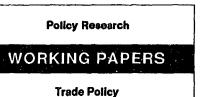WPS1025

Openness and Economic Performance in Sub-Saharan Africa

Evidence from Time-Series

Cross-Country Analysis

Kazi M. Matin

Openness exerts a significant positive impact on performance in
countries in Sub-Saharan Africa — the more open the economy,
the better the economic performance.

This paper— a product of the Trade Policy Division, Country Economics Department — is part of a larger effort in the department to assess the experience of Sub-Saharan Africa with trade liberalization. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Dawn Ballantyne, room N10-019, extension 38004 (November 1992, 38 pages).

In a cross-country study for 1967-87, Matin tests whether the finding that increased openness improves performance holds true for Sub-Saharan Africa as a subgroup among developing countries.

Econometric analysis — based on the augmented production function that includes labor, capital stock, and a measure of openness — shows that openness exerts a significant positive impact on economic performance of countries in Sub-Saharan Africa. The relation-ship is especially strong in "fixed-effect" esti-mates that use annual panel data with country dummies to capture unobserved country-specific differences.

Matin finds the evidence of a positive link between openness and performance surprisingly robust to different measures of openness, to different periods, and to the inclusion of other policy variables. All four measures of openness, for example, are significant for 1967-87. For the shorter period, 1980-87, three are significant. Also, the size and significance of the openness coefficients do not change when one controls for macroeconomic policy.

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Trade Policy Division

OPENNESS AND ECONOMIC PERFORMANCE IN SUB-SAHARAN AFRICA

By
Kazi M. Matin*

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I. INTRODUCTION

Though there is growing evidence that increased openness improve economic performance in developing countries, there is considerable skepticism about the relevance of this relationship for Sub- Saharan Africa. Notwithstanding a good deal of country-specific evidence that African producers respond positively to improved incentives, the skeptics argue that increased openness does not work in Sub-Saharan Africa for various reasons. Some argue that reforming trade regime to enhance efficiency and exports contributes less to output growth than increasing aid or promoting faster technical progress in agriculture (Helleiner 1991). Others argue that efficiency gains from reforms may be small because domestic producers cannot reallocate resources sufficiently due to weaknesses in the human resource base, in infrastructure and in institutions (Elbadawi, 1992, p. 5).

This skepticism is fuelled, in large measure, by the dismal economic performance of the Sub-Saharan Africa (SSA) region as a whole.[1] Nearly half the countries of the region are poorer today than they were a generation ago (World Bank 1991). More then three quarters of them have undertaken policy reforms during this decade. Thus, on the face of it, recent reforms, including trade reforms, do not appear to be <u>associated</u> with improved economic performance in the region.

There may be at least three reasons why increased openness resulting from trade reform may not be <u>associated</u> with higher aggregate output levels and faster growth. First, if producers do not respond to the trade reforms because inconsistent macroeconomic-policies may have undermined their credibility, then greater openness would not generate the expected gains in productivity. Second, even when trade reforms are credible, producers may be unable to respond to reforms because of domestic regulations in product and factor markets or because of intrinsic weaknesses in institutions, infrastructure and the human resource base. Again greater openness would not lead to productivity gains. Third, even if reforms are credible and producers do respond, the resulting productivity gains

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[1] Growth in GDP per capita has averaged 1.5 percent and -1.0 percent over the 1965-80 and 1980-90 periods, respectively.

from reform may be offset by declines in factor accumulation. In that event trade reform may not be associated with higher output and GDP growth, though greater openness actually improved productivity.

Unfortunately, there is very little systematic cross-country evidence of openness-performance link in Sub-Saharan Africa that can question such skepticism. Those that exist either do not explicitly examine the openness-performance link or if they do, their focus is not Sub-Saharan Africa. For example cross-country analysis of the effect of recent reforms (including trade policy reforms) on performance in SSA (World Bank 1992, Elbadawi 1992) show that they have not significantly affected their GDP growth.[2] These studies use dummies in the regressions for countries receiving World Bank loans to proxy reforms carried out by those countries. Since loan dummies cannot indicate either the extent to which the reforms proposed in the loans were actually implemented or whether the reforms that were implemented actually increased openness they cannot support or negate the openness-performance relationship.[3] Most of the cross-country studies that explicitly examine the openness-performance link do not focus on SSA countries. There are only five studies that analyze a sub-set of countries that come close to the SSA sample. Four of them find a positive relationship between openness and performance: three find a positive relationship for low income countries (Lal and Rajapatirana 1987, Otani and Villanueva 1990, Moschos 1991) and one finds for African

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[2]In one study (World Bank 1992) it is found that reforms under adjustment lending has restored growth in Sub-Saharan Africa to the moderate levels of the 1970s; the other study (Elbadawi 1992) using a different base period find that it has had no significant effect on growth. This is at variance with the strong positive result for all developing countries (Corbo and Rojas 1991). Another study (Faini et al 1990) also found weak effect of adjustment loans on growth of low income countries.

