# Developing Country Aspects To Trade Policy Analysis: Does One Size Fit All?

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## Abstract

Geography, international trade and institutions are often cited as reasons for the disparity in income among nations. The paper reviews these arguments and focuses on the interdependence between institutional reform and foreign trade. Countries must export to import, and integrating an economy into world markets induces institutional change, which facilitates increased rates of economic growth. It is shown that agricultural policies in advanced countries are a barrier to agricultural exports from developing countries. If these barriers, as the literature suggests, are also barriers to institutional reform in poor countries, then the typically measured gains to trade reform by advanced countries are greatly underestimated, i.e, one measure (size) does not fit all. An analysis of growth in factor productivity linked to institutional reform in sub-Saharan Africa is shown to increase transition and long-run growth substantially.

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# 1   Introduction

The surge in real income growth during the last three decades of the 20-th century lifted more people from poverty than any previous time in world history.  The $1/day poverty rate has fallen from 20 percent of the world's population to 5 percent over the last twenty five years.  The $2/day rate has fallen from 44 percent to 18 percent.  There are between 300 and 500 million less poor people in 1998 than there were in the 1970s (Sala-i-Martin, 2001).  Economists associate this unprecedented rise in wellbeing to the fundamental economic forces driving the globalizing of world markets (see Sachs and Warner, 1995, and Baldwin and Martin, 2000).

Nevertheless, many regions of the world are not participating in what might be termed the *gains from globalization.*  About 19 percent of the world's population live on only 1.3 percent of the world's income (Shane et al, 2000).  In sub-Saharan Africa, approximately 52 percent of the population live on two 1987 purchasing power parity dollars per day or less.  This population lives on roughly 12 percent of the regions income.  Countries in South Asia are the next poorest group.  About 25 percent of their population live on 5.5 percent of the regions income.  This glaring discrepancy begs the question: why are we so rich and they so poor?

The main features of economic growth in real per capita incomes are easily identified.  They include growth in the stock of human and physical capital, technological change, and for most countries, the transition of labor out of agriculture and other primary good producing sectors of the economy, and into higher value added sectors of manufacturing and services.  Fundamental to this transition is the micro-firm level environment that provides incentives

and opportunities for productivity growth, including variety and quality of products that allow markets to remunerate resources at sustained and growing rates of return. For most countries, this environment cannot be created in isolation from the rest of the world. Countries with strong and sustained records of economic growth engage in the international transfers of physical and human capital, including the business practices and technical expertise of foreign companies and foreign expertise in services such as banking and insurance.

Macroeconomic policies such as fiscal, monetary, exchange rate and trade policy are necessary but not sufficient to create this micro-firm level environment. These policies create the opportunities for wealth creation, but the creation of wealth lies with the market, and the institutions that allow markets to function. Herein lies an interdependence. Macroeconomic policies are products of institutions of governance. Institutions granting enforceable rights to physical and intellectual property, legal structures to adjudicate commercial disputes, development of codes of conduct to assure transparent financial institutions, to govern competition among firms, and the provision of public goods for transport and education that can be sustained by what the polity considers to be within the realm of the social good, are critical components of the micro-firm level environment.

## 2 Focus and organization of the paper

The interdependence question is: which comes first, productivity and growth from which evolve institutions, or institutions from which evolve productivity and growth? Is foreign trade a vehicle for inducing institutional change? But if this is the case, then is it possible that the agricultural trade barriers of the advanced nations are a barrier to institutional reform of low income countries whose economies are relatively dependent upon agriculture? The purpose of this paper is to discuss and bring some evidence to bear on these questions, particularly as this relates to sub-Saharan agriculture.

The paper begins with an overview of the recent literature on geography, institutions and international trade as an explanation for the differences in income levels between advanced an poor nations. This discussion suggests a link between institutional reform and economic opportunities. The opportunities precipitated by the same forces that are inducing the globalization of markets, may be a deriving force for institutional change. A discussion of

this linkage is briefly presented in the next section where the case of Mexico is considered, and then more broadly, globalization and the reforms that many countries have chosen to make in order to accommodate these forces. This discussion more clearly links trade and institutional reform.

Whether sub-Saharan countries can benefit from more trade, and hence induce institutional reform, depends on whether they can expand their trade opportunities. Since these are primary commodity exporters, which for most, this means agriculture products, their agricultural trade patterns are briefly reviewed. This review suggests these countries tend to export commodities for which the advanced economies pursue import-substitution polices. Is it possible that advanced country agricultural policies are a barrier to institutional reform in many of the poor countries in sub-Saharan agriculture? Section 6 is devoted to an analysis of this question. Drawing upon our previous work, we show which of the advanced countries, and which policies are likely to be most deleterious to the agricultural exports of sub-Saharan countries. The last subsection focus on an analysis of economic growth that is meant to show the potential for improvements in infrastructure and institutions to stimulate growth in sub-Saharan income per capita. Final remarks conclude the paper.

# 3   Overview

Why are we so rich and they so poor[1]? is a question that has preoccupied economists for centuries. Three lines of thought have emerged to help consider this question. One line centers on *geography* (Bloom and Sachs, 1998, Masters and Sacks, 2001) as a determinant of climate, natural resource endowments, disease burden, transport costs and the extent of diffusion of technology, all of which distinguish the low income countries of sub-Saharan Africa and South Asia. Bloom and Sachs suggest that the geographic features associated with poor economies also foster extractive forms of governance. Geographically disadvantaged countries thus become doubly damned.

Another line of thought centers on *international trade* as a driver of productivity change and income growth. Levin, R and D. Renelt (1992) were among the first to establish a strong statistical evidence for a positive growth

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[1]This is the title of D. Landes paper (1989) presented at the annual meeting of the American Economic Association.

to trade linkage. This linkage was later reinforced by others (e.g., Sachs and Warner (1995)), and further developed by Coe, D. T., E. Helpman, and A. W. Hoffmaister (1997) who identified R&D spillovers among nations due to the technology content embodied in imports and exports that stimulated growth. Rodriguez and Rodrik (2001) have been critical of the positive link that many, including Sachs and Warner, have found between trade openness and the growth rate of per capital GDP. They suggest that this link either disappears or becomes much less important when account is taken of the existence of a state monopoly of a country's major exports, and a black market premium on foreign exchange (an indication of other policy failures).

The third line of thought focuses on *institutions*. Recent work in this area is that of Rodrik et al (2002), and MacFarlan, et al (2003). Rodrik et al use a composite indicator to capture the protection afforded to property rights and the strength of the rule of law. These are referred to as market-creating institutions since markets either do not exist or perform poorly in their absence. This indicator over time and countries allows them to distinguish between geography, trade and institutions in explaining the gap between rich and poor countries. They conclude from their empirical analysis that the quality of institutions is the only positive and significant determinant of income levels. Once institutions are controlled for, integration (i.e. foreign trade) has no direct effect on incomes, while geography has at best weak direct effects. However, integration was also found to have a positive impact on institutional quality. This result suggests that trade can have an indirect effect on incomes by improving institutional quality. We return to this theme later.

MacFarlan et al focus on the role of institutions on three dimensions of economic performance: the level of economic development, growth, and volatility of growth. Their definition of institutions is broader than that of Rodrik et al. They include the indicators as Rodrik et al, plus indicators for quality of governance, extent of corruption, and limits placed on political leaders. In the case of sub-Saharan Africa, they conclude that raising the quality of institutions (i.e., increasing the aggregate governance index) in sub-Saharan Africa to the average level of the index for the Middle East and Turkey would cause an astonishing 80 percent increase in real income (MacFarlan et al, Figure 3.5, p 106), from $800 per capita to $1,400. In terms of the rate of economic growth, they conclude that improving institutional quality by one standard deviation (this is equivalent to moving the index for Cameroon up to the all-country average) would increase the rate of growth

of sub-Saharan region by 1.7 percentage points. They also conclude that a one standard deviation improvement in institutional quality would reduce the volatility of economic growth by about 25 percent.

Sachs (2003), a critic of this recent work, suggests the reasoning that institutions explain almost everything is too simple; institutions may matter, but they do not matter exclusively. The problem is one of identifying the direction of causation between economic opportunity, institutional reform and policy. Institutional reform without the choice of policy instruments and the administrative machinery to implement the instruments will not induce economic change. Geography matters because of the physical obstacles (disease burden, transport costs, resource endowments, climate) that an economy must take advantage of and/or overcome to remunerate labor capital and other resources at rates that raise the standard of living beyond the two purchasing power parity dollar per day levels.

