy. China has made determined efforts to transfer new technology into the country and to diversify exports and Bangladesh has not. What's more, the self-reinforcing nature of the process of creating advantage is evident in a study by Hwang's (2006), which indicates that, once a country gets started and establishes a position in an industry, there is unconditional convergence to higher unit values at the level of individual products. Specifically, countries that start producing low unit-value (low quality) goods within a product category are seen to eventually move up to higher unit-values (converge to the frontier for that good), regardless of the characteristics of the country. The rate of convergence is also quite rapid.

A central problem for policymakers trying to diversify exports, then, is how to get started in non-traditional industries that generate externalities. Spillovers and unconditional convergence begin only after entrepreneurs and firms make the necessary investments to establish a position in an industry. As we will discuss in more detail below, starting up this process of diversification faces many difficulties in low-income countries, as incentives can be distorted by a number of factors that block investments in new activities. Another issue for policy is the stage of development. Countries normally move through stages, beginning with products intensive in natural resources and labor, moving to medium-technology manufactured goods, and then further up the ladder to producing and exporting some high-technology products. Most low-income countries are in the initial stage of this evolutionary process – what Porter (1990) calls the “factor-driven” stage, where virtually all internationally successful industries in the country draw their advantage almost entirely from basic factors of production. In this early stage, the range of industries and industry segments in which a country's firms can compete in global markets is limited and the range of strategic policy options is limited. Under these conditions, policies to expand and diversify exports must focus on a mix of interventions designed (a) to improve factor advantage and (b) to improve incentives for entrepreneurship and investment in non-traditional exports that generate learning and productivity externalities.

Impediments to Realizing and Creating Comparative Advantage

The conclusions about comparative advantage outlined above are based on two important assumptions: (a) that comparative advantage, is, or can be, fully realized and (b) that market failures do not exist that can reduce incentives for optimal resource allocation and innovation. But inefficient policies may constrain firms from competing internationally – for example, sales in export markets may be impeded by export taxes, by policy-induced business costs, or by restrictions on foreign entry. Market failures also may create difficulties for optimal resource allocation, blocking diversification investments. Research in low-income countries has highlighted the following obstacles to realizing and creating comparative advantage, which require the attention of government policy.

Market Access: The world trade system has become more development-friendly in the 1990s, but it is still unwelcoming to the exports of low-income countries. Tariffs and quota arrangements of developed and developing countries alike create market-access barriers, especially for agricultural, textile, and labor-intensive manufactured products, which form the lion's share of what low-income countries sell in international markets (World Bank, Global Economic Prospects 2004). Such barriers to market access undermine incentives in low-income countries to move into higher-productivity, non-traditional export areas. Developed countries must find ways to further open their markets to low-income country exports and low-income countries must continue to lobby for these changes.

Infrastructure and Trade Facilitation Services : Infrastructure and trade facilitation services problems abound in low-income countries and the high costs and deficient service flows from these non-tradable factors of production often cause serious problems for export competitiveness. Trade requires official paperwork, transport, port handling, and customs inspections, and the high costs, excessive documentation and procedures, and time delays involved in these services have been shown to be one of the most critical impediments to export growth and diversification in many countries (Sachs and Warner 1995; Elbadawi, I, Mengistae, T and Zeufack, A 2006). The countries that have efficient customs and trade transport have been shown to export and import more (World Bank 2006). Infrastructure and trade facilitation services influence trade in at least two important ways. First, they reduce market access, because firms find it costlier to get to international markets, or because firms cannot meet the tight turnaround times required to compete in higher-end markets. Second, they raise input costs, because suppliers face higher transport costs and handling charges, because domestic substitutes for importable inputs are higher, and because producer's inventory costs are higher, in that producers are forced to carry higher inventories on account of delays and uncertainties in importing inputs.

Successful export development therefore often requires supporting infrastructure investments and efforts to improve the management of service flows from existing infrastructure. Infrastructure conditions can be a deciding factor in market access and cost competitiveness, especially in landlocked countries where geography and poor transport infrastructure are often distinct competitive disadvantages.

Anti-Export Bias in Trade Policies: There is a large literature dating back to the 1970s that identifies government-imposed distortions in trade policy and regulation (e.g., taxes, labor laws) as key impediments to export development in low-income countries (Balassa 1971, Little, Scitovsky and Scott 1970). These distortions alter the allocation of domestic resources so that they are no longer guided by comparative advantage by creating an anti-export bias in incentives, which make it attractive to invest in import-substitutes and unattractive to invest in export activities. The culprits cited are high and nonuniform nominal tariff rates across sectors and over zealous regulation. High tariffs provide negative protection to emerging export activities and high effective protection to import-substitutes, in some cases with negative value added, contributing to resource misallocation and underutilization of capital in capital scarce economies. Excessive regulation increases compliance costs, adding to anti-export bias, and hinders the reallocation of resources in cases where trade liberalization necessitates adjustment.

While heavy protection and excessive regulation have been responsible for low export performance in many low-income countries, the outcome of such policies is contingent on many factors, as noted earlier. Recent research raises some interesting issues that call for a more nuanced view of the anti-export-bias literature. First, the evidence that economic growth is driven by diversification not specialization in low-income countries makes it unlikely that the constraints to specialization highlighted by the anti-export-bias literature have been key impediments to development. The crucial element in development is to enhance the economy's productive capabilities over a wider range of more sophisticated goods, not to continue allocating resources to traditional areas where the country already has established capacities.

Second, Greenwald and Stiglitz (2006) argue that the dynamic benefits of broad trade protection in developing countries for activities such as manufacturing, which generate positive spillovers within the sector and to other areas of the economy, outweigh their static costs. These benefits provide the basis for an infant economy (as opposed to and infant industry) justification for protection. Critiques of protection of manufacturing in the anti-export-bias literature ignore these dynamic spillover effects.

Third, there is no evidence, or theoretical consensus, that rapid trade liberalization, especially in countries with high unemployment, will lead to faster growth. It may only lead to more unemployment and reduced productive capacity (Stiglitz 2004). One of the reasons for this is that liberalization may weaken the manufacturing base of the economy, reducing the production of learning and productivity externalities, because it constricts the import-competing sectors without adequately stimulating new non-traditional imports.

Another reason has to do with the nature of the competitive response of firms in low-income countries. Higher competition among incumbent firms or higher entry threat (as induced by trade liberalization) will tend to encourage innovative investments and productivity upgrading by incumbents aimed at escaping competition or entry by potential rivals. But the incentive to react to competitive pressures by way of innovating investments will be higher for firms in the same industry that are closer to the technology

frontier because they have the greatest chance of being successful at escaping competition through their innovative efforts. Higher competition will have no effect or a negative effect on firms far from the frontier that have little chance of competing in the post-liberalization environment or on world markets, which has been the case for a great number of firms in low-income countries (Aghion, Bloom, Blundell, Griffith, and Howitt 2004). Furthermore, research on trade liberalization in the 1990s shows that, in countries with very high tariffs that instituted large reductions through reform efforts, the share of imports and exports in GDP rose significantly. But, in countries that began with moderate tariffs and lowered them further, trade responses varied widely (World Bank 2005). It appears that, at more moderate levels of protection, other policies play the dominant role in promoting trade.

Real Exchange Rates: The exchange rate can be a potent driver of export growth and diversification. Undervaluation (overvaluation) of the currency can bolster (undermine) export competitiveness, as it raises (lowers) returns to entrepreneurial activity, especially in the area of discovering new, high-productivity exports. What matters for incentives is the real exchange rate, the level of which is often rendered uncompetitive in low-income countries by poor macroeconomic management and turbulence in financial markets. Volatility of the real exchange rate is also very high for the same reasons, creating a risky climate for new export investment, as it makes future returns and payments uncertain (Aghion et al 2004). Risks will be even higher where financial markets are underdeveloped and risks cannot be hedged. Hence, the market determined level and volatility of the real exchange rate in poor countries can be socially inefficient. Accordingly, appropriate policies should be able to improve market outcomes. To do this government must make a major commitment to keeping the real exchange rate competitive and stable as part of its export promotion and diversification strategy and apply appropriate policy management tools to this task.

Weak Institutions: Weak and missing institutions have been shown to limit the ability of firms to take advantage of new trading opportunities in low-income countries (Stiglitz and Charlton 2006; Roland 2000). Entrepreneurs cannot move easily into non-traditional exports if they face ill-defined property rights, if they have inadequate information about markets and technologies, if they have problems enforcing contracts, if they lack access to adequate financing, if they have limited ability to train workers, and if they have problems meeting health and safety standards in foreign markets.

Developing the right policies and institutional arrangements to deal with these problems requires a good deal of experimentation. Good institutions are those that deliver the universal economic principles of property rights, contract enforcement, information, and learning and are appropriate for local conditions. There is no unique correspondence between the functions that good institutions perform and the form they take (Rodrik 2004). Evidence from successful exporting countries indicates that good institutions have large elements of indeterminacy and characteristics specific to individual countries. This suggests that countries have considerable leeway in creative institutional design.

Human Capital and Learning Mechanisms: Low human capital and weak mechanisms for technology transfer and learning in low-income countries have been shown to hamper export growth and diversification (Hausmann, Hwang and Rodrik (2006); Biggs, Shah and Srivastava (1996). The most important constraint is inadequate mechanisms for transferring new ideas into the country and promoting learning, as skill levels can be raised through exposure to new ways of doing things and training. What are these technology transfer mechanisms and how do they work?

In the real world of most low-income countries an entrepreneur's choices are not always obvious and there is difficulty in choosing the action within those choices that is best. Entrepreneurs will have to figure out different kinds of strategies and structures, and develop core technical capabilities to respond appropriately to the new market and institutional conditions they face. Changing trade opportunities will thus involve considerable learning costs. The nature of the learning process requires that firms have to do it themselves – opportunity, context, learning mechanisms, and incentives may be subject to external influence. Research shows that firms cannot learn simply by downloading a “blueprint” from the Internet, as the general notion of “technology transfer” seems to imply. Much of the effective use of technology is not codified but is implicit or tacit and cannot be purchased from abroad (Pack 2003). Learning takes place chiefly by doing, or attempting to do, something quite specific in a specific context. It involves a lot of uncertainty, experimental groping, and learning by making mistakes and correcting them. This is often best accomplished by way of direct interaction with experienced practitioners from more advanced countries.

This type of learning is facilitated by an array of market, state, and community learning mechanisms, such as interactions with buyers and suppliers and direct foreign investors, in-firm and external training, hiring of employees from more advanced countries, hiring of technical consultants, linkages with state and private R&D institutions, state extension services, and information from business networks and associations. In low-income countries, many of these learning mechanisms are weak, or missing, and the enterprise learning environment is poor. Weaknesses in learning mechanisms in Africa, for example, stem from the fact that buyers and suppliers are not coming to the region in large numbers, direct foreign investment is low, public, private, and community training facilities are either indolent or non-existent, local technical consulting services are few-and-far-between, public and private R&D institutions are missing or weak, and information from community institutions, such as business associations, is poor. Biggs, et. al. (1996) provides empirical evidence that weaknesses in these mechanisms in sub-Saharan Africa are having a detrimental affect on enterprise productivity. Levy (1994) and World Bank (1993) show that the strength of these market and non-market learning mechanisms have been crucial for enterprise learning in Asia and Latin America and were an important determinant in achieving productivity growth and export success.

Addressing the learning problem in low-income countries has been shown to require, among other things, interventions to strengthen the mechanisms for technology transfer to create a richer environment for enterprise learning. One way to do this is via

cost-sharing grant schemes, where firms are provided subsidies for consulting services and training. Another way is to promote direct foreign investment. Studies indicate that foreign investors assist developing country exporters to connect to global markets, via joint ventures or knowledge spillovers, and often provide new technology and financing (Aitken, Hanson and Harrison 1997; World Bank 2006). The importance of such initiatives is underscored by research that shows that manufacturing plants which go into exporting are generally the most productive in the economy and are likely to make intensive use of skilled labor (Tybout 2000). Policies and programs that help to induce greater technology transfer and encourage improvement in worker and enterprise productivity are therefore likely to promote export growth.