[3]Another study (UNDP 1989) had tried to overcome this problem of using loans as proxy for reform by subjectively distinguishing adjustment loan countries that had implemented "strong" reforms from those that had implemented "weak" or no reform. Again, the study did not distinguish between trade reforms and other reforms.

countries (Fosu 1990). The fifth study (Helleiner 1986) finds no significant relationship.[4] All five studies use a single proxy for openness (i.e., export growth).

This paper attempts to shed light on the cross-country relationship between openness and performance by investigating it within a production-function framework. The paper adds to the empirical literature by departing from earlier cross-country analysis of openness-performance relationship in three ways. First it uses more appropriate policy based measures of openness. Second it relies on four different measures of openness instead of a single measure. The use of several rather than a single measure is a distinct advantage since estimation results that are robust across several measures of openness are likely to be more convincing than those that are based on any single measure.[5]

Third, unlike previous studies this paper uses fixed effects estimation with annual pooled data in addition to the usual cross-section estimation with period-average data.[6] The use of period-average data may obscure the significant changes in openness that occur over time. Since most countries of Sub-Saharan Africa have made substantial changes in commercial and exchange rate policies over the last decade, period-averages of any measure of openness is likely to be misleading. Moreover cross-section estimation fails to control for unobserved country-specific differences that can bias the coefficient estimates. By pooling annual time-series and cross-section data and using country dummies, the fixed effects model is able to overcome those problems.

The paper finds that differences in levels of or changes in openness accounts for significant cross-country differences in economic performance in Sub-Saharan Africa. This result (i.e., significant

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[4]Helleiner (1991) argues (a) that these studies (Moschos 1991, Fosu 1990) should not be viewed as evidence of positive openness-performance relationship for SSA because Lussier (1991) cannot find a positive result when he re-estimates the regression for SSA sample and (b) because they use outcome (i.e. export growth) as a proxy for trade policy openness.

[5]Given the problems with measures of openness cited in Pritchett (1990), it is necessary to use several measures instead of a single measure.

[6]Harrison (1991) is an exception.

positive coefficient for openness variable) is robust across all four measures of openness. Estimates for some measures suggest that on average a ten percent rise in openness leads to around five percent improvement in output of Sub-Saharan African countries. Also the results for Sub-Saharan Africa compares very favorably with those for developing countries in Non-Sub-Saharan Africa. In addition, sensitivity analysis suggests that the positive openness-performance relationship for Sub-Saharan Africa is robust to the introduction of macro-economic policy in the analysis (e.g. fiscal variable).

The rest of this paper is organized as follows. Section II reviews the theoretical and empirical basis for the relationship between openness and economic performance. Section III discusses the problems of measurement, especially measurement of openness. Section IV develops the framework for estimating the openness-performance relationship, discusses the data and reports the results of estimation including those for the sensitivity tests. Section V concludes.

II. OPENNESS AND ECONOMIC PERFORMANCE

The concept of openness should be viewed as synonymous with the notion of neutrality in trade policy. Neutrality means that incentives are equal or neutral between saving a unit of foreign exchange through import substitutes and earning a unit of foreign exchange through exports. Empirically, this equality relates to average incentives for import substitutes and exports: i.e. a trade regime will be viewed as "open" if it is found to be neutral in an average sense even when it is non-neutral in respect of specific sectors (Bhagwati 1986). Thus trade reform increases openness through a shift towards greater neutrality by reducing the inequality in the average incentives. Though this reduction can be achieved by either reducing import protection and export restrictions or by raising export incentives, it is more desirable to achieve neutrality through the former[7].

Theoretical Basis

Theory suggest that a higher level of openness or increases in openness promote better economic performance. Static allocative efficiency gains suggest that greater openness yields unambiguously better economic performance in terms of a higher level of output or income even if not in terms of a higher long-run rate of growth. "New" theories of growth suggest that a higher long-run rate of growth of output can result from greater openness. However, they also show that this positive effect of openness on growth is not unambiguous.