Advances in electronics reduced information and communication costs which surely helped to alleviate some geographic obstacles, together with the removal barriers to trade among nations, have created the opportunity for countries to experience unprecedented rates of economic growth. China appears to be the prime example of a country that has instituted reforms in order to grasp these opportunities. However, as Rodrik (2003, p ) concludes from series of country studies that he organized, " ..the desirable institutional arrangements have a large element of context specificity, arising from differences in historical trajectories, geography, political economy and other initial conditions." Institutional reform can thus be partial, provided it is well targeted to controlling the power of the illite, rule of law, and sufficient protection of property rights so as to encourage investment.

# 4  Linking trade and institutional reform

The economic reforms instituted by President Salinas for the case of Mexico in the late 1980s early 1990s is a example of opportunity led reform[2] Mexico was partly a victim of events outside its boarders that had deleterious effects on the economy which were further exacerbated by the country's general pursuit of inward oriented economic policies. The prospect of long term

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[2]see articles in the North American Journal of Economics and Finance, Special Issue: NAFTA: Economic Effects on Agriculture, Capital Markets and Selected Environmental Outcomes, vol 3., No. 2 Fall, 1992

stagnation and declining per capita incomes tended to undermine confidence in the Institutional Revolutionary Party. Under the leadership of Salinas, major policy initiatives were made as early as 1988 when Mexico joined the GATT. Regulations were changed to encourage direct foreign investment. Shane (1992) details the unprecedented nature of structural reforms which decreased the number of quasi state enterprises by almost two-thirds. Effectively, the strategy pursued by the Salinas administration removed from the polity those policy instruments (e.g., trade protection, majority ownership of foreign based domestic enterprises) and activities (e.g., quasi - state enterprises) that were most prone to rent seeking by special interests. Or at the least, the strategy raised the costs of rent seeking to influence those policy instruments by, for example, bringing Mexico under the discipline of the GATT and joining NAFTA.

This case suggests that distinguishing between changes in economic policy and institutional reform is not clear cut. Instead, policy and institutional reform appear to be a "joint" interdependent process. In the case of Mexico, this process was initiated when the difference between the prospect of stagnation compared to the opportunities of opening the country to world markets offered sufficient potential to induce a change in policy, which in turn induced institutional change.

From a broader perspective, consider briefly the effects of globalization on the world economy. The surge in widespread economic growth among the world's economies is generally associated with the world's second wave of globalization starting around 1960 (Baldwin and Martin, 1999). The second wave shares in common with the first (1860-1914) radical reductions in technical and policy barriers to international transactions, and departs from the first in the impacts that these reductions have on trade in goods versus trade in ideas. The technical barrier overcome in the second wave is the tremendous decline in the costs of exchanging ideas compared to goods. Baldwin and Martin (1999) show that globalization has increased the share of manufactures in GDP for many of the lower and middle-income countries, while lowering the share in advanced country GDP. In contrast to the first wave, the second is helping to industrialize at least some countries in the south. Moreover, these countries are shown to have greatly increased their share of total country trade to GDP.

Rodrik (2002) lists property rights, regulatory institutions, institutions for macroeconomic stabilization (e.g., managing fiscal deficits), institutions for social insurance, and institutions for conflict management as critical for

7

development. Countries that have gained much from reform have developed and strengthened those institutions whose services markets use relatively intensively, especially those markets that accommodate the decline in cost of exchanging information. These include the establishment of low cost enforcement of physical and intellectual property rights, efficient low cost adjudication of commercial disputes, development of transparent financial institutions that are open to international competition, harmonization of business codes for goods and services, the unbiased provision of public service to international firms, and the management of activity that restricts competition in markets for final goods and factors of production. These reforms facilitate the entry of foreign firms, the industrial country out-sourcing of component fabrication and assembly, and increase the growth in capital stock by attracting foreign savings.

Rodrik notes that no country has developed successfully by turning its back on international trade and long-term capital flows. However, he suggests it is equally true that no country has developed simply by opening itself up to foreign trade and investment without engaging in fundamental institutional reform. Countries that have engaged in trade reform, without the reform of other policies and accompanying institutions, have experienced at least one economic collapse, including Turkey, Indonesia, and Argentina[3]. In the case of Mexico, it may be conjectured that the collapses experienced led to a strengthening and reform of her institutions.

This discussion suggests that while trade reform is not sufficient to induce institutional reform, a link between the two nevertheless exists. Trade reform entails: the importation of institutions from abroad; membership in the WTO requires the adoption of a set of institutional norms that rent seekers find more costly to change; financial integration raises the premium for macroeconomic stability, the freer flow of information encourages civil liberties and political freedom, government enforcement to protect the rights of foreign investors induces government to become more inclined to protect the basic human rights of its own citizens as well.

If foreign trade is an important link to institutional reform, what evidence suggests that the agro-climatic endowments of sub-Saharan Africa are conducive for an expansion of trade, and if so, with whom? Are the agricultural

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[3]See Haggard, S. (2000), for a discussion of instituional reform and policy linkages, and Diao et al (2000) for an analysis of Turkey's fiscal deficits caused by her inability to replace the revenues lost from trade reform.

policies of the U.S. and the E.U. a barrier to increasing agricultural exports from sub-Saharan Africa? If these barriers were removed, and institutional change occurred that led to gains suggested by Rodrik et al (2002), and MacFarlan, et al (2003), what is the approximate magnitude of these gains? These questions are addressed in the remaining sections of the paper.

# 5    Do sub-Saharan agricultural trade patterns suggest possible gains from trade?

The potential for countries to benefit from the lowering of agricultural trade barriers imposed by advanced countries should thus depend, in part, on their agricultural trade pattern. Using the GTAP database, these shares are shown in figure 1 for 40 country/regions for the year 1998 where sub-Saharan countries are denoted by "*". These are the country/region definitions used by Diao et al (2002) in their analysis of developing country interests in agricultural reforms under the WTO. The chart shows that (a) of the countries/regions in the sample, many of the sub-Saharan countries are more dependent on agricultural exports than many other developing country regions, and (b)agricultural exports accounted for more than 40 percent of total exports for a seven country/region grouping, eleven that ranged from about 15 percent to over 30 percent, with an average for the entire set of about 10 percent.

Based on UNCOMTRAD data for sub-Saharan Africa, table 1 shows the share of specific commodities in agricultural trade. Traditional commodities account for the bulk of net exports, with considerable intra-category trade among non-traditional commodities. Note that imports from the rest of the world are mostly staple crops, where the rank order of importance is shown in the table.

Exports from the region to the rest of the world are mostly traditional, accounting for almost 50 percent of total agricultural exports. These are cocoa bean (1), coffee green (3), tobacco (5), sugar (8), tea (9), cashew nuts (14), other nuts (25) and other fibers (26). Non-traditional exports also rank relatively high, accounting for almost 40 percent of total agricultural exports. This category includes fish (2), vegetables and fruits (6), miscellaneous (7), oilseeds (12) oils and fat (13), processed food (20), and beverages (27). Notice that many of these important commodities (tobacco, sugar, vegetables

and fruits) are those for which the Northern countries tend to erect trade barriers.

Intra-region trade is important for non-traditional crops (over 40 percent of total trade intra regional trade), followed by traditional and staple crops. This suggests that potential gains also may be gained from the lowering of trade barriers among countries in the region to encourage neighborhood trade.

Most developing countries' agricultural export markets are in the North. On average, advanced countries import 65 percent of developing countries' total agricultural exports. Figure 2, taken from Diao et al, 2001, shows the importance of three of the largest markets in the world, (namely, East Asia, represented by Japan and Korea, North America, and the EU), to the exports of agriculture from developing countries. Exports of non-grain crops, such as vegetables and fruits, cotton, sugar, and vegetable oil are largely the domain of developing countries. These are the crops that are relatively labor and/or water intensive in contrast to the grain exports from North America and the EU. Excluding intra-EU trade, developing countries account for 60 to 80 percent of world exports of these commodities, most of which are exported to the North (Diao et al, 2002).

The chart also shows that the EU is a far more important agricultural market for African countries than is North America. Latin America exports a large share of its agricultural crops, outside of grains, to North America, as do a few Asian countries. While Japan and Korea are known to have relatively high agricultural tariffs, their agricultural import pattern appears to be spread across more countries.