It should be noted that there is a debate in the research literature about the direction of causality of the impact of exports on productivity. Some researchers argue that the direction of causality runs from increases in productivity to growth in exports (Rodrik 1995; Tybout 2000). However, considerable case study evidence suggests that one has to interpret this econometric evidence with some care (see Noland and Pack 2003 for a review of this literature). It has been shown that export orders catalyzed an increase in productivity in several East Asian firms, with the growth in TFP or product quality preceding actual exports by several years. Thus the causality is shown to run from export order to productivity. It has also been shown that OECD importers often provided extensive advice on production methods, design, and quality control that improved exporters' productivity. So estimating the relationship between productivity and exports can be difficult. Existing econometric studies of this relationship have to be seen as tentative in light of the case study examples that spell out a very complex relationship between export orders and efforts to enhance productivity.

Financial Depth: Access to finance at reasonable cost can be important for export development for the simple reason that firms find it easier and less costly to finance working capital needs (including trade financing) and investments in technical upgrading and new innovative activities. In low-income countries, where many firms are far from the technology frontier, financial market imperfections can be particularly important in firms ability to export. In an environment with financial market imperfections and credit constraints, firms cannot borrow more than a multiple of their current profits. Profits are typically proportional to current productivity. The R&D costs of raising productivity and catching up with the technology frontier depend on the distance from the frontier. Therefore, the lower the current productivity of a firm, the more costly it will be to catch up with the frontier and the more financially constrained the firm will be. Hence, firms far from the frontier have a much lower probability of catch up (Aghion and Griffith 2005). As we just observed above, failure to raise productivity and catch up to the frontier severely reduces the chances of exporting in any particular industry.

Market Failure: Market failure is endemic in low-income countries and has been identified as a major constraint to export diversification. Hausmann and Rodrik (2003) argue that market failures reduce incentives to invest in non-traditional export ventures and hamper learning about new export possibilities. In low-income countries, investors diversifying into non-traditional exports must learn through experimentation what the

country is good at producing. They face considerable uncertainty about costs of production of new export activities, because these costs depend on the investor's experience and ability in transferring and adopting new technologies, on government economic policy, and on the actions of other investors. The "first movers" in this process of so-called "self discovery" bear a disproportionate amount of the risk that arises from this uncertainty and therefore generate valuable information spillovers to the rest of the economy. The investor's inability to appropriate the full value of these spillovers means that unfettered market forces will result in underinvestment in new activities. Low-income countries will therefore diversify into fewer non-traditional export areas than they might have.

Another form of market failure is where the market fails to coordinate complementary investments. Export growth and diversification may require coordinated and simultaneous investments in a number of different areas. Frequently there are complementary effects to investments in modern, non-traditional export activities, where the profitability of each investment depends on other investments being made in other areas. It is generally difficult to be a "Greenfield" investor. While many investments can operate at some level by themselves, it is just not as profitable when complementary infrastructure is not in place, when complementary upstream specialized intermediate goods are not being produced, when complementary government programs are not operating to certify the health and safety of goods, or when there are no other final goods producers in the industry where one can recruit employees and learn from their accumulated business experiences. Profitable investments in new activities may therefore fail to develop unless complementary investments are enticed to enter the market in upstream and downstream activities simultaneously.

Interventions to support experimentation in new export activities and to persuade entrepreneurs to make complementary investments may therefore be necessary. Incentive schemes for investments in new export activities have been shown to increase export diversification in some highly successful exporting countries (Wade 1990; Amsden 2001; Rodrik 2006; Klinger and Lederman 2006), where many of the exporters were new firms and many of the exports are new products (World Bank 2006). But success with such interventions requires the right combination of incentives and discipline. Subsidies must target new activities that provide clear potential for externalities, and they must be performance-based. In addition, the institutions involved in providing the support must be transparent and accountable, must be linked to (but autonomous from) the private sector, and must set clear benchmarks for success.

3. A Framework for Assessing Export Supply Constraints in Low-Income Countries

Our review of research on export development calls attention to several important issues that should be considered in developing an agenda for assessing export supply constraints in low-income countries. First, expansion of traditional exports, as well as diversification of exports into new, higher-end, non-traditional activities, are each important for export development. Diversification of exports into non-traditional areas,

such as manufacturing and modern agriculture, is indicated to be a key element in generating the learning externalities that ultimately drive future growth. Therefore, the agenda for assessing export supply constraints needs to consider both constraints to traditional export supply as well as constraints to shifting resources into new export activities.

Second, lessons derived from the cross-country research of the decade of the 1990s stress that (a) effective export development strategies must be country-specific: one-size-fits-all approaches have been shown not to work well, and (b) effective strategies must be comprehensive: one-dimensional approaches, aimed at a single element of the problem, such as trade policy reform, have also been shown not to work, other elements must be included in the policy package that address binding constraints to export growth. Real export growth was highest in countries that got a combination of things “right” – improved macroeconomic stability, reduced tariffs from high levels, developed more effective trade-related institutions, invested in technology transfer, and ultimately conceived strategies best suited to local economic, political, and institutional conditions (World Bank 2006; Rodrik 2004). Therefore, a framework for assessing export supply constraints must be flexible enough to allow for country-specific issues and broad enough to encompass the macro to micro elements that can impede export development.

Third, while export strategies need to be comprehensive, governments do not have the capacity to deal with everything at once. Consequently, the optimal strategy is to target binding constraints that can help kick-start export growth and diversification in the short-run. Sustaining export development over the longer term will involve building higher quality institutions, which will take time and should be part of a medium to longer-run strategy. Hence, a framework assessing export supply constraints should have both a short-run and a longer-run perspective, focusing first on identification of the most binding constraints to be addressed on a priority basis and then moving to the longer term issues.

Fourth, it should be noted that export development strategies are not just about the right mix and sequencing of sound macro management, freeing markets, and trade liberalization. Unorthodox approaches have also been shown to work well when they effectively address country-specific conditions. China, India, and Vietnam, for example, successfully integrated into world markets in unconventional ways. None of these countries is a clear story of export growth promoted simply by trade openness and free markets. Each country identified a way to promote exports and diversification best suited to its initial conditions, political economy, and institutional constraints: China and Vietnam following a two-track approach of partial liberalization through EPZs; India opening up different sectors at different speeds. There is still much evidence of restrictive tariffs and licenses, of bureaucratic red-tape, regulation, and other impediments to FDI, and of corruption and weak rule of law in these countries. But in each of these cases there has been reasonably effective off-setting policy, such as duty-draw backs, to neutralize the effects of protection on exporters, incentive schemes for export-oriented investments, and requirements for FDI to engage in joint-ventures, technology transfer to local

partners, and sourcing of local inputs, which appear to have made a difference in export promotion and diversification (Rodrik 2006; Wade 1990; Amsden 2001). The moral of this story is that, in assessing export supply constraints, the analyst should be on the lookout for ways to make things work in the local context and not just to follow conventional wisdom about how things are supposed to work.

Keeping these concerns in mind, the checklist below can be used to carry out a country assessment of constraints to export supply. Each major constraint listed in this research agenda by itself or in combination with others has potential for creating impediments to export growth and diversification. The important thing for the analyst, in addition to evaluating the impact of these impediments, will be to identify the most important (or binding) constraints in order to give some rank-order priority to the timing and sequencing of policy recommendations for addressing these export development problems.

The research agenda progresses from macro to micro elements of the problem – beginning with the issue of national price competitiveness and the measures used to assess a country’s competitive position in international markets and then moving to an examination of the principal industry and firm-level supply-side constraints on export expansion and diversification.

Constraints to Export Supply: Assessment Agenda

National (Price) Competitiveness

- The real exchange rate and trends in aggregate productivity growth.

Competitiveness at the Industry and Firm Level

Relative Costs

- Trade policy and anti-export bias;
- Trade facilitation services: documents, port and terminal handling, customs and inspection, domestic transport and warehousing;
- Costs and quality of other infrastructure: electricity, communications, and water;
- Labor costs and labor regulations ;
- Financing costs and credit availability
- Constraints that reduce the productivity of workers and firms;

Incentives and Capacity to Diversify into Non-Traditional Exports

- Private appropriability, investment in complementary factors, and cost and availability of financing;

- Capacity to implement interventions to kick-start diversification: infant economy protection and subsidies for new activities;

Trade Support Institutions

- Weaknesses in the institutional support for trade promotion and diversification.

The headings or categories in the assessment agenda encompass many of the impediments to export development emphasized in the research review in the last section. The categories represent the proximate constraints to export development; the deeper determinants being: geography, incentives, capabilities, infrastructure, and institutions. The categories are, however, a convenient way to group things for analysis of export supply competitiveness. In important ways the categories listed sometimes overlap – for example, constraints that reduce the productivity of firms and workers both raise relative costs and hamper the capacity to diversify into non-traditional export activities. What is important is that the categories, as set out, represent an organized and comprehensive methodology to carry out an assessment. The impact of each constraint can be assigned given conditions on the ground in different country.

3.1 National Price Competitiveness

It must be stated at the outset that competitiveness is a difficult concept to define for a nation. A nation is always “competitive” in global markets in the sense that it always has a comparative advantage in producing something. Nations, unlike companies, are not in a “win-lose” struggle for international markets. Success for one country in a particular market does not mean losses for others – international trade is a positive sum game and success for one country generally translates into success for its partners as well. The partners benefit from availability of new and better products, from larger markets abroad, and from more favorable terms of trade. Furthermore, even if a country has lower productivity in the production of everything compared with its international partners, it is still “competitive” and can gain from trade by specializing and exporting those products where its factor endowments make relative differences in productivity smallest, while importing products where its productivity differences are greatest.

Thus to define national competitiveness by way of a country’s changing shares in world markets in particular activities is partial and misleading. Declining competitiveness in maize or garments does not necessarily mean that a nation’s economy is less competitive. The decline of these activities may be a manifestation of the country’s changing endowments and a necessary part of efficient resource reallocation from old to new areas of comparative advantage. In this general equilibrium sense, then, competitiveness is a vague word when applied to a national economy.

So how should national competitiveness be defined? Views on this subject differ somewhat depending on the perspective of the analyst. For those interested in

macroeconomic problems, such as external balance, competitiveness is viewed as a real exchange rate issue. International competitiveness of goods and services produced in a country depends on relative movements in costs and prices expressed in a common currency, or simply real exchange rates. A lack of competitiveness would mean that a country is running a persistent and unwelcome current account deficit, which, in due course would require adjustment by way of a mixture of deflation and depreciation (i.e. an appropriate change in the level of the real exchange rate). The macroeconomic costs of such misalignments in the real exchange rate can be significant. A prolonged period of exchange rate overvaluation can lead to permanent losses in markets and, more importantly, too high unemployment and reduced skill development. This definition of competitiveness has a short-run orientation, focusing on short-run macroeconomic management that will change relative price or cost indices denominated in some common currency.

In the long-run, competitiveness becomes virtually synonymous with the trend rate of aggregate productivity growth, as it is presumed that the real exchange rate will converge to its equilibrium level. Aggregate productivity measures the amount of output produced with given amounts of factor inputs. The growth rate of productivity depends on capital accumulation, improvements in labor quality, and innovation, all of which are not amenable to much change in the short run. These factors determine the value of a country's products and services, measured by the prices they can command in world markets, and the efficiency of workers that produce them. Productivity growth allows a country to support higher wages and attractive returns on capital – and with them higher standards of living. Only if a country expands exports of products and services it can produce efficiently in order to import the products and services its citizens require will national productivity increase. Accordingly, a useful definition of international competitiveness in this long-run context is the degree to which a country can, under free and fair market conditions, produce goods and services that meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long-term.