The traditional case for increased openness or enhanced neutrality of trade regime was based primarily on theories of static allocative-efficiency gains. The removal of trade barriers expands the

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[7]Though trade policy reform and trade liberalization are often used interchangeably, they are not synonymous in a strict sense. Greater neutrality may come from additional interventions (e.g. duty drawback or export subsidy interventions to promote exports) but greater liberalization imply the removal of trade interventions. The former is dependent on a country's institutional capacity; it may not achieve the objective of greater neutrality if poorly implemented (Thomas, Matin and Nash 1990, Thomas et al 1991, Levy 1989).

feasible set of consumption possibilities by providing a "more efficient technology" to transform domestic resources into goods and services. Thus, efficiency gains from a better allocation of resources raises the level of national output. In addition, reduction of trade barriers reduces other costs of a less open trade regime: deadweight losses arising from domestic monopolies, costs arising from scale inefficiency, technical inefficiency or X-efficiency (Liebenstein 1966, Corden 1974) and costs of rent-seeking and directly unproductive activities (Krueger 1974, Bhagwati 1980).[8]

The "new" growth theories suggest a link between openness and the long-run rate of growth of output rather than a rise in the level of output. This can occur through the favorable impact of openness on technological change. For example openness to trade increases growth rate because it provides access to a variety of imported inputs which embody new technology (Grossman & Helpman 1992, Romer 1986). Another channel of favorable impact is that greater openness expands the size of market facing domestic exporters (Krugman 1988) thereby raising returns to innovation and thus enhancing the country's specialization in research-intensive production.

However, this theoretical literature is not unambiguous about the direction of the effect of increased openness on the growth rate. It does not predict that greater openness will unambiguously raise the growth rate. This is because the "new" growth theories also show that growth can be lowered by increased foreign competition or it can be increased by import protection if protection promotes investment in the research-intensive sectors of the relevant country. Thus, under the "new" growth literature, the direction of the openness-growth relationship is not a theoretical given: it is an open question for empirical investigation.

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[8]Though early studies of efficiency gains from removal of trade barriers found them to be small, being in the range of 1 to 2.5 percent of GDP. This is because those estimates did not recognize gains other than static allocative efficiency gains. Available estimates (Bergsman 1974, Grais et al 1984) finds the total gains from increased openness to be a multiple of the early estimates. Bergsman (1974) measured the conventional production cost, a technical inefficiency cost and a monopoly cost for four countries in Asia and Latin America (Pakistan, Philippines, Brazil, Mexico) and found it to range between 4% and 7% of GDP, of which the conventional production cost was less than 1% of GDP. Grais et al (1984) obtain much higher percentages.

Empirical Basis

Empirical research have generally found a positive relationship between greater openness and economic performance. The early cross-country work relied on changes in export growth or in export shares as a proxy for changes in openness (See Michalopoulcs and Jay 1972, Michaely 1977, Tyler 1981, Feder 1983,1986, Balassa 197ዶ Heller and Porter 1978, Kavoussi 1984, Ram 1985, 1987, Otani and Villanueva 1990, Moschos 1991). Most of these studies use the aggregate production function framework to analyze whether differences in export performance explain cross-country differences in economic growth after controlling for growth in capital stock and labor. All of them confirm a positive openness performance link for developing countries.

However, several of these studies (Michaely 1977, Tyler 1981, Kavoussi 1984, Feder 1986, Edwards 1989) have argued that a positive openness-performance relationship is not relevant to low income countries because such a link may not operate below a threshold level of development. For example Michaely (1977) claims that "the positive association of the economy's growth rate with the growth of the export share (which is the index of openness) appears to be particularly strong among the more developed countries, and not to exist at all among the least developed .... This seems to indicate that growth is affected by export performance only once countries achieve some minimum level of development." Feder (1986) and Edwards (1989) makes similar claims.[9]

Recent studies have used more appropriate price and policy-based measures of openness (Balassa 1985, Edwards 1991, Alam 1991, Bhalla and Lau, 1991, Dollar 1991a, 1991b, Harrison 1991, Lopez 1991, Thomas et al 1991, Thomas, Halevi and Stanton 1992). Though these studies use different measures, they all confirm the positive openness-performance relationship for developing countries.

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[9]Helleiner (1986) finds "no statistically significant link between the change in export share of GDP and growth" in a study of low income countries heavily weighted toward Sub-Saharan Africa.

Virtually all these cross-country studies, both early and recent, have three common characteristics. First these studies cover developing countries of all regions, the number varying between 35 and 95 countries. Except Dollar (1991b), none examine regional variations. Second, except Bhalla and Lau (1991) and Harrison (1991), all rely on cross-sectional period averages of time series data. Third, except Harrison (1991), all studies use a single measure of openness to test whether openness explains cross-country differences in economic performance. This paper seeks to depart from those studies in the same three respects: it focuses on Sub-Saharan Africa, uses annual time series cross section data and tests several measures of openness.