Tables 2 and 3 focus more narrowly on sub-Saharan Africa commodities that are exported to the EU and the U.S. With the exception of Ethiopia for the case of oilseed and beverages, and the Cote d'Ivoire and Cameroon for tobacco, the share of exports to the US is trivial. This suggests that the lowering of U.S. barriers is unlikely to have a great effect on the region. The EU is clearly the major destination for both traditional and non-traditional sub-Saharan exports.

The relatively large export shares shown in table 2 prevail in spite of EU trade barriers. The tariff rate on vegetables and fruits in the EU (table 4) is twice the level of Japan and Korea, and almost four times higher than that in North America. The effect of non-tariff barriers for fruits and vegetables may be even more onerous than tariff levels. Thus these data likely understate the potential gains from trade due to differences in factor composition.

# 6 The effect of trade reform on agricultural trade

This section draws upon previous and recent work, some of which appears in Diao et al (2001, 2002). Details of the global general equilibrium model can be found in Diao et al (2002). The analysis focuses on the three disciplines: tariffs (market access), domestic support and export subsidies. The analysis decomposes the global effects of a full reform by type of policy and by commodity. The reforms investigated are (1) eliminating agricultural import barriers (tariff equivalents) throughout the world; (2) eliminating agricultural export subsidies throughout the world; (3) eliminating domestic support in the developed countries; and (4) combinations of these scenarios. In the case of sub-Saharan Africa, attention is also focussed on intra-region trade and the effect of transport costs on trade.

## 6.1 Results of the static analyses

Figure 3 shows the effects on the change in the world agricultural price index, relative to the base from the static component of the analysis. The height of the first bar shows the effect for all WTO member countries of the elimination of export subsidies, those domestic subsides deemed to be trade distorting, and tariffs. The index rises by almost 12 percent. In terms of relative importance of the three policy instrument categories, tariffs accounts for over 50 percent of the 12 percent rise in the price index, domestic support for almost 30 percent, and export subsidies for the about 13 percent.

The second bar shows the importance of country groups. The removal of protection in developing countries accounts for about 20 percent of the 12 percent rise. Thus, as expected, the major cause for distortions in world agricultural price is largely due to the policies of the advanced economies. The third column shows which of the advanced countries contributes most to the distortion in world agricultural prices; ranked from lowest to highest they are: Japan and South Korea, the U.S., and the EU. It should be noted that while Japan and South Korea have relatively high rates of protection, they are nevertheless relatively small traders in world markets, even though they are important markets for some commodities for some countries. In 1998, Japan and Korea imported about 12 percent of all agricultural goods traded worldwide, the U.S. and Canada accounted for another 12 percent,

11

while the EU and the European Free Trade Association countries accounted for 42 percent.

The effects on trade volumes are much more pronounced. These are shown in figure 4. Notice the large effect on exports from SSA to the EU. Free trade results in more trade. Removing all agricultural support and protection results in an increase in the value of world agricultural trade by about 30 percent. Agricultural export values from developing countries increase about 27 percent. The developing countries export more vegetables, fruits, oilseeds, and sugar, i.e., crops that are relatively more labor and water intensive than the exports from the advanced countries.

For developing countries in Eastern Europe, the Middle East, Africa, and some in South America, the EU is the largest agricultural export market. The United States and Canada are the largest market for countries in Central and some in South America, as well as for some countries in Asia. Reform thus causes a substantial change in regional trade flows. For two Asian countries (China and Thailand), 50 percent of their increase in agricultural exports is due to liberalizing Japanese and Korean agriculture. For two Latin American countries (Mexico and Colombia) more than 50 percent of their increase in agricultural exports is due to liberalizing US and Canadian agriculture. For twenty-seven of the thirty-five country groups, 50 percent or more of the increase in their agricultural exports is due to liberalizing EU agriculture. Clearly, these results suggest that an open EU market is in the common interest of most developing countries, and particularly so for those in SSA.

A more detailed breakdown for sub-Saharan Africa (a group of 33 countries) is shown in figure 5. The first set of bars shows the total effect on sub-Saharan agricultural exports from the total liberalization of (a) EU agricultural policies, (b) U.S. agricultural policies, (c) sub-Saharan agricultural policies, and lastly, (d) the effect of infrastructure (i.e., transportation) of the change in agricultural exports, relative to the base data. The second set shows the effect of (a) through (d) on exports to the EU and the US, the third set on shows the effect on sub-Saharan imports of (a) through (d), and the last set shows the effect of (a) through (c) in intra sub-Saharan agricultural trade.

The first set of bars shows that EU liberalization has a large effect on exports (almost 20 percent increase relative to base), the US has a minimal effect, while liberalization of agricultural trade barriers among sub-Saharan countries alone has an effect that is slightly greater than the EU effect. The second set of bars shows that EU liberalization indeed increase sub-Saharan

12

agricultural exports mostly to the EU (almost 30 percent), while sub-Saharan liberalization also increase exports to the EU (bar three, set two). The third set of bars shows the effect on imports. Both EU and US liberalization decreases imports to sub-Saharan countries, largely because of the increase in prices shown in figure 3. The fourth set shows that EU and US liberalization has little effect in intra-regional trade. Instead, the major barriers to intra (neighborhood) trade are the barriers imposed by sub-Saharan countries.

Country level data of prices received by farmers, prices received by wholesalers, and paid by retailers while piecemeal, suggest relatively large price spreads that we attribute largely to the state of transport infrastructure[4]. A fifty percent lowering of this price spread is shown by the last bar in each set to have a large effect on agricultural exports, and intra sub-Saharan trade. Infrastructure and the role of institutions in providing and maintaining these public goods would appear important to integrating the sub-Saharan economy into the world economy as well as creating internal efficiency gains from intra-regional trade.

## 6.2 What is the nature of the longer-run world-wide gains from reform?

The question here is whether the longer-run effects of agricultural trade reform greatly or only slightly dominate the short- run effects. The detailed country specification of the world static models discussed above is aggregated, and cast into a dynamic inter temporal model in which households and firms optimize over time. This is a Ramsey - Cass - Koopmans genre growth model, the basic conceptual structure of which can be found in Barro and Sala-i-Martin (1995). The source of economic growth is due to total factor productivity, and capital accumulation.

The results from this analysis appear in figure 6. Three "sets" of bars appear, one set for the static analysis, one set that accounts for growth in capital stock caused by the inter temporal behavior of economic agents but no growth in total factor productivity (TFP), and the third which allows for growth in both capital stock and TFP. The reported values, in billions of dollars, are equivalent variation and express the amount the consumer would

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[4]Using data complied by Peter Hazell and associates at IFPRI, Yeldan and Roe (1995) show that these price margins are larger for sub-Saharan Africa than they are, on average, for countries in South Asia, East Asia and even Latin America.

be indifferent to accept in lieu of the policy change.

The results show that the static effects and the first five-year effects restricted to capital accumulation, are modest. This is not an unusual result, as Rodrik (2002) noted. The gains to advanced countries are larger than to the developing country group because their agricultural policies cause greater distortions in their economies. Nevertheless, time is required for the new incentives to encourage households to forego consumption and save in order for the capital stock to accumulate. By year 15, the value has grown to $6.52 billion. Gains from reform grow over time. Still, in the absence of growth in factor productivity, the longer-term gains are relatively modest.

If the growth in agricultural exports from developing countries leads to an increase in the importation of intermediate capital inputs embodying advances in technology than, as Coe et al (1995), Wang and Xu (1997) and others find, a country can expect to experience an increase in TFP. If the expansion of trade encourages a country to respond to the new opportunities by creating and reforming those institutions whose services markets use intensively, or as Rodrik (2002) suggests, i.e., institutional reform "trickles" down, then still another source of growth in TFP is possible. Using the modest estimated value of growth in TFP found by Coe et al of about 0.02 percent per year for the developing countries alone, gives rise to the third set of bars in figure 6.

In this case, the gains to developing countries are far more pronounced, exceeding by a factor of eight in year 5 (or $10.16 billion) the gains in the no TFP growth analysis, and by factors of over three ($17.39 billion, and $21.15 billion) in years 10 and 15, respectively. The relative gain in year 5 is higher than in the latter years because the effect of TFP is to encourage a more rapid accumulation of capital stock earlier in the transition to long-run growth. In any case, the analysis makes clear that the dynamic gains from agricultural trade reform are likely to far exceed the static gains.