Data and Research Methods: National Price Competitiveness

There are several short-run measures of national competitiveness, focused on the real exchange rate, that express real costs or prices in a common currency. An often used statistic is consumer prices of country x divided by a weighted average of competitor's consumer prices expressed as a common currency, such as euros or US dollars. This measure ignores price movements in capital and intermediate goods and concentrates on comparisons in changes in consumer prices and exchange rate movements. A second measure is relative unit labor costs – unit labor costs in country x divided by a weighted average of competitor's unit labor costs expressed in a common currency. This measure focuses on relative changes in average wages, labor productivity, and exchange rates and is generally measured in the manufacturing sector, but in principle can include all industries: exporters, potential exporters, and import-competing activities. A third measure is relative GDP value-added deflators – country x 's deflator divided by a

weighted average of competitor GDP deflators. This is the most comprehensive basis for comparison because it deals with unit labor costs as well as profits per unit of output.

When assessing national competitiveness, trends in these real exchange rate indexes (for example over a period of five or ten years) are compared – a rise in the index indicates that country x (the home country) is less price or cost competitive, depending on the index used. These measures do not take into consideration non-price competitiveness factors, such as quality and design. A good source for real exchange rate data for most countries is IMF Financial Statistics (see IMF data website).

As a policy matter, the real exchange rate is a key variable that requires close government supervision in any program to expand and diversify exports. Competitive and stable real exchange rate should be explicit policy objectives. There is broad cross-country evidence that shows that policy interventions can have a considerable impact on the real exchange rate over the medium term, with important consequences for export development (see for example Rodrik 2006b). Restrictions on capital inflows, encouragement of capital outflows (e.g., allowing domestic pension funds to be invested abroad), sterilized intervention, tighter fiscal policies, and nominal devaluations (in the context of supportive demand management policies) are all possible avenues for government management of competitive and stable real exchange rates. A policy program aimed narrowly at inflation targeting is generally not recommended as the best way to promote a competitive real exchange rate, as the central bank does not have a competitiveness target in such a monetary regime. The level of the exchange rate becomes relevant only as it affects inflation. As a result, there can be long spells of overvaluation along with substantial currency volatility over the medium term. Hence, there can be an important cost paid in terms of export growth and diversification for putting financial and monetary considerations ahead of an exchange rate policy focused on competitiveness.

The most often used measures of productivity to evaluate longer-run competitiveness are trends in relative labor productivity, relative total factor productivity (TFP) or relative real cost reduction (see Harberger 1998 for a good discussion of this measure), and relative unit labor costs. Relative labor productivity is simply measured as country x's average labor productivity divide by a weighted average of competitor's average labor productivity. Labor productivity is measured as either output per worker (total output divided by total employment) or as output per man hour (total output divided by hours worked).

TFP provides an index measure of the combined effect of all factors of production on efficiency. There are two alternatives for calculating TFP growth – growth accounting and the estimation of production functions. Growth accounting weights the rate of growth of factor inputs by factor shares and subtracts the weighted growth of inputs from that of output growth to arrive at a measure of TFP growth. Production function estimates regress output on a complex functional form of capital and labor to obtain estimates of TFP growth. Most growth accounting implicitly invokes a number of restrictive assumptions, including constant returns to scale, Hicks-neutral technical change, an

elasticity of substitution equal to unity in the case of two inputs, and competitive factor markets. If these assumptions are not correct, growth accounting estimates of TFP are not very robust, which then raises the question of the extent to which the assumptions are violated and resulting quantitative impact on the TFP estimates. Production function estimates do not involve restrictive assumptions. Trends in TFP measure the rate of technical progress.

Real cost reduction is a measure of the reduction in real costs the economy has been able to achieve (as an aggregate of all the real cost reductions achieved by all firms in the economy). It is calculated by multiplying the growth in TFP over the period by initial value added (GDP). Real cost reduction can be made additive by calculating it for each sector or industry (TFP x initial value added in the sector or industry) and simply adding up these cost reductions for an economy-wide total.

Trends in ULC reflect trends in two important variables: wage costs and labor productivity ($ULC = W/Q/L$). If unit labor costs fall, it indicates that the same amount of output can be produced for a smaller expenditure on labor. Unit labor costs measure the average cost of producing one unit of output – for example, labor costs divided by GDP.

Data for an analysis of trends in aggregate productivity generally come from national accounts, employment statistics, and industrial census data. For many countries, these data are available on the World Bank's data website and/or the IMF's data website.

Lastly, it should be noted that national competitiveness is often viewed as a much broader topic than just price competitiveness. Several annual reports on country competitiveness, the most popular being the World Economic Forum's Global Competitiveness Report, offer up comparative data on various variables, such as political stability, investment climate, quality of infrastructure, FDI flows, and so on, to provide a more comprehensive measure of a country's capability to compete in world markets. These reports also generally provide a good discussion of measurement and data collection methods. For Africa specifically, there is the Center for International Development's Africa Competitiveness Report, which was published only for the year 2002. In this paper, we discuss these other variables, but we relate them to specific supply constraints to export development at the firms level.

3.2 Competitiveness at the Industry and Firm Levels

At the microeconomic level competitiveness can vary across different economic activities depending on how constraints affect relative costs by way of their impact on economic policy, productivities, factor endowments, resource mobility, and institutional support services.

3.2.1 Relative Costs

Trade policies and anti-export bias

Exports can face discrimination because of the level and structure of import and export duties and indirect taxes (and quotas) in low-income countries. This is the simple message of the Lerner Symmetry Theorem, which states that taxes on imports are taxes on exports. The incentives created by the level and structure of the tariffs (when nominal duties are high, vary widely across sectors, and cascade across different stages of production) can encourage domestic industries to replace imports that carry high duties; and the industries established often depend heavily on imported raw materials and capital goods. What has consistently occurred in most low-income countries is a shift of the composition of imports away from consumer goods into intermediate and capital goods. These imported intermediate goods complement domestic production of consumer goods; and the consumer goods are produced at high costs behind protection, with the result that it is difficult to break into export markets.

The export-bias of such import and export duties and indirect taxes can be measured in several ways. The first is the ratio of the effective exchange rate on exports to the effective exchange rate on imports. Earlier, the principal effects of overvaluation of the exchange rate is that there is a bias against exports. The ratio of the effective exchange rate on exports (EER_x) to that on imports (EER_m) can be taken as an index of how far exports are profitable relative to import-competing goods. Thus, when EER_x/EER_m is less < 1 for a good this may be described as the existence of a bias against its exportation.

To capture the effects of trade and indirect taxes, the effective exchange rate on exports is defined as the units of domestic currency that can be obtained for a dollar's worth of exports, taking into account export tariffs, subsidies and surcharges, special exchange rates, input subsidies related to exports, and so on. The effective exchange rate on imports is correspondingly defined as the units of domestic currency that would be paid for a dollar's worth of imports, taking into account tariffs, surcharges, interest on advance deposits, and so on. In the cases where there are import licenses, the EER_m should also include premiums on import licenses.

A second measure of export bias, which has been more widely used in international institutions, such as the World Bank and IMF, and is fully equivalent to the first definition of export bias, is the ratio of effective rate of protection in foreign and domestic markets. To examine the effects of trade and indirect taxes on the incentives of exporters, the effective rate of protection (ERP) calculates the "effective," rather than the "nominal" tariff on a good taking into account taxes on both inputs and outputs. The nominal tariff defines the percent by which the price of a good can exceed world price (at the official exchange rate), and the effective tariff defines the percent by which the payments to factors of production in the domestic market can exceed those implied by world prices at the official exchange rate. The effective tariff or effective level of protection on an economy or industry can be expressed as:

$$T_i = (t_i - \sum a_{ij}t_j)/p_i$$

Where t_i is an ad valorem tariff, a_{ij} is the coefficient of inputs for industry j into industry i and α_i is the share of value added in output in industry i . The numerator of the expression is the nominal tariff on output minus the weighted average of tariffs on inputs, and each tariff is weighted by its importance as an input into the industry. The denominator, the share of value added in output, indicates the importance of primary factors relative to material inputs in producing the output of the industry.

For ease of measurement we can look at the nominal and effective rate of protection in a different way. Since we defined the effective rate of tariff as the percent and by which payments to factors of production can exceed the difference between inputs and output prices on world markets (usually called to value added that world prices), we can write the effective rate are protection as:

$$T_i = (W_i - W_w) / W_w$$

Where W_i is domestic value added and W_w is value added the world prices. In analyzing the effects of a given structure of indirect taxes and tariffs, we usually know W_i from census of manufacturing data, but we do not know, or have any way of directly observing, W_w . However, if we have the relevant information about tariff rates on inputs and on output, and if we know the structure of the industries inputs, then we can determine the value of W_w for that industry.

The usual input-output relations state that the value of output of an industry, X_i , will equal the value of the material inputs used in the industry $\sum X_{ji}$, plus the payment to factors a production used in the industry W_i . Or, career writing to obtain value added:

$$W_i = X_i - \sum X_{ji}$$

Now if we know the value of tariffs on the output and on inputs used in the industry, and if the domestic prices of those goods equals the world price at the official exchange rate plus the tariff, then knowing he domestic price and the tariff rate gives us enough information to calculate the world value of goods at the official exchange rate. If the value of output at domestic prices is X_i , and the value of output at world prices is expressed as X_w , then:

$$X_i = X_w (1 + t_i)$$

$$X_w = X_i / (1 + t_i)$$

In a similar manner, we could find the international value of each input used in the industry. And having found the value of output and the value of inputs and world prices, we could calculate, as a residual, value added that world prices:

$$W_w = [X_i / (1 + t_i)] - \sum [X_{ij} / (1 + t_i)]$$

Once we have W_w and the observed value added in the industry W_i , we can calculate the effective rate of protection or the extent by which domestic factor payments exceed the difference between the value of foreign exchange saved by domestic production and the value of foreign exchange used by consuming tradable intermediate inputs.

To offset some of the effects of the anti-export bias of the trade regime, many countries institute trade regulations that allow exporters to import raw materials free of duties and other taxes. Many African countries, for example, took the partial liberalization path to trade reform in the 1980s and 1990s and established a regime of offsetting regulations, such as duty exemptions, duty drawbacks and VAT drawbacks to assist exporters. The effect of such offsetting trade regulations can, of course, be fully captured in the effective rate of protection measure. But plugging in the numbers based on the letter of the law does not always tell the whole story. There is still the matter of how well offsetting regulations are managed. A good deal of evidence shows that poor administration of these offsetting regulations is raising the costs of exporters. Delays of three to four months in getting duty and VAT draw-backs appear to be commonplace, and in some countries there are reports of longer delays of up to six months or a year.

Delays in getting duty and VAT draw-backs cause cash flow problems for exporters, as well as time and administrative costs involved in hassling with authorities to get refunds. High cost and limited access to finance increases the impact of these costs. In countries with duty exemptions, there can be other problems. Obtaining duty exemptions, for example, can require the exporter to provide an import/export plan (a "Master List" of planned imports) for the year to the authorities for approval. Getting these approvals takes time and often requires informal fees. As there are inevitable market changes that exporters need to respond to during the year, by changing their output and input mixes, there are always deviations in planned imports. Any such deviations from the plan can require added documents and approvals and added bureaucratic costs. The questions for researchers are (a) why don't these offsetting regulations generally work well in the African context? (They worked pretty well in East Asia during their export drive) and (b) can they be made to work better in the typical low-income African country?

Finally, export processing zones (EPZs and special economic zones SEZs) are also often part of the offsetting trade policy regime for promoting exports, and for promoting foreign direct investment where there is inadequate infrastructure, inadequate provision of public services, and trade protection. Again, experience with these facilities across many countries is mixed and their impact on anti-export bias needs to be assessed. Where they work well they generally have strong public support and a public/private consensus about where the program is going and what to do. There are also concerted actions to support the EPZ program with legislation, one-stop-shops, and provision of utilities. This gives investors confidence. Well functioning EPZs are also generally managed by autonomous agencies that do not have other responsibilities. These other responsibilities frequently hamper the ability to manage the zones properly.