Moreover, it is interesting to note that gains also accrue to the developed countries even though we assume that they experience no TFP growth due to agricultural trade reform. What is the source of this "payoff?" The developed countries benefit indirectly from the growth in the returns to increased capital flows from the developed to developing countries, and sales of intermediate capital that is induced by the increased investment demand of the developing countries. They also gain from importing the relatively labor and water intensive agricultural goods that they would otherwise have to produce at higher costs. The capital flows result because most developing

countries do not have sufficient domestic savings to fully finance their growth in investment demand that is largely induced by their growth in TFP.

## 6.3   The case of sub-Saharan Africa

The analysis of the previous section suggests grains from growth in TFP. In this section, we take a closer look at sub-Saharan countries and consider the effect of infrastructure, and infrastructure plus institutions on economic growth. The average per capita GDP in 2001 of the 33 countries in this region was about $567 in 1995 US dollars (IBRD). An aggregate three sector (manufacturers, agriculture, service) inter-temporal Ramsey model is calibrated to this region's data for the year 1993, based in a social accounting matrix (SAM) available in the archives at IFPRI, and the SAM appearing in Yeldan and Roe (1995). Analytical features of the model can be found in Roe (2001) and Roe et al (2003). Our purpose is to illustrate the type of gains that could accrue to this economically depressed region over a fifty year period.

In order to suggest the magnitude of the possible increase in TFP, we draw on the paper by Gopinath and Roe (1997). They found that about 0.69 percentage points of U.S. agriculture's total factor productivity of about 2.1 percent was due to public investments in infrastructure (this includes electrification, roads, public buildings) during 1959 - 1968 period. Estimates of growth in sub-Saharan Africa's factor productivity at the national level is very small, about 0.02 percent per annum. This estimate compares to 1.0 percent per annum for the U.S. over the period 1981-1995, and 1.9% for the period 1996-1998 (Marquez, 2001). To estimate the possible increase in TFP, it is simply assumed that the 0.69 percentage points applies to sub-Saharan Africa. The positive TFP shock simulated is thus 0.69% percentage points.

The second simulation draws upon the results of MacFarlan et al (2003), which suggests that bringing sub-Saharan Africa's institutions up to the mean level index of the over 100 countries included in their sample, would increase this regions growth in GDP per capita by 1.7 percentage points. The second simulation considers at TFP shock of 2.39 percent (0.69 + 1.7).

The factor share parameters, as compiled from the aggregate SAM, and other non-calibrated parameters are the following:

| Tech. | Growth | Elast. Manuf. | | Elast. Ag. | | | Elast. Service | |
|---|---|---|---|---|---|---|---|---|
| Change | Labor | Labor | Capital | Labor | Capital | Land | Labor | Capital |
| 0.0002 | 0.02 | 0.689 | 0.311 | 0.295 | 0.353 | 0.352 | 0.495 | 0.505 |

### 6.3.1  The base solution

The rate of transition growth in GDP per capita is shown in figure 7. Also show is the region's actual real rate of growth based on IBRD data for the period 1993 to 2002. Excluding the year of negative growth, the model's estimate of the rate of growth during the years 1994-2001 appears to be a "reasonably" good fit to the data. The model's steady state (long-run) rate of growth GDP is 0.02 % per annum per capita. Transition growth reflects the growth in capital stock due to household's foregoing present for future consumption. Growth declines overtime due to the diminishing returns to capital.

As capital accumulates, labor productivity grows, wages rise. Land productivity also grows with the accumulation of capital which in turn causes land prices to rise over the period. Nevertheless, growth in real income is small. The model estimates that sub-Saharan Africa's GDP per capita will rise from $567 observed in 2001 to about $589 (in 1995 dollars) by the year 2020, and to about $639. per capita by the year 2040. These are increase of only 5.7 percent and 12.7 percent , respectively.

The differences in the *relative* evolution of output of the three sectors is due largely to the relative capital intensity of the various sectors. As capital accumulates, the service sector benefits relative to the other sectors because it is relatively capital intensive. As capital accumulates in this sector, labor productivity rises which allows the service sector to bid up wages. The sector placed at a relative disadvantage from the rise in labor wage is manufacturing because it employs labor more intensively than do the other sectors. In the long-run, the output of all sectors grow at the same rate of 0.02 percent per capita per year.

### 6.3.2  Experiment: the dynamic effects of infrastructure

The rate of transition and long-run growth in GDP per capita is shown in figure 7. Long-run growth converges to about 0.71 percent per capita per annum, which exceeds the 1993 - 2001 average of 0.53 percent  This rate is modest compared to the rates implied by the analysis of Rodrik et al (2002),

and MacFarlan, et al (2003). In this case, if factor productivity growth due to better infrastructure could have occurred in the base year 1993, per capita income, according to the analysis, would have been about $627.6 per capita in 2001, $819.2 in 2020, and about $1128.2 in 2040, all expressed in constant 1995 U.S. dollars. These are increase over the path generated by the base solution (i.e., the status quo) of about 11 percent for 2001, 39 percent for the year 2020, and about 76 percent for the year 2040. Nevertheless, these values are modest compare to the average per capita income reported by the World Bank for the Middle East and North Africa of $1,905 for the year 2001, in constant 1995 U.S. dollars.

The manufacturing sector expands relative to agriculture, and agriculture expands modestly faster over the transition to long-run growth than services. This transition pattern results largely from the fact that the accumulation of capital causes an expansion of the services sector, but in spite of the growth in real disposable income, this growth is not sufficient to consume the increase in service production at "old" prices. Consequently, the price of services, and by implication, the real exchange rate, falls. This has the effect of releasing labor to manufacturing and to agriculture. Since manufacturing is marginally more labor intensive than agriculture, it tends to benefit slightly more than agriculture. In the long-run equilibrium, the share of services, manufacturing and agriculture in GDP are roughly 52 percent, 40 percent, and 8 percent, respectively.

This analysis, while only illustrative, suggests that infrastructure while related to institutional structure, is by itself, unlikely to raise the per capita income of sub-Saharan countries, as a group, to an appreciable level. We next focus on the effect of institutions in addition to the improvement in infrastructure.

### 6.3.3 Experiment: the dynamic effect of institutions

In this case, we draw upon the results MacFarlan et al (2003) and add an additional 1.7 percentage points the country's rate of growth in factor productivity. The effect on growth in real income per capita is shown in figure 7. Initially, growth in per capita GDP begins at about 2.7 percent, and declines slowly as capital accumulates to about 2.4 percent per year. Notice that this path exhibits much less of a decline compared to the other two paths. This occurs because the relatively high rate of factor productivity growth greatly dampens the decline in the marginal physical product of capital. Effectively,

the region is able to maintain a slower decline in the growth rate over the same interval of time compared to the other simulations.

In the short run, TFP accounts for about 30 percent of the regions growth in per capita GDP, with capital accounting for about 48 percent and labor the remaining 22 percent. In the case of agriculture, the percentages are similar, with TFP, capital and labor accounting for 27 percent, 40 percent and 33 percent respectively. In the long run, as the effect of transition capital on growth declines, capital's contribution falls to 40 percent, labor rises to 25 percent and TFP accounts for 35 percent. This pattern is in contrast to the base case where diminishing returns to capital occur more quickly. In that case, capital's contribution to growth in GDP in the short run is 60 percent, declining to about 45 percent in the longer run. Since TFP is relatively small, its contribution is only 10 percent in the short run, rising to 12 percent in the long-run.

If, in 1993, this region had experienced an increase in the quality of its institutions to a level equal to the average of the index of institutional quality of the mean of the over 100 countries in the MacFarlan et al study, this analysis suggests that it would have enjoyed an income per capita of about $650 in the year 2001, $1057 in the year 2020, and about $1,844 dollars in the year 2040 (in 1995 dollars). These increase correspond to percent increase of 10, 70 and 188 of the corresponding base period path. Nevertheless, the 2040 income is less than the 2001 average for the Middle East and North Africa ($1,905). The comparison of this path with the base is shown in figure 8.

The level of sectoral output relative to the base path is shown in figure 9. Relative to the base path, manufacturing expands relative to agriculture, and agriculture relative to the service sector for the same reasons as mentioned in the previous experiment. Not shown is the growth in trade relative to GDP. The relative decline in the price of services over the period releases resources to the other two sectors, the outputs of which are traded in international markets. Thus, trade as a percentage of GDP tends to grow throughout the transition to long run growth. If barriers were erected by other countries to this regions exports, growth would be slowed. In the extreme case where the regions exports are held to the initial levels, as a percent of GDP, the regions growth pattern resembles that of the first experiment.

This analysis suggests that modest increase in TFP has relatively large long-run effects, but these effects take time to work through the economy. Time is required for capital deepening, especially when it comes from do-

18

mestic savings alone. The simple model here presumes that the only source of savings is from domestic households. If the country's domestic capital markets are sufficiently well developed and diversified to allow an immediate inflow of foreign capital equal to approximately 18.5 percent of the base period capital stock, then the economy's transition to long-run growth would have allowed it to obtain the 50 year targets more quickly. An economy open to foreign goods and capital, with well developed institutions should help to speed up the transition to long-run growth.

# 7    Conclusions

The growth experience of countries during the last half of the 20 century suggests that "accidents" of geography and the presidents of history are not a poverty trap. The evidence is also clear that institutions matter. Institutional reform as Rodrik mentions (2002), does not travel well, i.e., another country's institution is difficult to modify and transplant to a second country. Institutional reform induced by better economic opportunities that increased openness to the world economy is surely "trickle" down reform. These opportunities help create the conditions for institutional reform, but surely they are not sufficient.

Nevertheless, since institutional reform is difficult, it seems that it is also the case that if the agricultural policies of advanced countries not only cause a waste of resources in themselves, but also become barriers to helping induce reform, then even more pressures should be brought to bear that encourage their use of first-best (i.e., non-market distorting) policy instruments. Surely the sub-Saharan countries have a major vested interest in the Doha round of trade negotiations that should be induced by more than just getting prices right. They also should have a vested interest in fostering regional trade among themselves with prospects for fostering institutional reform.

Thus measures of the welfare gains from trade reform for advanced economies may largely entail the typical decline in deadweight losses. For countries that experience an induced institutional reform, the gains are likely to be far larger. This may cause the indirect feed-back effects on welfare in advanced countries caused by trade expansion to likewise be significant.

We conclude that (1) initial conditions matter, but they are becoming easier to overcome for many of the same reasons that has driven the second wave of world globalization, (2) institutional change is induced by the potential

for economic gain, and thus the incentive for change follows the emergence of economic opportunities, (3) however, there is no compelling reasons to think that societies will naturally gravitate toward good institutions, all else constant (i.e., bad institutions could persist indefinitely in static or worsening economic conditions, this is the main reason for the trickle down feature of trade induced institutional reform), and (4) while a democratic form of governance that allows for relatively free entry and competition among political entrepreneurs is one means of fostering institutional change, Mohtadi and Roe *(2003),* change can well be brought about by non-democratic means of governance.

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**Table 1. Sub-Saharan African (SSA) agricultural trade -- 1996-2000 annual average**

| | | Rank* | Exports Value (Million $US) | Imports Value (Million $US) | Export share by commodity (%) | Import share by commodity (%) |
|---|---|---|---|---|---|---|
| **Staples** | Meat | 16 | 335 | 2,572 | 1.8 | 25.4 |
| | Livestock | 18 | 123 | 1,104 | 0.7 | 10.9 |
| | Other cereals | 19 | 207 | 272 | 1.1 | 2.7 |
| | Maize | 22 | 287 | 105 | 1.6 | 1.0 |
| | Beans | 24 | 54 | 35 | 0.3 | 0.3 |
| | Cassava | 28 | 2 | 0 | 0.0 | 0.0 |
| | *Sub-Total* | | **1,007** | **4,089** | **5.5** | **40.4** |
| **Non-traditional** | Fish | 2 | 2,403 | 1,239 | 13.1 | 12.2 |
| | Vegetable&fruits | 6 | 2,449 | 787 | 13.3 | 7.8 |
| | Miscellaneous | 7 | 777 | 554 | 4.2 | 5.5 |
| | Oilseeds | 12 | 317 | 456 | 1.7 | 4.5 |
| | Oils and fat | 13 | 359 | 435 | 2.0 | 4.3 |
| | Processed food | 20 | 159 | 333 | 0.9 | 3.3 |
| | Beverages | 27 | 334 | 56 | 1.8 | 0.6 |
| | *Sub-Total* | | **6,798** | **3,859** | **36.9** | **38.1** |
| **Traditional** | Cocoa bean | 1 | 2,387 | 797 | 13.0 | 7.9 |
| | Coffee green | 3 | 1,844 | 148 | 10.0 | 1.5 |
| | Cotton | 4 | 1,459 | 130 | 7.9 | 1.3 |
| | Tobacco | 5 | 1,125 | 119 | 6.1 | 1.2 |
| | Sugar | 8 | 1,063 | 73 | 5.8 | 0.7 |
| | Tea | 9 | 646 | 44 | 3.5 | 0.4 |
| | Cashew nuts | 14 | 221 | 22 | 1.2 | 0.2 |
| | Other nuts | 25 | 44 | 12 | 0.2 | 0.1 |
| | Other fibers | 26 | 233 | 4 | 1.3 | 0.0 |
| | *Sub-Total* | | **9,022** | **1,349** | **49.0** | **13.3** |
| **Others** | Processed cocoa | 10 | 492 | 305 | 2.7 | 3.0 |
| | Animal skin | 11 | 564 | 224 | 3.1 | 2.2 |
| | Spices | 15 | 157 | 124 | 0.9 | 1.2 |
| | Feed stuffs | 17 | 147 | 76 | 0.8 | 0.7 |
| | Coffee roasted | 21 | 105 | 60 | 0.6 | 0.6 |
| | Cigarettes | 23 | 108 | 41 | 0.6 | 0.4 |
| | *Sub-Total* | | **1,572** | **829** | **8.5** | **8.2** |
| **TOTAL** | | | **18,400** | **10,125** | | |

\* By share in sub-Saharan Africa total agricultural exports.

Source: UNCOMTRAD rev3, 2002

Table 2. Share of exports to the EU in selected countries for total agricultural exports by commodity group, 1996-2000 average

| | Fish | Shrimp | Vegetables &fruits | Oilseeds | Beverages | Sugar | Coffee green | Tea | Tobacco | Cotton | Other fibers | Spices | Animal skin | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kenya | 38.6 | 97.6 | 88.9 | 29.9 | 3.9 | 7.3 | 82.7 | 33.2 | 63.6 | 17.5 | 50.9 | 7.9 | 12.7 | **55.5** |
| Uganda | 50.5 | 0.0 | 81.8 | 44.5 | 3.7 | 8.1 | 64.5 | 9.3 | 79.1 | 52.8 | 54.0 | 20.9 | 39.7 | **57.6** |
| Tanzania | 61.1 | 0.0 | 81.0 | 16.4 | 1.4 | 94.0 | 60.2 | 33.0 | 69.9 | 14.0 | 49.0 | 3.4 | 19.1 | **43.1** |
| Ethiopia | 27.0 | 0.0 | 13.6 | 19.6 | 13.9 | 12.9 | 54.8 | 11.2 | 100.0 | 18.5 | 100.0 | 6.0 | 65.6 | **46.4** |
| Madagascar | 78.6 | 0.0 | 93.6 | 19.7 | 63.5 | 77.7 | 61.8 | 88.2 | 48.2 | 73.4 | 81.2 | 26.8 | 48.6 | **65.7** |
| Cote d'Ivoire | 98.0 | 97.5 | 93.4 | 61.8 | 5.7 | 63.9 | 57.3 | 4.8 | 30.0 | 14.4 | 86.6 | 32.9 | 89.4 | **65.2** |
| Cameroon | 38.9 | 0.0 | 86.7 | 6.1 | 1.2 | 1.7 | 75.0 | 36.1 | 15.2 | 18.2 | 1.4 | 56.7 | 72.2 | **60.2** |
| Nigeria | 87.1 | 98.0 | 64.2 | 73.3 | 81.0 | 10.7 | 68.0 | 27.6 | 66.0 | 17.6 | 98.8 | 63.2 | 58.6 | **70.5** |
| Senegal | 79.1 | 96.3 | 95.0 | 80.8 | 0.9 | 60.0 | 68.9 | 1.3 | 12.8 | 49.7 | 90.7 | 9.6 | 70.4 | **75.0** |
| Ghana | 81.1 | 87.1 | 92.2 | 80.3 | 47.0 | 0.9 | 57.6 | 21.7 | 52.6 | 32.0 | 42.3 | 71.4 | 27.3 | **69.3** |
| Zimbabwe | 44.5 | N/A | 81.7 | 13.1 | 3.3 | 35.2 | 77.1 | 32.7 | 42.2 | 40.7 | 18.1 | 84.9 | 45.6 | **43.9** |
| South Africa | 57.2 | N/A | 67.2 | 35.2 | 62.3 | 25.6 | 75.8 | 84.5 | 25.2 | 8.2 | 59.7 | 63.3 | 56.2 | **47.4** |