Trade Facilitation Services

One of the biggest barriers to trade in low-income is the time delays, hassles, and bribes involved in trade facilitation services. Time is money: studies show that each additional day of transport delay cost .5 percent of cargo value for goods transported by ship or rail. In the case of manufactured goods, for example, customs and transport together represent the single greatest cost of trading in developing countries (World Bank 2006). Any assessment of the constraints to export supply, therefore, must include an examination of the procedures, time delays, and costs of importing and exporting, caused by customs services, port and terminal handling, and transport.

The World Bank's "Doing Business 2006" report provides a good model for how to go about assessing the costs of trade facilitation services. It focuses on the procedures and time involved in importing a standardized cargo of goods (for example, a 20-foot or 40-foot container). It then looks at indicators, such as the number of procedures, number of documents, and number of signatures required to process this cargo. These indicators are tracked from the time the business starts preparing the required documents to the time the cargo is in the client's warehouse. Every official procedure is counted along with the time required for completion. All documents and signatures for each procedure required for clearance of the cargo across the border are recorded. In the case of importing, for example, the process is broken down into four stages: (i) pre-arrival documentation for the cargo to be loaded on the ship, (ii) procedures during the ships arrival at the port and the associated terminal handling, (iii) customs and cargo inspections, and (iv) transport for the delivery of the cargo to the warehouse. The time when the cargo is at sea is not counted. Once the importer has completed the pre-arrival documents, time recording stops; it then starts again when the ship is docked. If the final destination is a landlocked country, the transport time includes the cross-border transport to the importers warehouse.

Of course, where there are more procedures and signatures required in importing and exporting, there is generally more corruption. Corruption not only raises costs but dampens the spirits of participants in the system. An estimate of the bribes which must be paid to move documents along and avoid procedures should therefore also be included in the assessment of the costs of trade facilitation services.

Local freight forwarders, shipping lines, customs brokers, and port officials are a good source for information on procedures, documents, and signatures required in importing and exporting, as well as the time to complete these formalities and the bribes that must be paid. In gathering this information one has to be careful to hold the standard of the cargo constant and not mix a standardized cargo with one necessitating special conditions – e.g., hazardous products, refrigerated products – and that it meets international phyto-sanitary and environmental safety standards.

In reforming trade facilitation services, the three most effective changes to the system have been electronic document filing, use of a risk assessment policy for customs inspections, and regional cooperation in reform of customs and transportation rules (World Bank 2006).

Costs and quality of infrastructure

In addition to the time delays and procedural hurdles exporters and importers face in trade facilitation services, hard infrastructure costs – transportation, ports, electricity, communications – are another important cost of trade. In many parts of the world, improvements in transport and communications have facilitated globalization of production by reducing the cost of breaking up the production chain into components. This has allowed some developing countries to expand and diversify trade by playing a major role in production sharing. In most African countries, however, infrastructure creates a bottleneck. Part of the problem of infrastructure costs relates to the regulations and time delays of what we called trade facilitation services above and part relates to the basic cost of the infrastructure. An assessment of the impact of infrastructure costs and quality on export supply should try to pay heed to these separate effects. We review the problems that need to be considered in each of the important infrastructure areas below.

Transport: Transportation is probably the most important infrastructure barrier to trade in most African countries. It isolates markets from competition, reduces economies of scale, and directly raises import and export costs. Transport problems also pose a serious constraint to commercialization of agriculture in many African countries, limiting the ability to diversify into new export activities, such as horticulture and floriculture. All forms of transportation – road, rail, sea, and air – are generally costly in low-income countries. But costs are increased by the fact that, in many cases, cheaper forms of transport, such as rail, perform poorly, necessitating the use of higher cost road services (40 to 60 percent higher cost than rail).

In some landlocked nations in Africa transport can be the single most important component of cost for some products. Rwanda, for example, is an efficient coffee producer, but transport costs of coffee from the farm to the Port in Mombasa, Kenya, add 80 percent to farm-gate production costs. Uganda's freight transport rate is high even among land-locked countries, outpacing its neighbor Malawi, where transport adds 50 percent to the ex-mill production cost of sugar exports. But it is not just the landlocked that suffer from high transport costs. Tanzania's freight transport rates also rank with some of the highest in the world.

The reasons for high transport costs only partly involve poor and fragmented infrastructure and inadequate maintenance and investment in these facilities. High costs are also caused by lack of competition in the transportation sector and the costly regulations and excessive documentation, formal (taxes, road charges) and informal fees at checkpoints, and lengthy delays along main corridor routes we documented above. Landlocked countries face added problems in that they have only limited control over many of these costs, as they arise in neighboring countries as exports transit to and from ports in those locations.

The litany of such problems is substantial. National air-carriers and shipping lines in many countries continue to have monopoly power over rate setting and landing rights. High road charges are required for foreign-owned freight vehicles. Cabotage laws and

other regulations increase costs further as cargo carriers are not allowed to pick up loads at the delivery destination except those destined for their originating country. In some countries, each transit consignment must be escorted by customs officials. The convoy service is officially free, but most of the time a bribe is required. Other informal fees add to these costs – payments to an array of border agencies and payments to road police. An assessment transport costs must include an examination of such problem areas to understand the high costs of trade.

In terms of policy, recommend actions in the transportation area to address these problems have generally targeted four broad areas: (i) upgrading of transport infrastructure, including freight facilities at ports and airports, taking maximum advantage of public/private partnerships in infrastructure investments; (ii) promoting competition in road, rail, and air transportation; (iii) training of transport operators, providers of logistics services, and forwarders; (iv) strengthening public/private dialogue in transport and trade facilitation; (v) developing and implementing a transport reform program, which would include modernizing transport legislation and regulations, developing technical capability of government staff, and setting up a transport information system. Finally, landlocked countries have to find ways to address transport problems outside their borders through their memberships in regional organizations.

Ports: Port charges add another dimension to the freight cost problem. Long delays and high port clearing charges are experienced in importing and exporting containers in many African ports. For example, in Mombasa port the average dwell time of an import container bound for local Kenyan companies was found to be 12 to 17 days and even higher for containers destined for other countries (dwell times for containers for Uganda could be as high as 37 days). Such delays raise inventory costs substantially. These delays also lengthen turnaround times (the time from a buyer's order to delivery of the product), which can keep exporters from moving into higher-value market segments where shorter turnaround times are important.

Many of the requisite reforms to port operations do not necessitate expensive infrastructure investments insofar as they involve improvements in procedures and management. Many ports need revised legal status to give them autonomy, open concessioning of operational structures, and improved access for vehicles and better circulation in the port. They also need to rationalize the various entities operating in the port and improve their management. And, in some cases, they need dredging of shallow channels to improve ship access. An assessment of the costs of port operations should look into such issues.

Electricity: Electricity supply is yet another serious infrastructure problem driving up exporter's costs. Many exporters in Africa report that unreliable power supply is one of the biggest problems affecting their operations. Frequent power outages stop production and drive up operating costs. Many exporters have to rely on generators to deal with the problem of outages at three to five times the cost of electricity from the grid. Some companies complain about the difficulty of even getting electricity connections without significant bribes.

Dealing with high electricity costs and reliability of supply is thus a priority issue in most countries. Addressing the problem in most cases will require new investments. But again, the first priority in many countries will be to improve system management – setting appropriate pricing structures, devising effective collection systems, better management of Power Authorities, and improved maintenance. Of course, not all the countries can deal with their electricity problems through better management of the system. Uganda’s power shortages and high electricity costs, for example, are due mostly to drought and low water in Lake Victoria the main source of power. An analysis of electricity problems and their effects will have to address these country-specific differences.

Communications: Communications is a final infrastructure problem raising costs of international trade and constraining the development of new exports. Protection of communication services from foreign and domestic competition in many countries, because of state monopolies, has raised costs, particularly of fixed-line services, and slowed the development of key new IT services, such as internet, broadband, and VIOP. This hampers export development in countries where firms want to diversify exports into areas like IT services and financial services. One of the most pressing problems facing firms trying to break into these export markets is cost and access to Internet, particularly broadband and satellite connections, which are required for high-speed data and optical transmissions. Another hurdle for the development of such services is often legal, regulatory, and institutional obstacles. State monopolies frequently tolerate only limited competition in telecommunication services. Internet providers are often under a number of restrictions that limit the potential for web hosting services. The basic laws governing communications and broadcasting generally have a number of problems, including content controls. And ministries of communications are often both the regulator and an operator.

These examples provide a picture of the types of things that must be assessed in an examination of the communications sector and its impact on export development. The general take away message for policy in most countries is that increased competition, improvements in laws governing the sector, and better management of the regulator are the important factors that need to be addressed.

Data for an assessment of costs in all these infrastructure areas is generally available in government publications and in reports from international institutions, such as the World Bank and USAID. Assessing the impact of infrastructure cost and quality on firms requires industry surveys, which we will discuss in more detail below.

Labor Costs and Labor Regulations

Low labor costs are a key relative factor cost advantage in most low income countries. However, this advantage is often offset by rigid labor regulations. Sub-Saharan Africa, for example, accounts for a large share of the countries in the world with the most rigid labor regulation. Inflexible labor market regulations keep wages high in the formal

sector of the economy, hold back new job creation, and drive workers into the informal sector. The form these rigidities take includes restrictive hiring and firing rules and excessively high severance payments, inflexible work hours, and inflexible labor contracts. On top of this, rigid employment regulation is frequently not associated with lower taxes to cover for the risks of unemployment and sickness and old-age pensions. Many African countries have social security taxes in excess of 18% of wages, exceeding those in wealthier developed countries.

As we have already noted, the important metric for competitiveness is relative unit labor cost, which takes into consideration wage rates as well as labor productivity. Low-income countries in most cases need low wages to offset their productivity disadvantage with the rest of the world to be competitive in many product areas. Rigid labor regulations reduce this possibility. But having low labor costs as the principal source of comparative advantage over the long run should not be the aim of export development policy. Productivity improvement is a better option. Developing the capacities that raise productivity and enable companies to pay workers well should be the central goal. Firms do need to begin competing where they have real advantages. And in most low-income countries, the only real advantages in the beginning are factor cost advantages – cheap labor or natural resources. But any export development strategy that begins with these advantages also should contain a clear plan for migrating away from them over time. This means developing more sophisticated sources of advantage and improving firm-level productivity in order to take advantage of them.

Financing Costs

In most sub-Saharan African countries, the relative costs of working capital credit and fixed asset financing are higher than in competitor countries. This is evidenced by high real interest rates and high collateral requirements. Access to credit for most borrowers is also limited. For a discussion of some of the reasons for these high costs of financing see section 3.2.2.

Constraints that reduce the productivity of workers and firms

Empirical research suggests that higher productivity growth leads firms to export. Studies using detailed plant-level data have shown that manufacturing firms which move into exporting are generally the most productive in an economy. The fact is that firms generally cannot enter world markets and compete unless they meet a certain productivity threshold. Consequently, policies that encourage investments in human and physical capital, and that support technological change, are likely to promote export growth. Of course, his general proposition does not preclude the possibility that causality in some cases will run from export orders to higher productivity, as we noted in section III.

Firm-level studies generally single out seven major factors that reduce the productivity of workers and firms in low-income countries and lessen their ability to compete in world markets. They provide a good starting point for the assessment of productivity problems at the firm-level and offer a focus for export development policy.

We briefly review each of these productivity issues below to provide some idea of the research issues involved, beginning with static variables and ending with dynamic variables.

Lack of economies of scale: Domestic markets in low-income countries are generally small, as populations are frequently small and incomes are low. But markets in these countries are made even smaller by several other factors. First, a large portion of the rural population is often isolated from the market because of inadequate infrastructure and high transportation costs. Post-conflict economies have additional problems because distribution channels and markets have been disrupted and need to be re-established.