Table 3. Share of exports to the US in selected countries for total agricultural exports by commodity group, 1996-2000 average

| | Fish | Shrimp | Vegetable & fruits | Oilseeds | Beverages | Sugar | Coffee green | Tea | Tobacco | Cotton | Other fibers | Spices | Animal skin | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kenya | 0.9 | 0.4 | 3.7 | 0.3 | 0.5 | 0.0 | 5.3 | 2.3 | 5.2 | 0.4 | 0.0 | 0.2 | 0.0 | **3.5** |
| Uganda | 3.2 | 0.0 | 1.4 | 0.0 | 0.1 | 5.0 | 4.8 | 1.0 | 0.1 | 0.0 | 0.0 | 69.8 | 0.2 | **3.7** |
| Tanzania | 4.7 | 0.0 | 13.9 | 0.0 | 0.2 | 0.0 | 2.3 | 6.4 | 2.7 | 0.0 | 0.1 | 0.4 | 3.2 | **2.5** |
| Ethiopia | 0.0 | 0.0 | 1.6 | 66.6 | 38.0 | 0.0 | 9.7 | 1.5 | 0.0 | 0.0 | 0.0 | 4.2 | 2.8 | **7.6** |
| Madagascar | 0.0 | 0.0 | 3.0 | 0.4 | 0.0 | 20.5 | 8.7 | 0.0 | 33.5 | 0.0 | 0.0 | 28.4 | 0.7 | **8.4** |
| Cote d'Ivoire | 0.0 | 0.0 | 0.2 | 5.2 | 9.0 | 7.2 | 4.5 | 0.0 | 38.6 | 0.0 | 0.0 | 2.5 | 0.0 | **9.3** |
| Cameroon | 3.7 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 3.2 | 6.9 | 75.5 | 0.2 | 0.0 | 1.5 | 5.0 | **1.4** |
| Nigeria | 1.4 | 0.6 | 6.9 | 1.5 | 7.4 | 0.1 | 9.9 | 0.0 | 0.0 | 0.3 | 0.0 | 6.0 | 0.3 | **3.3** |
| Senegal | 0.5 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.3 | 4.8 | 0.0 | **0.3** |
| Ghana | 3.9 | 1.0 | 3.9 | 0.6 | 11.5 | 1.1 | 1.9 | 9.4 | 1.1 | 3.8 | 50.9 | 6.5 | 36.4 | **6.7** |
| Zimbabwe | 1.0 | N/A | 1.1 | 0.0 | 0.6 | 8.3 | 4.8 | 1.1 | 3.5 | 0.0 | 0.0 | 8.0 | 11.8 | **3.4** |
| South Africa | 11.2 | N/A | 4.5 | 5.4 | 2.9 | 7.7 | 9.4 | 1.3 | 1.2 | 0.1 | 1.9 | 5.7 | 7.4 | **4.8** |

These 12 countries account for 75 percent of total SSA agricultural exports.
Source: UNCOMTRAD rev3, 2002

**Table 4 Agricultural Protection in the European Union and United States**

| | Import Tariffs | | Export Subsidies | | Domestic Protection | |
|---|---|---|---|---|---|---|
| | EU | US | EU | US | EU | US |
| Paddy rice | 64.6 | 4.9 | 12.6 | | 43.2 | 13.4 |
| Wheat | 68.3 | 2.6 | 9.1 | | 75.2 | 47.3 |
| Other cereal grains | 43.1 | 0.6 | 34.1 | 0.0 | 78.8 | 24.5 |
| Vegetables, fruits, nuts | 17.5 | 4.7 | 1.0 | | | |
| Oil seeds | 2.6 | 17.7 | 0.0 | | 117.6 | 24.2 |
| Sugar cane, sugar beet | 247.3 | 0.7 | 0.0 | | 3.5 | 4.1 |
| Plant-based fibers | 0.0 | 9.7 | 0.0 | | | 45.0 |
| Other crops | 4.6 | 21.5 | 0.4 | | | |
| Cattle and sheep | 38.0 | 1.1 | 0.1 | | 31.9 | 0.6 |
| Other animal products | 6.1 | 0.6 | 0.0 | | 1.6 | 0.6 |
| Raw milk | 0.0 | | 3.8 | | 3.2 | 1.5 |
| Forestry | 0.8 | 0.4 | | | | |
| Fishing | 8.0 | 0.3 | | | | |
| Beef and mutton | 95.2 | 5.3 | 27.0 | | | |
| Other meat products | 52.0 | 3.6 | 4.5 | 0.0 | | |
| Vegetable oils and fats | 11.8 | 4.3 | 0.1 | | | |
| Dairy products | 89.8 | 42.5 | 26.0 | 18.6 | 3.2 | 1.5 |
| Processed rice | 86.3 | 5.3 | 13.7 | | 43.2 | 13.4 |
| Processed sugar | 76.5 | 53.4 | 53.5 | | 3.5 | 4.1 |
| Other processed food | 32.3 | 11.4 | 4.2 | | | |
| Beverages and tobacco products | 12.4 | 3.0 | | | | |
| Average tariff (weighted) | 21.7 | 10.7 | 7.1 | 0.0 | 14.4 | 10.2 |
| Average tariff (non-weighted) | 45.6 | 9.2 | | | | |

**Figure 1: Share of agricultural exports in country's total exports, 1998** (Source: Diao et al 2002)



* denotes SSA countries
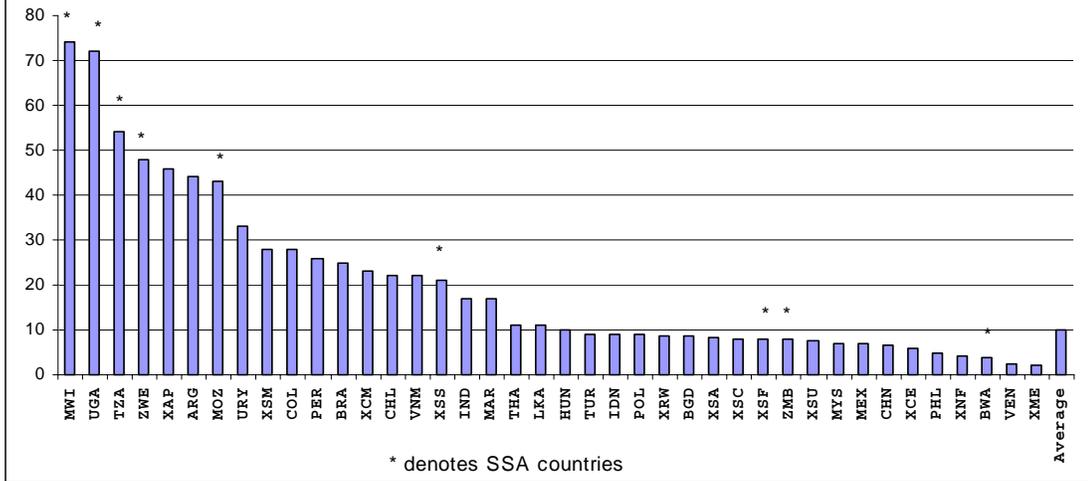
**Figure 2: Share of Exports to Japan/Korea, USA/Canada, and EU in Developing Countries' Total Agricultural Exports 1998 (%)**

(Source: Diao et al 2002)