Second, working capital is often inadequate and irregularities in supplies of raw material are frequent. Working capital constraints limit the ability of down stream processors (e.g., wood products, agricultural processors) to buy adequate volumes of raw material from upstream suppliers to make efficient production runs possible. Recurrent irregularities in upstream supplies of raw materials add to this problem. Take for example the fruits and vegetable industry in most African countries. Few processors can exploit scale economies because of working capital problems, raw material shortages, and infrastructure problems. The financial system is underdeveloped in most cases and banks are particularly reticent about lending to risky agro-business ventures. The market for raw materials is generally highly unpredictable, as it is poorly organized and highly dependent on the weather because there is no irrigation. And processing firms frequently have severe difficulties with unreliable electricity and inadequate transportation. As a result, processors are forced to operate at a lower scale than they would if these conditions were better.

Third, inadequate standards and enforcement of standards reduce the size of the market for manufacturing companies. For example, in the wood processing industry, producers of construction materials, such as windows and doors, and furniture makers, have problems producing standard products and gaining economies of scale because construction standards are not well defined or properly enforced. With limited market size, it is difficult for manufactures to shift from “job-shop” production of a few units of special-order products to batch production where productivity is much higher.

Fourth, widespread smuggling in most countries (because of corruption, weak customs administration, and a general inability to control leaky borders) undercuts formal firms on domestic markets and limits their ability to achieve economies of scale. This environment encourages the proliferation of informal and small-scale activities, creates a bias against formal tradable activities, and does not allow the already small domestic market to become a platform for export growth.

As domestic firms that become exporters generally begin by first producing for the local market and then enter world markets only after their costs are brought closer in line with the world technology frontier, restraints on the size of the home market can play a significant role in export development. Widening the market will require generally improvements in infrastructure, better access to working capital, better standards (e.g., a

shift from mandatory standards to internationally recognized voluntary standards) and enforcement of standards, improved customs services to reduce smuggling, and initiatives to assist upstream raw material suppliers and downstream final product exporters.

Low capacity utilization: Plants in many low-income countries operate with considerable excess capacity. Enterprise surveys typically find that firms operate at about 50 percent capacity on average. The reasons for low capacity utilization vary, but there are some common patterns – problems adjusting to policy changes, shortages of working capital, policy-imposed distortions, and delays in getting inputs because of poor trade-related infrastructure. In some countries, there continue to be large plants that were established by the state when capacity was installed to meet government needs rather than market demands. Many of these plants have been privatized. But a good number operate today at only a fraction of their capacity, as they are still trying to adjust to the new structure of incentives and face an array of problems, including competitive challenges, difficulties getting finance, poor infrastructure, continued over-staffing, and inadequate management capability.

In addition, policy-related factors and problems with trade facilitation services continue to create difficulties that reduce capacity utilization. For example, trade policy continues to be an issue in getting production inputs in many countries. Most quantitative restrictions are gone, but some restrictions remain, and there continue to be major delays in importing inputs because of bureaucracy and problems with customs, as already noted.

Inefficient technologies: Another reason why firms have low productivity in the DTIS sample is inefficient technologies (production processes, management practices, organizational structures, machinery, seeds and agronomic practices, and so on). The reasons why firms are often far from the “best practice” frontier include (a) low risk-adjusted expected returns on new investment because of poor investment climates, uncertain supplies of raw materials, and poor infrastructure (b) financial market imperfections that constrain the ability of firms far from the technology frontier to upgrade (c) weak mechanisms for technology transfer and (d) inadequate government R&D and extension services.

In many countries, machinery in use is vintage equipment, designed for mass production of standard products and cheaper energy. This type of equipment, even if it is useable, is inefficient and highly unsuitable for the flexible specialization strategies most firms must adopt for competitive success in world markets today. It is also subject to frequent breakdowns, which stops production and raises set up costs, and frequent repair and maintenance, which requires expensive importation of spare parts. Upgrading investments are frequently held back because expected returns on investment are low in the face of continuing political uncertainty, uncertain raw material supplies because of weather and infrastructure problems, and lack of marketing information and capability to seek out appropriate markets and market segments. Furthermore, as we discussed earlier, studies have documented that in an environment with financial market imperfections and credit constraints, firms cannot borrow more than a multiple of their current profits. For the many firms in low-income countries that are far from the technology frontier, this

constrains upgrading possibilities, because the R&D costs of raising productivity and catching up are higher the greater the distance from the frontier. Hence, firms far from the frontier face financial and incentive problems in raising technological capability.

Technological upgrading is facilitated by an array of market, state, and community technology transfer mechanisms. In most low-income countries, these mechanisms are weak, or missing, hampering the ability of firms to upgrade technology. As we noted in section II, weaknesses technology mechanisms in Africa stem from the fact that buyers and suppliers are not coming to the region in large numbers, direct foreign investment is low, public, private, and community training facilities are either indolent or non-existent, local technical consulting services are few-and-far-between, public and private R&D institutions are missing or weak, and information from community institutions, such as business associations, is poor.

Technologies in use are also poor because of ineffective policies in the area of natural resources and weak institutional enforcement capability. A key reason for the use of low productivity production methods in downstream processing of natural resources is that operators have property rights problems: insecure leases and security issues, which cause them to limit investments in modern equipment. In many African countries leasing arrangements for forest concessions, fish lots, and other natural resources are generally opaque, cumbersome, and corrupt. Some natural resources suffer from “commons problems,” because of the inability of governments to cooperate on a regional basis – for example, in setting fishing limits on Lake Victoria. Lack of transparency in the leasing process and the short duration of leases in many countries, as well as security problems in leased areas, encourage inefficiency in resource extraction and overuse of the resource. This leads to poor quality raw material and loss of value-added in downstream processing and stock depletion problems. In most places, there are laws against using highly inefficient techniques that squander natural resources – e.g., chainsaws in the wood industry, particular types of nets in the fishing industry, and blasting in stone quarries. But producers use these techniques anyway rather than investing in more modern techniques, because they have no incentive manage natural resources well and because governments generally fail to enforce the laws against these techniques, compounding the problem.

Agricultural technology in use is often poor because of insufficient research and because government extension services fail to disseminate available new technologies and complementary inputs widely. Uganda, for example, has a serious problem with wilt disease in coffee, one of its main exports. After more than 15 years of coping with the disease, the Coffee Research Institute has failed to come up with any wilt resistant varieties and the government’s coffee replanting program has been a major flop. In addition, it is argued that Ugandan cotton productivity could increase much faster if the government extension service could get genetically modified seeds to the farmers.

As this brief review indicates, improving the efficiency of technology in use will have to involve a range of policies and programmatic interventions. The broad agenda will generally have to aim at improving incentives for investment, increasing access to

finance, upgrading arrangements for exploitation of natural resources and governing property rights, expanding government R&D and dissemination (public and private) of technologies to farms and firms, and improving government capability to deal with this broad agenda.

Weak management capability: Firm surveys in low-income countries all underscore that low human capital, particularly poor management capability, is an important factor in low enterprise productivity. Managers are shown to have limited modern business training and limited experience. They frequently look to the government for help rather than rely on their own initiative. Planning and long-term development strategies are inadequate. Financial management is poor. Few firms engage in quality management. Decision making in firms is highly centralized – top managers make the decisions and key technical personnel are generally not involved. Managers also often argue that they need more bank loans to produce more profits and pay only limited attention to finding ways to generate retained earnings for financing.

A new, post-liberalization group of young entrepreneurs is beginning to change this situation, but it has been shown in studies that interventions are needed in most countries to create a richer learning environment for entrepreneurs and managers to upgrade strategic, organizational, and financial management capability. Education programs, efforts to strengthen technology transfer mechanisms, and changes in immigration policy to permit the hiring of more foreign staff with the experience and expertise to enhance technology transfer and learning.

Worker efficiency: Task-level efficiency of workers is generally poor in low-income countries adding to the low technology problem. As a result, the low wage advantage that prevails in most low-income countries is often undermined by poor worker efficiency. Many manufacturing operations, as a consequence, suffer from high and uncompetitive unit labor costs. Part of the reason for low task-level efficiency of workers in African firms is due to differences in capital-intensity of production methods and part to the length of production runs (lack of economies of scale), but much of the gap is caused by other factors. In some instances, workers have reasonable skills, but their initiative, work intensity, and consistency are comparatively poor. Worker attitudes can be a part of the problem. In some countries, poorly structured and unbalanced labor laws and regulations undermine worker incentives. Overly restrictive regulations on firing, excessively restrictive work rules of various kinds, limits on incentive pay schemes, and heavy-handed labor unions, often supported by governments, distort incentives and make it difficult for managers to motivate employees. But poor management and inappropriate incentive schemes also contribute to the situation. There is a good deal of evidence in Africa showing that plants, with trained and experienced local or foreign managers, have task-level efficiencies of workers, and unit labor costs, well within competitive Asian ranges.

Another important part of the task-level efficiency problem is worker training. Industry specific training institutions do not exist in most low-income countries; hence there is nowhere to train workers. And companies do not have the resources or incentives

to develop training programs for basic skill development. There is also a “brain drain” of educated and talented workers to higher wage countries in the region and to developed countries. Clearly there is a need to study ways to increase technical and vocational training as well in-firm training. In addition, labor laws needed to be examined to make sure there is enough employer flexibility while maintaining basic labor standards.

Lack of specialization in production: Firm-level studies show that African firms often produce too many products. The reason for this lack of focus is that they often try to serve domestic and international markets, and, within those markets, too many market segments. Lack of specialization can reduce productivity because it increases shop floor complexity and reduces throughput. Companies that try to produce too many products also find it much more difficult to track just how much profit each individual product provides and, as a result, they often end up selling products that do not really make money.

Specialization in production is made difficult in low-income countries by the fact that producers lack the necessary information to plan future production, lack access to credit to deal with shocks, and lack sufficient marketing capability to develop effective strategies to target the right markets. In the food processing industry, for example, information is a problem because farmers, farmer organizations, and public agencies do not provide adequate harvest forecasts or other types of timely production information; hence processors commonly have poor information on crop conditions during the growing season and often do not even know exactly where particular crops will be grown, what will be grown, or who will grow them. Working capital credit is a problem, too, because of imperfections in financial markets. And marketing capability is a constraint because entrepreneurs generally lack experience and training in marketing and trade associations and government agencies do not make adequate information available on foreign and domestic consumer markets.

An examination of ways to improve the strategic capabilities of firms to specialize in the right product mix might include: (a) interventions to increase availability of market information on agriculture, manufactures, tourism, and services -- collection of statistics, forecasting, and dissemination, (b) programs to improve marketing capabilities and consulting services in marketing, (c) support for marketing promotion at the industry and national levels, particularly in activities such as tourism, on the grounds that no single firm has an incentive to promote national tourism where many suppliers would stand to benefit.

Process of creative destruction and reallocation of resources: While the continuous process of restructuring and technical upgrading by incumbent firms is essential to boost aggregate productivity, entry of new firms and exit of obsolete firms and the reallocation of resources to higher productivity enterprises and activities also play an important role (Audretsch 1995; Baldwin and Gorecki 1991; Caves 1998; Restuccia and Rogerson 2004). The usual picture in low-income countries is one of significant firm heterogeneity, which is manifested in large disparities in firm size, firm growth and productivity performance. Much of the difference in firm sizes and other variables has

generally been shown to be due to within industry effects, rather than in the industry composition of the economy. Firm “churning” (entry and exit rates) is generally lower in low-income countries than in higher-income countries, reflecting lower turnover of firms as well as of employees. Entering, but also exiting, firms tend to be very small, much smaller than in higher-income countries, suggesting that the entry of small firms is relatively easy, while larger-scale entry is more difficult, and also that survival among small firms is more difficult and many small new comers fail before reaching the efficient scale of production. Market selection is often fairly harsh in low-income countries, but firms that enter the market do not grow as much or as fast as firms in higher-income countries. All of these enterprise turnover and mobility factors tend to lower the average rate of productivity growth in low-income countries compared with higher-income countries.