* denotes SSA countries
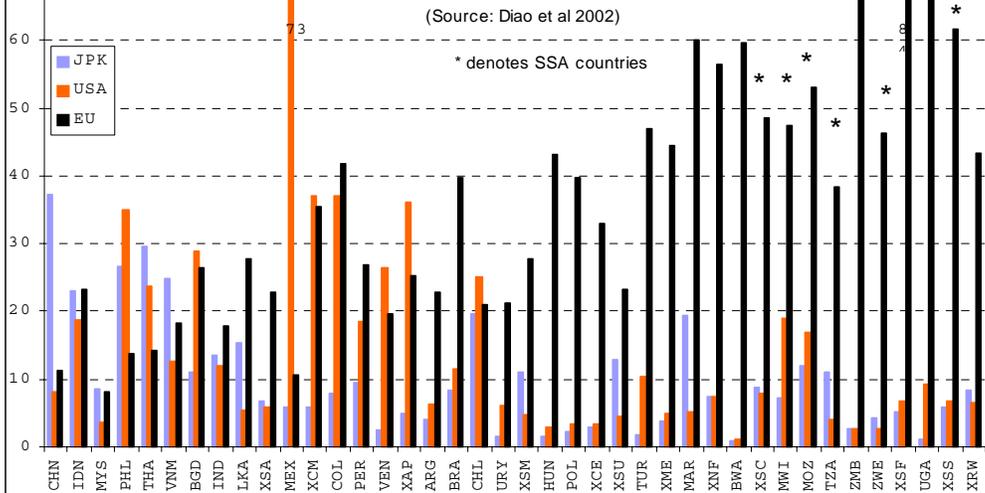
**Figure 3 Decomposition of Price Effects of Global Agricultural Libralization** (Source: Diao et al 2001)
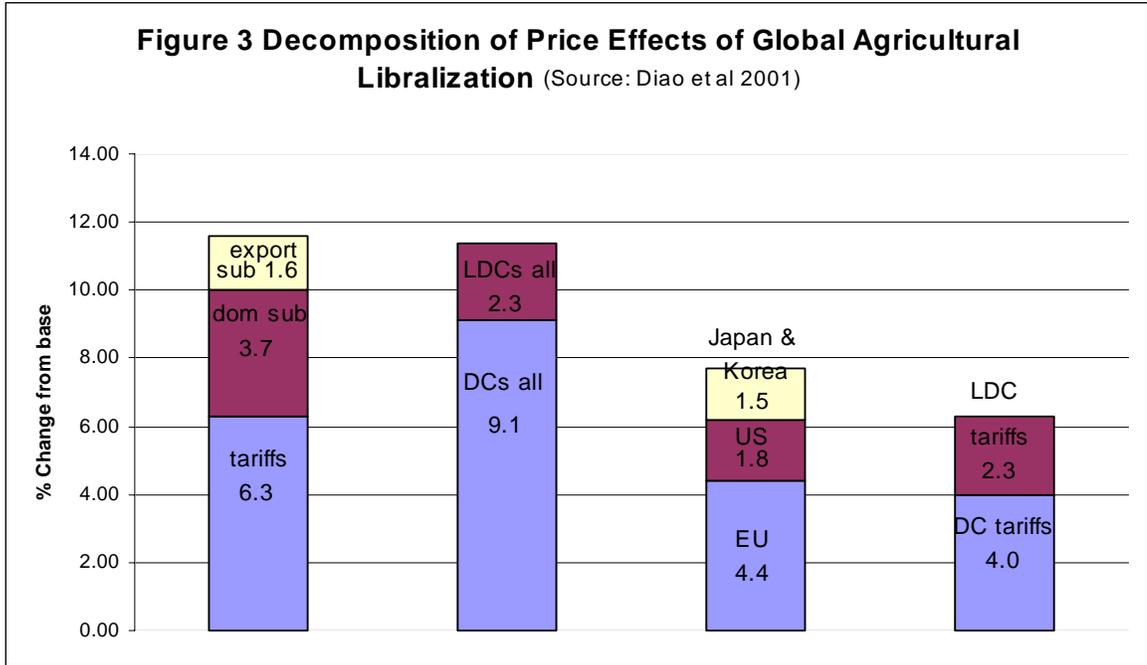


**Figure 4: Percent Change in Developing Countries' Ag. Exports by Destination** (Source: Dial et al 2001)

28
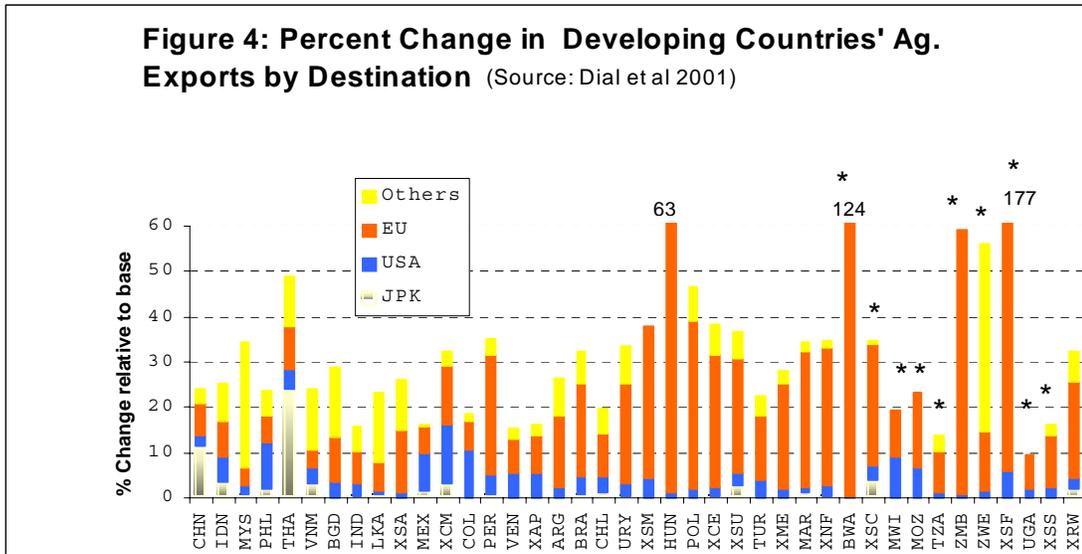
**Figure 5  Effect of trade liberalization and transport efficiencies on sub-Saharan Africa agricultural trade: Percent change from base**
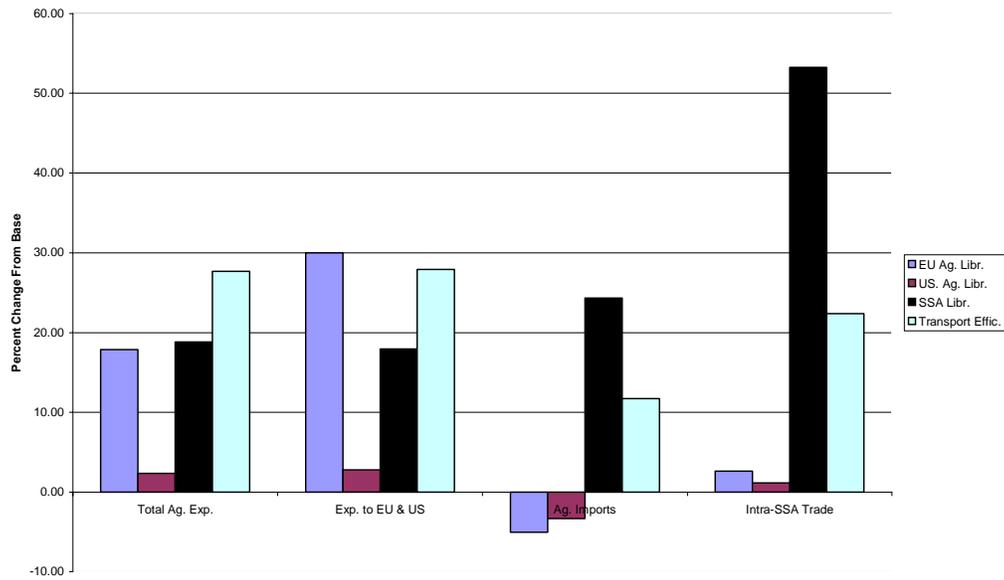