A strong process of creative destruction also promotes productivity-enhancing strategies among incumbents (however, as we noted in section III the incentive to react will be higher for firms in the same industry that are closer to the technology frontier, there may be no effect or a negative effect on firms far from the frontier). Evidence of this “contestability” effect is found in many studies around the world: significant correlation is found between firm turnover rates and incumbent productivity growth among similar firms across industries and countries; and there is also a significant correlation between the net entry contribution to productivity and incumbent productivity growth. So higher firm turnover is generally associated with stronger productivity growth among incumbents, and the more effective the process of creative destruction is for productivity, the more it stimulates growth by incumbents. While this process does not seem to be hampered in low-income countries the productivity growth rates of incumbents and the contribution of net-entry are often both small. What these findings suggest is that the possible constraints to productivity and export growth may come not so much from barriers to start up and exit, but rather from barriers to expansion – for example, access to credit, access to infrastructure, adoption of leading technologies, improvement of labor skills, and reduction of cumbersome operating licenses. But this is an open research question in most countries.

Methodologies for Firm-level Analysis

There are a number of useful methodologies to facilitate policy-focused data collection and analysis at the enterprise level. All involve some type of stratified random survey of firms, in target industries, aimed at gathering data on costs and revenues in such a way that these metrics can be related to policies, institutions, infrastructure and other market constraints. One approach that is often used to assess relative firm-level costs and productivities is “integrated value chain analysis”. An integrated value chain analysis is developed by means of a channel mapping exercise, which quantifies production inputs and costs associated with each segment along the value chain of a product (see Porter 1990 for a good explanation of the value chain). For example, the value chain of a jeans manufacturer in country x can begin with the production of raw materials, such as cotton growing, move on to spinning, weaving and dyeing of cloth, then to production of the jean, which requires cutting, sewing, washing, finishing and packing,

and then finally to export administration and transport of the finished denim jean (see figure 1). The value chain shows how total costs are distributed (or total revenue is distributed) along all of these segments of the value-generating process of manufacturing the product.

The value chain provides a tool for understanding the sources of competitive cost advantage or disadvantage. A product's competitive cost advantage or disadvantage is its collective costs of performing all the required activities relative to competitors, and cost advantages or disadvantages can occur in any of the activities along the value chain. The value chain technique makes it possible to break down the costs and productivities involved in the value chain process of a specific product and provide reference points for analysis, by benchmarking these costs and productivities against costs incurred in the value chains of a number of similar export products of competitor countries. The results of the exercise allow the analyst to relate institutional problems, ineffective regulations, and inappropriate policies and other constraints to specific cost, quality, and productivity issues in the value chain of a specific product or industry. It also assists in identifying technology problems, labor and management issues, and infrastructure bottlenecks constraining competitiveness.

“Cluster analysis” is another firm-level analytical method that is popular today. It seems to have various definitions but in most cases simply adopts a wider perspective on the problem and extends the value chain analysis to related and supporting industries, buyers, factor markets, and the conditions of competition. This facilitates a deeper analysis of the determinants of competitive advantage or disadvantage in particular product areas and points up further directions for export development policy. In some cases, the cluster analysis concept is broadened even further to include activities that assist in organizing exporters and potential exporters in the “cluster” and initiating appropriate changes to upgrade competitiveness of the system.

Selection of product areas for value chain and cluster analysis can be made initially on the basis of current comparative advantage – key activities in the economy where the country has traditional exports and emerging exports based on factor cost advantages. The analysis can then take up areas where future exports might be generated with concerted private sector effort and government support.

The analysis of creative destruction and reallocation of resources is a data-intensive exercise that is difficult to carry out in most African countries because of lack of sufficient information. The analysis is generally based on government statistical databases which draw from annual surveys of all manufacturing firms with more than 10 or 20 employees. The data from these statistical databases must be representative of the whole population of manufacturing firms in a country. There is also a need for data from a ‘business register’ that longitudinally tracks all firms. Collected information for comparator countries is also often used to create indicators that are directly comparable to those from the country under examination (see for example Bartelsman 2004 and Bartelsman, Eric J., Stefano Scarpetta and John C. Haltiwanger. 2005).

3.2.2 Incentives and Capacity to Diversify into Non-traditional Exports

As noted in the research review in section 3, empirical evidence shows that diversification is a central driver of growth and development in low-income countries and export diversification is a key element of this structural transformation process. This is most evident in the highly successful growth performers in Asia and Latin America where a large proportion of exporters are new firms and many of the exports are new products. Constraints on the capacity to upgrade and diversify exports are therefore important impediments to growth. Hence, removing barriers to entry and providing incentives for innovation and investment in new export activities must be a central focus of export development strategies.

In diagnosing constraints to export diversification, the aim should be to identify those determinants with the largest direct impact. Once the analyst knows where to concentrate efforts, he/she can then look for the associated economic imperfections and distortions whose removal would make the greatest contribution to improving diversification outcomes. Following an approach which has been used to successfully diagnose impediments to growth (Hausmann, R, Rodrik, D and Velasco, A 2005), the analyst can begin this task by answering a series of questions that try to identify the major drivers and constraints to diversification in a step by step fashion, looking at recent diversification experience in a country using available evidence.

The central question is generally what keeps diversification into non-traditional export activities low? If private investment and entrepreneurship in non-traditional exports is found to be low in a country, is this due to a lack of investment opportunities (low returns to investment) or a lack of investable resources (low supply of finance)? If low returns to investment is the answer, is it due to (a) to lack of (or insufficient investment in) complementary factors of production, such as human capital and infrastructure, or perhaps poor geography (e.g. high shipping costs), or is it due to (b) a problem of private appropriability caused by such things as a poor investment climate (macro stability, high taxation, and so on) or market failures in the form of learning and coordination externalities? If lack of investable resources is the answer, is it a problem of low savings, poor intermediation in domestic financial markets (e.g. high real interest rates, limited access to credit), or poor international finance (e.g. high country risk, unattractive conditions for FDI)?

Equipped with the analysis of constraints that comes from answers to each of these questions, hypotheses about the binding constraints to diversification can be proposed. Each hypothesis explains not only what is constraining diversification, but why this or that constraint (or set of related constraints) is the most binding for the country. In the next step, these diversification hypotheses generated in step one can be examined to determine their validity as binding constraints.

Let's look a little deeper into the two broad factors that determine the capacity to diversify just outlined: returns to investment (as conditioned by private appropriability and availability of complementary factors) and cost and availability of financing.

The Problem of Private Appropriability

Investment Climate

Investigating problems of private appropriability first and foremost involves a review of the elements of the investment climate and how they may be constraining the private appropriability of investment returns. The list of contributing factors generally contains the following items:

- Macro-conditions real exchange rate misalignment or volatility;
- Policy uncertainty;
- Bureaucratic red-tape and corruption;
- Restrictive business entry requirements (including restrictions on FDI and other restrictive investment laws);
- Difficulties getting access to land and restrictive site development regulations ;
- Inflexible labor laws ;
- High taxes and poor tax administration;
- Inadequate property rights;
- Poor contract enforcement and dispute resolution.

In addition to the importance of macro conditions for investor incentives, this list conveys the key point that expectations about policy implementation and the prevailing background institutions of the state and society are core elements of the investment climate. Investment depends on expectations of policy implementation, policy implementation depends on background institutions, and when institutions are in flux or weak no one can say with certainty what will happen. The result is low risk-adjusted returns on investment. A review of these investment climate variables below provides an outline of the types of issues to be covered in an investment climate analysis.

Investment is always about the future, and about the future there are no certainties, only beliefs and expectations. *Policy uncertainty* implies uncertain investor expectations about future policy implementation. Such expectations are conditioned by many factors, but one of the most crucial is the institutional limits on the exercise of discretion in policy implementation. In the worse case, where government cannot make a credible commitment to resist discretionary and predatory behavior and background institutions do not put limits on this behavior, where public-private dialogue is extremely limited, and where there is very little transparency in government decision-making, risk-adjusted returns on investment can be exceedingly low, cutting off domestic investment and FDI to the point where diversification into new export areas is stagnant. What is needed to create a more certain policy environment is more capable and credible policymaking organs, which are transparent and have a fruitful dialogue with the private sector, quality background institutions, which limit the exercise of discretionary or predatory behavior by the state, and continuity in these background institutions.

Another layer of investment uncertainty and business costs are added by ***bureaucratic red-tape and corruption***. In some cases, heavy-handed control of business and excessive regulation, and corruption raise costs to levels that are highly discouraging to new investment. With the exception of a few outliers like Uganda, which reduced bureaucracy to a point where its business environment ranks as one of the best in sub-Saharan Africa, most sub-Saharan African countries have regulatory requirements that are more onerous than competitors outside the region. On the Kaufman-Kraay governance index of regulatory quality, 8 out of 10 countries rank in the bottom quarter of the 156 countries evaluated. These bureaucratic requirements in most cases overwhelm the professional capacity of the civil service to administer them – official inspectors, for instance, are often not up to date on the technical aspects of the regulations they must enforce and do not understand how to help firms comply with the rules if they are found to be in violation. Complicating matters further is the fact that in some countries provincial governments, where professional capacity is lowest, rather than central authorities, are responsible for administering many regulations. Surveys in some of the countries also show that these problems of red-tape and corruption affect exporters more than other segments of the economy.

Entering into a new business can be a high risk venture even in the best of investment climates. Restrictive and time-consuming business start-up requirements worsen the situation and reduce the number of start-ups. Basically, if it is easier to set up a business, more businesses will set up. According to “Doing Business in 2006,” 6 out of 10 countries where it is the most difficult to start a business are in Africa. And Africa has the poorest record for reform in this area. High capital requirements, antiquated rules, complicated and numerous forms, involvement of numerous ministries in the process, annual renewal of licenses, and bureaucratic delays all make start-up difficult and costly.

Weaknesses in the legal framework for business is a significant investment climate problem. Most countries have a reasonably comprehensive set of laws, though some laws are of mixed quality, in that they are old or relics from a previous non-market regime. The central problem in most cases is the institutional capacity to effectively enforce the laws in a fair and timely manner. This means there is little effective recourse to the court system or other formal means to obtain judgments and enforce business contracts or resolve disputes. This creates problems for many new investments in non-traditional export areas, because in situations where formal mechanisms governing business and financial transactions are lacking, investment is limited to those types of projects that can be governed by informal or private mechanisms. Large, fixed-capital investments with long gestation periods, which require the certainty of more complex formal institutions for adjudication and enforcement, will not be forthcoming. This can put a damper on ventures in manufacturing and tourism where large capital investments are generally needed to be internationally competitive.

Lack of protection of intellectual property rights can be another legal area that holds back diversification investments. Most low-income countries lack a sound framework of legislation, adequate administrative procedures, and enforcement capability in the areas of intellectual and industrial property rights. This can be an issue for

developing exports in information technology, as well as in any area where brand identification is important and counterfeit products can undermine the market. In the IT industry, inadequate legislation and weak enforcement of intellectual property rights raises costs for local companies trying to break into the software market, as they have to spend a great deal of time and money fighting to protect their property, and it hinders development of IT services exports. Foreign software companies are reluctant to buy programming services from companies when they lack confidence that their source codes will be protected. Foreign IT companies are also less enthusiastic about joint ventures and direct investments where intellectual property rights are weak. Improving property rights protection can be critical in promoting more foreign investment and technology transfer, particularly in landlocked countries targeting IT services exports to overcome their transport cost disadvantage.

As a policy matter, strengthening the legal system is a long term proposition requiring efforts to update laws, disseminate legal information, revamp the court system, and train judges, lawyers and other legal professionals. What is becoming clear in the research on institutional development is that it is not always necessary or prudent to try to move directly to building a set of formal, Western-style institutions to solve the problem of an underdeveloped legal system. A cumulative process of building higher quality local institutions, working with available informal institutions where feasible, may be a better alternative. The history of most developing countries is a story of sequential development of more complex institutions and organizations appropriate for the governance of investment and other business transitions at particular stages of their development. Strategies to strengthen institutions should move away from a focus on “best practice” models and shift attention to a context-specific analysis of effective institutional arrangements that can assist in the transition from informal, private mechanisms of governance to more formal mechanisms of governance of transactions.