**Figure 6 Net Benefits From Agricultural Reform, Billions of Dollars:** (Source, Diao et al 2001)
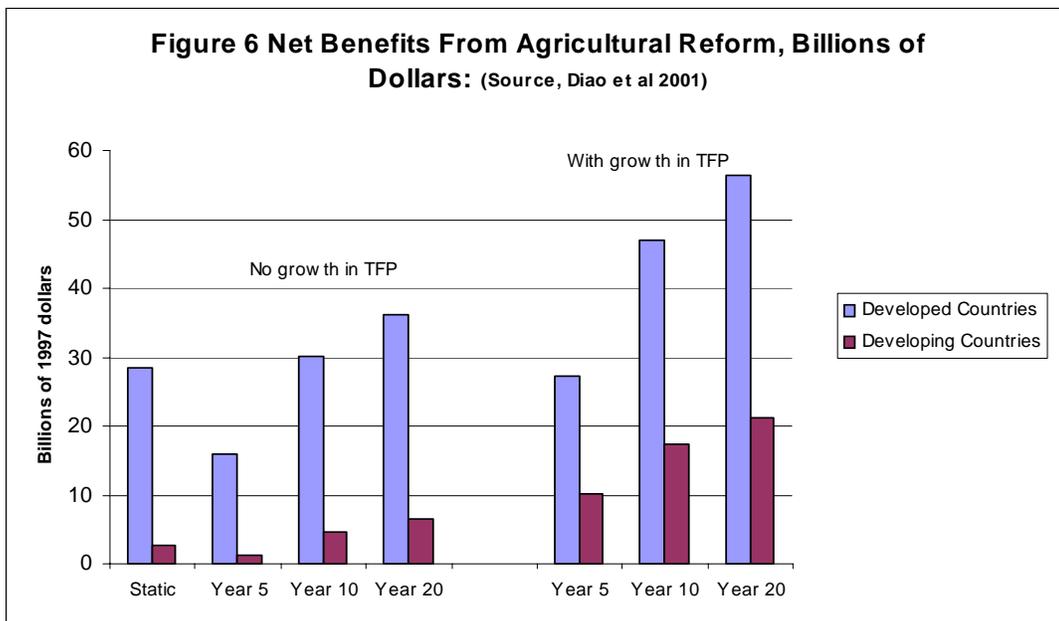
**Figure 7 Sub-Saharan Africa: growth in GDP per capita, base plus two simulations**
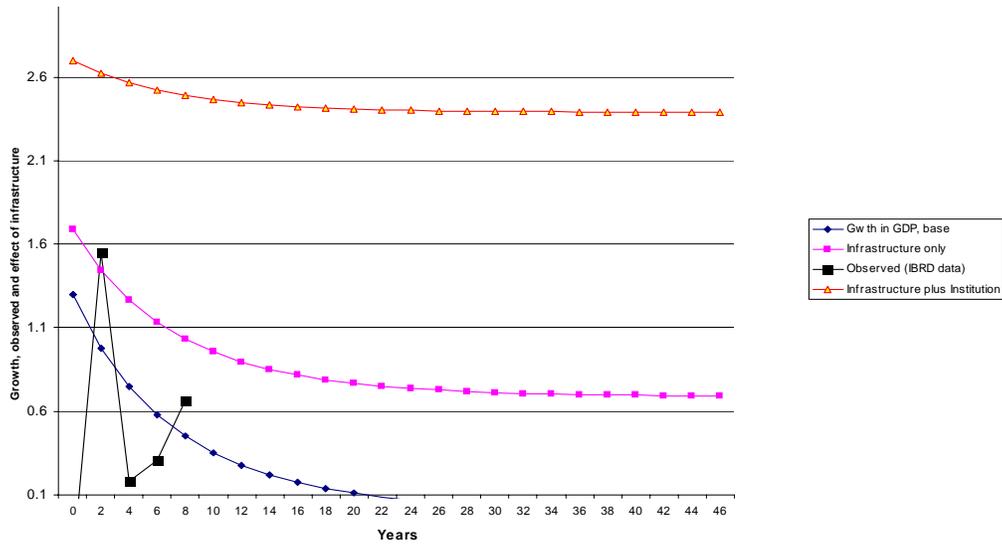


**Figure 8. Sub Sharan Africa: Illustration of the effect of infrastructure and institutions on GDP per capita**



30
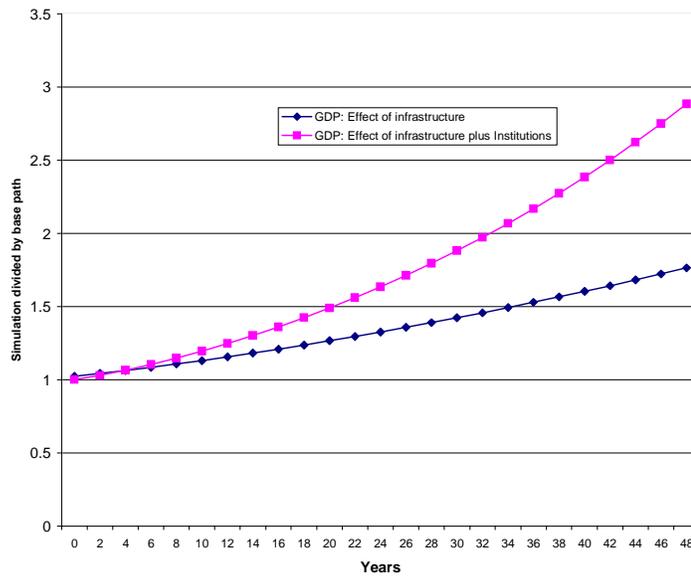
**Figure 9. Sub-Saharan Africa: effect of infrastructure and institutions on sector output;
Simulation relative to base path**
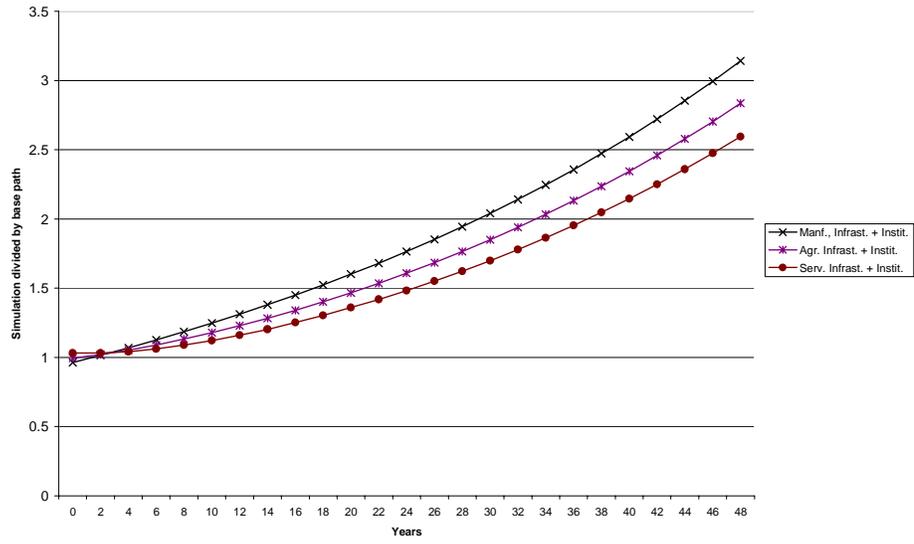
**Country groups**

ANZ     Australia and New Zealand;     JPK     Japan and Korea
ADC     Other Asian developed countries;     USA     U.S. and Canada
E_U     EU and European Free Trade Association;     CHN     China
IDN     Indonesia;     MYS     Malaysia
PHL     Philippines;     THA     Thailand
VNM     Viet Nam;     BGD     Bangladesh
IND     India;     LKA     Sri Lanka
XSA     Rest of South Asia;     MEX     Mexico
XCM     Central America and Caribbean;     COL     Colombia
PER     Peru;     VEN     Venezuela
XAP     Rest of Andean Pact;     ARG     Argentina
BRA     Brazil;     CHL     Chile
URY     Uruguay;     XSM     Rest of South America
HUN     Hungary;     POL     Poland
XCE     Rest of Central Europe;     XSU     Former Soviet Union
TUR     Turkey;     XME     Rest of Middle East
MAR     Morocco;     XNF     Rest of North Africa
BWA     Botswana;     XSC     Rest of South Africa Custom Union
MWI     Malawi;     MOZ     Mozambique
TZA     Tanzania;     ZMB     Zambia
ZWE     Zimbabwe;     XSF     Rest of Southern Africa
UGA     Uganda;     XSS     Rest of Sub-Saharan Africa
XRW     Rest of World