High marginal tax rates, numerous taxes, and poor tax administration reduce returns to investment and increase investment risk in many low-income countries. The problem is often not so much that individual tax rates are high (of course, in some cases they are) but that entrepreneurs have to deal with an array of taxes – income, corporate, VAT, import duties and export taxes, excise duties, and a host of local taxes – which make the overall tax burden high. Also, tax administration can be fraught with time-consuming and complex documentation, hassles with authorities, and corruption, which creates more uncertainty.

Problems with acquisition of land obstruct development of agricultural exports and tourism in particular, but also hinder entry into mining and manufacturing in many low-income countries. The reasons for difficulties in acquiring land vary across the sample countries. All African countries have laws that allow private ownership or long-term lease arrangements for land; although some land ownership restrictions apply in some cases. However, while reasonably favorable policies for land ownership or leasing are in place, the procedures associated with land acquisition and site development can be characterized as difficult, costly, and time-consuming, and many would-be investors just

do not want to hassle with these problems. In addition, problems with land titling make it difficult to use land for collateral in some countries.

State ownership of land, lack of cadastres, and land titling issues all play a role in making access to land problematical. Investors often have to spend long periods of time negotiating with rural communities or traditional rulers to get access to agricultural land. In some cases, access to certain types of land is restricted to certain investors. For example, in Botswana, the Citizen Empowerment Scheme, which is set up to “empower citizens by enhancing their skills, resources and opportunities in productive enterprises,” restricts the initial acquisition of serviced industrial land on state property to citizens. This creates major delays for foreign investors in getting access to desirable land.

Addressing the land issue generally centers on developing a unified cadastre in countries where it does not exist, accelerating the privatization of urban property, streamlining administrative procedures in land registration and site development, removing restrictions on access to land for FDI, and adopting zoning laws and new construction standards (particularly in the transition countries).

Market Failure

A key challenge that entrepreneurs face in diversifying into new export areas is learning or “discovering” what the country is good at producing, as noted in section III. Investors can only make a rough estimate of what the costs of production of new export activities might be, because these costs depend on a range of factors: the investor’s experience and ability in transferring and adopting new technologies, expectations about government economic policy, and the actions of other investors. Hence, early investors take great risks and provide valuable information spillovers for others. The inability of first-movers to privately appropriate the full benefits of their investments in new activities creates incentive problems, resulting in an undersupply of this type of entrepreneurship and reduced diversification into non-traditional exports.

According to the principles of optimal policy, a subsidy to investment in new export activities would be required to bring diversification up to more socially optimum levels, with the size of subsidy calculated to equal the spillovers generated. Of course, the information requirements here are onerous. It is very difficult to quantify and measure these externalities. But assuming that some approximation of the appropriate subsidy can be determined, two other questions arise in intervening to address this private appropriability problem: (a) Does the government have the capability to intervene to provide the appropriate subsidy to investments in new activities? And, if it does, (b) what type of intervention program would make sense in the local situation?

Notwithstanding the sound market-failure rationale for assisting investments in non-traditional export areas, most low-income countries have public agencies with limited capacity to implement such interventions. In many cases these governments cannot effectively administer a duty drawback system or run an efficient customs service. How are they going to manage a complex and politically charged subsidy scheme to

support experimentation in new activities? The answer, of course, is that they have to cooperate much more closely with the private sector, as bureaucrats do not have enough information to run what is effectively a venture capital operation to support diversification. Cooperation with the private sector, however, is also something many governments are not yet equipped for – public-private dialogue is frequently poor. Before some countries will be able to think about initiating interventions to support diversification activities, they will have to strengthen their capabilities in public-private cooperation and in implementation effectiveness.

While capacity limits point up potential difficulties with implementation of a subsidy, these limitations do not preclude the need to do something to boost incentives for investment in new export activities. The analyst should investigate other avenues of assistance that may be within the limits of government agencies. For example, in Uganda, the case is made by the floriculture industry that the key to more rapid diversification and expansion of floriculture exports is development of a significant cluster of production at high altitudes. To get this cluster going, it is argued that interventions are needed to assist in (a) identifying the most suitable areas for high altitude floriculture; (b) developing basic infrastructure; (c) initiating trials to find the best varieties and agronomic practices; (d) facilitating land purchases and permissions; (e) and developing a cold chain to the airport. A similar program of assistance is recommended for the development of seaweed farming in Tanzania. And, in other countries, interventions are suggested to assist in getting new exports in fruits and vegetables going with “incubator projects” and other types of development initiatives.

Some of these suggested interventions require the government to address another private appropriability problem – coordination failures, as they necessitate coordinated and simultaneous investments in a number of different areas, the profitability of which depends on investments being made in all the areas. Thus, for lack of a specialized “cold chain,” which can preserve the product from the field to the port of exit, fruit and vegetable producers and flower growers find it unprofitable to make the necessary downstream investments to kick-start a potentially valuable export industry. Governments are often waiting for private investors to build the cold chain, but the private sector does not want to take the risk of incurring the high fixed cost of such an investment without knowing that downstream investments will be made so that enough produce would be forthcoming to make the cold chain investment profitable. In such circumstances, there can be a high return to the government’s ability to assist in coordinating such investments. Coordinating infrastructure investments with economies of scale and investments in new non-traditional export activities can be particularly crucial when financial markets are nascent and face information and contract enforcement problems.

“Cluster development” approaches are often advocated to help address coordination problems. As in the case of subsidies for diversification investments, the argument for such government involvement is sound, but the question for the analyst again is whether government has the implementation capacity. Cluster development initiatives require a good deal of market information and therefore necessitate close

collaboration between the public and private sectors and the right combination of incentives and discipline to keep special interests in line. Export development strategies, however, might make a modest start in dealing with coordination failure, where government capacity is low, by facilitating collective action of exporters in a number of areas. For example, some African countries require interventions to assist in developing cooperation among exporters in consolidating shipments to get lower volume-based shipping and transport prices. Another problem of coordination that needs to be addressed in many countries revolves around use of natural resources. Fishing on Lake Victoria provides a good example. The countries bordering the Lake, like Uganda and Tanzania, focus on preventing things like fish smuggling, rather than eliminating unlicensed fishing, and each country competes to ensure maximum yields of fish. It has become clear that over fishing is beginning to deplete lake resources and coordination among the countries is needed to manage access.

Complementary Factors

If shortcomings (or lack of investment) in complementary factors of production, such as human capital and infrastructure, are a binding constraint to investment returns in non-traditional export areas, it should be evident in the value of infrastructure and skills to the economy and weaknesses in the mechanisms by which they get upgraded. We have already discussed infrastructure problems in some detail in an earlier section of this paper. Hence, we limit the discussion here to labor issues: specifically, to workforce skills and mechanisms for technology transfer and learning. One of the main determinants of export activity is skilled labor. Many studies show that the ratio of skilled to unskilled workers in export firms is generally much higher than in domestically oriented companies and that shortages of skilled labor can constrain export diversification and expansion. For example, lack of enough middle-level technical and management personnel is said to be slowing the diversification and expansion of newly emerging horticulture and floriculture exports in countries like Tanzania and Uganda.

Part of Africa's skills shortage problem is low basic education and lack of experience. Most African countries fall well below the average for developing countries in average years of schooling of the population and above the average in percent of the population without schooling. And the workforce in many countries has only limited experience in factory production and non-traditional agricultural activities. The other part of the skills shortage problem is weak or missing mechanisms for technology transfer. Firms in developing countries learn by transferring-in technologies from more advanced countries, as documented earlier. Most of the "learning" mechanisms or technology transfer mechanisms that firms traditionally rely on to upgrade their knowledge are inadequate in Africa. There is too little FDI in most countries to learn from; foreign buyers and suppliers are generally not visiting in large numbers and entrepreneurs do not have the resources to travel abroad; in-firm training is low; technical consulting services are usually not available locally and are expensive to import; there are difficulties in hiring foreign experts because of restrictions on visas and work permits; and local technical training resources are either nonexistent or of poor quality.

Weaknesses in these learning mechanisms are important because educational attainment of a nation's labor force is not an absolutely binding constraint on success or failure of its export development strategy. Education is important, but many successful exporting countries show that regardless of formal educational attainment, workers in 3.3 low-income countries can be adequately trained on the job to meet higher productivity standards of competitive international markets in many industries. Much of the in-firm, on-the-job training is done by FDI companies from more advanced countries that transfer expertise to local workers and managers or by local companies hiring foreign experts. So low-income countries do not have to wait until they develop a bigger educational system and educate a whole generation of workers to kick-start export growth and diversification. If they provide better incentives and work to strengthen the mechanisms for technology transfer, such as FDI, all low-income countries are capable of more rapid growth of productivity improvement from their existing workforces.

Access and Cost of Financing

If lack of investable resources is a binding constraint, reducing returns to investment in non-traditional exports, then one should observe high returns to capital. This is evidence that the economy is willing to use up additional savings, but prevented from doing so because of constrained supply. As with complementary factors, such as human and infrastructure capital, one should see the tightness of the constraint in the price the economy is willing to pay for the scarce resource. A lack of investable resources has several elements: low aggregate savings, poor domestic intermediation of financial resources and poor integration into world financial markets. If aggregate savings were scarce high foreign debt or a high current account deficit – signals that the country is using or has used up its access to foreign savings, given the lack of domestic savings. Moreover, one would see high real interest rates to depositors or government bond holders – signs of a high willingness to reward savings. Investment should also respond vigorously to inflows of foreign resources (aid or remittances). If intermediation of domestic financial resources is poor, one would expect to see high real interest rates, high collateral requirements, and high bank spreads. If integration into world financial markets is poor, one would expect to see low levels of FDI and other financial flows.

On the issue of intermediation of domestic financial resources, in most African countries, high real interest rates, high collateral requirements, and limited access to credit for working capital and fixed-capital investments for most borrowers is standard. Interest rates to depositors, on the other hand, are not always that high, leading to high bank spreads. Liquidity in banks can also be quite high, with average loan to deposit ratios of only around 40% in some cases, when the average in low-income countries is 70 percent. Banks frequently hold high levels of government bonds, crowding out private sector lending.

Financial sectors have been a key component of government reform efforts in many countries and credit to the private sector has generally grown as a proportion of domestic credit. But the ratio of private credit to GDP in many African countries is still low even compared to the low average level for low-income countries. Uganda and

Tanzania, for example, have private credit to GDP ratios of only about 6 percent compared with the average in low income countries of 13 percent. While credit to the private sector has improved a bit, the banking sectors of most countries remain small and weak. And small and medium firms and new firms have an especially difficult time getting loans. This situation is made worse by underdeveloped or non-existent capital markets and by lack of leasing arrangements in many countries.

Imperfections in financial markets in the form of institutional weaknesses – information and contract enforcement problems – contribute greatly to the credit problems in these countries. Information is a problem because accounting standards are often poor and credit information sharing is very limited between banks and other financial institutions. In addition, credit bureaus, if any, are in a nascent state of development. Contract enforcement is difficult because court systems are weak, insolvency legislation is often inadequate, and land titling and registration systems are poor. These deficiencies are an important contributor to low loan to deposit ratios in banks and high lending rates. In Uganda and Tanzania, for example, where information and enforcement are especially weak, loan to deposit ratios in banks are only about 40 percent, when the average in low-income countries is 70 percent, and net interest margins average more than 7 percent.

A related issue is the legal and institutional framework for secured transactions. The existing framework for secured transactions is generally insufficient to meet the needs of the private sector in many of the sample countries, particularly in the case of movable property. The legislative and institutional framework governing collateral is often fragmented and incomplete. The Civil Code and laws on mortgages, both of which cover different aspects of collateral, are sometimes inconsistent. Moreover, many countries do not presently have a regime that effectively allows the pledging of movable property collateral. Registries sometimes do not exist, or, when they do, they are maintained by different governmental bodies for various types of collateral and not all types of collateral are covered, such as equipment, inventory, and accounts receivable. The establishment of a comprehensive collateral registry system is a necessary institution to support the extension of secured credit.

Surveys of exporters in Africa indicate that many firms do not use export financing instruments, such as letters of credit (L/C), or export guarantees. Buyers in many of the regional markets served by these exporters prefer to deal through direct payments (some on the basis of prepayment and some on the basis of payment after delivery). Some of the reluctance to using these instruments is caused by the high cost of bank charges for these facilities. In other cases, exporters are not able to get access to L/Cs for one reason or another and/or export guarantee schemes did not exist. There are some outliers in respect to trade finance, for example, Botswana has relatively well developed trade financing. A few countries have also set up special programs to facilitate access to finance for exporters. These schemes frequently fund working capital and, in some instances, equity and/or venture capital. But, where they exist, export finance schemes are generally very limited and collateral requirements are sometimes as stringent as with general loans. Venture capital is just getting started in a few countries.

Data and Research Methods: Incentives and Capacity to Diversify

One of the best sources for investment climate data as well as a discussion of analytical methods is the World Bank's Doing Business report (World Bank 2006). It not only provides data for most countries on a number of critical investment climate variables, but also presents a good explanation of how these variables are measured and collected. Several other annual reports on country competitiveness offer up data on various investment climate variables and provide a discussion of data measurement and collection methods, such as the World Economic Forum's Global Competitiveness Report and The Center for International Development's Africa Competitiveness Report, mentioned earlier.

The analyst should keep in mind in consulting these data sources is that developing the "right" institutional arrangements in low-income countries requires a good deal of experimentation. The fact that a country does not have the quality of institutions of Norway does not mean it should move to adopt Norway's institutions without delay. Transplanting institutions from advanced countries to developing countries often does not work well. Moreover, evidence from the high-performing developing countries indicates that good institutions have large elements of indeterminacy and characteristics specific to individual countries. Hence, countries have considerable leeway in creative institutional design. Good institutions are those that deliver the universal economic principles and are appropriate for local conditions. Also, if the institutions that can limit rapacious behavior by the state, such as an independent judiciary or electoral accountability, do not exist, and the government cannot make a credible commitment to resist predatory behavior, it is possible that no amount of institutional reform will sufficiently reassure investors.

Data for an analysis of market and coordination failures will have to come from industry and firm-level surveys. Examining these issues requires a great deal of detailed industry-specific information on externalities, technologies, and complementary investments that only private sector participants possess. Again value chain and cluster analysis can assist in highlighting many of the important issues.

Assessing the impact of complementary factors, such as education/skills and infrastructure, on levels of investment and entrepreneurship in new activities requires direct evidence of prices and shadow prices (e.g. returns to education) rather than simply quantities (e.g. educational attainment), because examination of relative prices will help reveal whether a constraint is binding. As noted above, complementary factors, such as human capital or infrastructure, are binding constraints, reducing returns to investment in non-traditional exports, one should see the tightness of the constraints in the price the economy is willing to pay for the scarce resource of skilled workers or infrastructure. For example, if poor transport links are a serious constraint, we should observe bottlenecks and high private costs for transport. If skilled workers are a binding constraint, returns to skills/education should be high. Many African countries, as noted above, can have similarly low years of schooling of the labor force, but differ in returns to education and experience, depending on their economic dynamism and demands for labor. The big

question is whether a sudden increase in supply of skilled workers would stimulate investment in diversification into non-traditional exports in the short-run. If returns to investment are constrained by other things, an increase in supply of skilled workers may simply result in reduced returns to human capital rather than in higher investment in non-traditional exports.

A good example of how to analyze the returns to infrastructure and human capital is provided by a study by Canning and Bennathan (2000). They estimate social rates of return to electricity-generating capacity and paved roads by examining the effect on aggregate output and compare this effect with the costs of construction. In the process of estimating these returns to infrastructure, they also estimate returns to human and physical capital.

To carry out the analysis, they use a standard aggregate production function of the form:

$$y = a + b + f(k, h, x) + \epsilon$$

where (y) is log of output per worker, (a) is a country-specific level of total factor productivity, and (b) is a time dummy capturing changes in total factor productivity, (k), (h), and (x) are the log of per worker inputs of physical capital, human capital, and infrastructure capital respectively, and (ϵ) is a random error term. They use a trans-log specification of the function versus a Cobb-Douglas specification because the Cobb-Douglas function imposes a declining marginal product of each type of capital as the capital-labor ratio rises, which virtually imposes a finding of a high rate of return to all capital goods in lower-income countries. The equation is used to estimate rates of return on the various types of capital for a panel of more than 40 countries. Techniques to remove the bias that can be introduced by reverse causality are also employed.

Canning and Bennathan find that the rates of return on infrastructure are highest in countries with infrastructure shortages: that is, countries with low levels of infrastructure relative to their levels of human and physical capital, and countries that have low costs of construction. They find that for most countries, the estimated rates of return to infrastructure are in line with, or below, those for capital as a whole. High rates of return are the exception rather than the rule; hence the case for large-scale investment in infrastructure should depend on an analysis of a country's characteristics rather than on a blanket prescription. As a rule, a tendency to infrastructure shortages – signaled by higher social rates of return to paved roads or electricity-generating capacity than to other forms of capital – varies by income levels of developing countries: electricity capacity has high rates of return in the poorest countries, paved roads in the middle-income countries.

Another way to measure the returns to labor skills is via the earnings function (see for example Berndt 1991). The most basic form of the function that takes years of education and on-the-job general training into consideration is

$$\ln Y_i = \ln Y_o + \beta_1 S_i + \beta_2 K_i X_i + u$$

where (Y_i) is earnings of the i th worker with education and training, (Y_o) is earnings without education and training, (β_1) is rate of return on education, (β_2) is rate of return on on-the-job training, (K_i) is the proportion of the i th worker time devoted to training investment, and (X_i) is the i th workers years of labor market experience, usually measured as age minus (S_i) minus six years. Various forms of this equation can be use to measure individual as well as industry and country-wide rates of return on skills.

On estimating the impact of mechanisms for technology transfer, a paper by Biggs, T, Shah, M and Srivastava, P (1996), focused on the determinants of productivity in African enterprises, provides a good description of the mechanisms for technology transfer and techniques and measures the effect of various mechanisms on enterprise value-added. A number of other studies use micro-data to analyze the role of individual mechanisms, such as FDI, in promoting technology transfer and learning and by measuring their effect on host country wages (see, for example, Aitken and Harrison 1999; Haddad and Harris in 1993; Djankov and Hoekman 2000; Konings 2000; Damijan et. al. 2003).

3.3 Trade Support Institutions

Inadequate Institutional Support for Trade Promotion and Diversification

Poorly functioning government institutions, involved in formulating and managing trade policy, promoting trade in particular sectors, and providing trade support services, can be an important constraint to export supply. An assessment of constraints to export supply should pay particular attention to government institutions that manage trade policy and develop and implement sanitary and phyto-sanitary standards. We briefly review some of the pertinent issues involved in what follows.

Trade policy management

A big challenge for many trade ministries is the fact that issues affecting trade integration and export development go well beyond trade policy. These issues include a vast “behind the border” agenda, which creates the need for inter-agency coordination. It requires a sort of “trade czar” that can focus attention, coordinate the many agencies involved, and incorporate private sector input for effective decision making on export development. Some countries have tried to develop inter-ministerial mechanisms for this purpose, often including private sector participants. But there always seems to be problems organizing and implementing inter-ministerial trade policy committees, which are given the responsibilities of consulting with relevant ministries, building consensus on the way forward in export development, and advising Cabinet or the President’s office. And, in most cases, these mechanisms lack the political clout and technical expertise to get things done. They also generally become insular and fail to include knowledgeable outsiders and private sector participants.

There are problems, too, with the way individual ministries (e.g., tourism, agriculture, industry) deal with trade development issues. Basic policy objectives are often not realistic, given the situation in the country, and there is no prioritized implementation plan for achieving these objectives; hence it is generally difficult to measure and monitor implementation. The budgets and activities of the various departments of the ministries are also not managed within a commonly agreed development strategy. In addition there is little cooperation with the private sector. Marketing of the country, for example, as a tourism destination is frequently left to the private sector, as there is no joint public/private cooperative activity. Poor ministry objectives and meager government budget allocations also lead to underinvestment in essential facilities and infrastructure.

Finally government trade support agencies and services, such as export promotion and investment promotion, frequently do not operate effectively. Many times there are numerous agencies, public and private, with unclear and overlapping mandates and no overarching strategy within which these agencies operate. And the services offered generally do not meet the needs of the export community. Trade and investment support institutions often need to be consolidated into a single export and investment promotion agency, where modern management techniques can be applied and qualified personnel can be hired, such as product specialists and functional specialists with private sector backgrounds who can provide advice and guidance to new exporters. This consolidated institution should work closely with private sector constituents and be a prominent and powerful spokesperson for the export community.

Sanitary and phyto-sanitary standards (SPS)

Building SPS capacity has become increasingly important for the emergence of non-traditional exports in most low-income countries. Notwithstanding this necessity, most countries in Africa have only had modest success in fostering development of sustainable SPS/quality management capacity. Government efforts to address SPS have generally been in response to crises rather than as part of a coherent and concerted government policy to enhance competitiveness and protect domestic consumers. As a result, many countries have ended up with limited pockets of capacity in SPS in the public and private sectors. This limited capacity constrains diversification in agricultural and food exports, fish exports, and tourism (where poor food hygiene can be a constraining factor). All these items face market access problems in the EU because of SPS issues. In some other areas (e.g., honey and groundnuts), SPS problems have caused exporters to defensively shift exports to markets where standards are less stringent and/or rigorously enforced, which often means lower prices.

Most countries have basic SPS legislation in place. But there is a need to modernize this legislation, and to build stronger public and private SPS institutions with clear functional responsibilities. Institutions, such as bureaus of standards and SPS facilities, often face a number of challenges: inadequate legislation, limited testing facilities, and limited facilities at borders to implement controls and monitor quality of trans-border goods. In general, SPS management capacity has to be developed

strategically, focusing on key export opportunities. Also, attention has to be evenly balanced between SPS management capacity (building awareness and recognition, good practice, and enforcement) and equipment (field testing labs and other equipment).

Data and Research Methods: Analysis of Institutions Supporting Trade Development

An assessment of the institutions supporting trade development will require a review of the objectives, policies, and management practices of the various ministries involved directly with trade and those involved with “behind the border” issues influencing trade competitiveness. A key issue revolves around whether there is effective overall coordination of these activities. Another issue is whether the basic policy objectives (export development and diversification objectives) of the ministries involved are sound and whether there is a priority-driven implementation plan for achieving these objectives, which includes the budgets and activities of the various departments of the ministries. Still another issue is whether the agencies, public and private, involved with export promotion and investment promotion have clear mandates and an overarching strategy within which they operate. Do the services they offer actually meet the needs of the private sector?

Finally, most countries need an action plan for developing SPS capacity (see for example Blind, K., and A. Jungmittag (2005) for a methodology for analyzing the impact of standards on trade). An assessment of current activities, with an eye toward developing such a plan, should focus on the following elements (a) designation of a formal mechanism for coordinating a national SPS effort (b) clearly defined functions and roles among the SPS players, particularly between institutions that create standards and institutions that enforce standards (c) a concerted campaign to raise SPS awareness (d) promotion of good SPS practices among regulatory agencies and primary producers (e) a designated budget available for SPS activities (f) incorporation of SPS management capacity into broader efforts to build competitiveness (g) shared SPS resources at the regional level (h) a continuing dialogue on SPS activities between the public and private sectors that intensifies collaboration in implementation and (i) priority investments in SPS equipment and capacity-building needs.

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