III. MEASURING OPENNESS

Though there is reasonable consensus on measuring aggregate economic performance, there is no such consensus on measuring openness. Changes in the level or in the growth rate of either real gross domestic product (GDP) or per capita real gross domestic product are commonly used as indicators of changes in performance. On the other hand no openness measure is free of methodological problems[10] and several different measures commonly used are found to be not highly correlated (Pritchett 1990).

The are many reasons why summary measures of openness are difficult to devise. First, the tariff is only one form of restriction on openness and often this is not the most important one.[11] Second, the variety of commonly used nontariff import barriers is large. They include restrictive licensing, quotas, outright prohibitions, controls on foreign exchange transactions, advance import deposits, customs valuation pricing and more. Quantifying the effects of such restrictions on a common scale is extremely difficult. Price comparisons are problematic but even when they are appropriately implemented, they may capture distortions from both import barriers and domestic market imperfections. Third, even if tariffs were the only trade intervention used, one could measure at best weighted averages of varying tariff rates across commodities. These would provide a poor idea of the marginal protective effect of the tariff structure. Also because of differing elasticities of demand and supply across goods, aggregate duty rates or total tariff revenue as a percent of imports are a poor measure of the degree of restrictiveness. Fourth, in the presence of intermediate goods the protective effect of a tariff structure depends on tariff rates on final goods relative to those on

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[10]Even the use of direct price comparisons made possible by the work of Summers and Heston (1988) suffers from small sample problem and from the fact that price distortions may reflect both trade distortions and domestic market distortions.

[11]In fact, for countries in Sub-Saharan Africa, non-tariff barriers like exchange controls and licensing dominate.

intermediate inputs. Fifth, the welfare cost of tariff rates and other impediments to trade depends on their general equilibrium effects and the market structure.[12]

In the literature on cross-country analysis of the openness-performance link, two broad strategies have been used to measure openness. One strategy is to use a proximate effect of openness as a proxy for openness itself, e.g. export performance in terms of export growth rates, or GDP shares of export (Michaely 1977, Balassa 1978, 1985, Tyler 1981, Kavoussi 1984, Ram 1985, 1987, Fosu 1990 Moschos 1991) or actual GDP shares of total trade (Quah and Rauch, 1990, Levine and Renelt, 1992). This amounts to assuming, without rigorous testing, a linear relationship between greater openness and larger export or trade share or faster export or trade growth. On this basis, a positive export-GDP or trade-GDP link implies a positive openness-performance relationship. However, such a proxy begs the question of which policies, trade and others, best promote exports or total trade.

The other strategy, which is probably more appropriate, is to devise a summary price-based and policy-based measure of changes in the incentive regime for tradables. This strategy has yielded both relatively more subjective and or more objective measures of openness. The subjective measures of the incentive regime for tradables depend more on judgement about the nature of the trade regime and about changes in that regime. This judgment is based on levels and movements of several trade policy instruments. Such measures include the trade-orientation index (World Bank 1987, Alam 1991), the index of liberalization (Choksi et al 1991, Phillips and Havrylyshyn 1990) and the trade liberalization index (Halevi, 1989, Thomas et al 1991, Thomas, Halevi and Stanton, 1992).[13]

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[12]For example, if substitution possibilities are moderate, then the welfare costs of distortions will be small. Similarly, restricted trade leads to imperfect competition, which may impose substantial economic costs.

[13]Though it is difficult to compare in such measures across countries, they are more likely to be comparable across countries when judgement on changes in openness is exercised by the same individuals for all countries (e.g. Thomas et al 1991) rather than when it is exercised by different individuals for different countries (e.g. Choksi et al 1991).

The more objective policy-based measures (e.g. Leamer 1988, Edwards 1989, Dollar 1991a, Syrquin & Chenery 1989, Kaufman 1991) attempt to capture the net effect of various trade policies on the incentive regime for tradables. There are five such policy-based measures of openness that have been used in various cross-country studies: the Leamer Index (Leamer 1988, Edwards 1989), the residual trade share index (Syrquin and Chenery 1989), the purchasing power parity index of outward orientation (Dollar 1991a), the black market exchange rate premium (Edwards 1989, Kaufman 1991) and the index of relative price of tradables (Bhalla and Lau 1991).

Most of these summary price or policy-based measures of openness are not available for Sub-Saharan African countries. The Leamer index[14], the Syrquin-Chenery trade shares[15] index and the Bhalla-Lau index are not available for more than eight SSA countries for a sufficiently long period. Only two are readily available over time for the countries of Sub-Saharan Africa: Dollar's purchasing-power parity based index of outward orientation and the black-market premium are available for around twenty-seven Sub-Saharan African countries. The Halevi-Thomas index of trade liberalization is available for around fifteen SSA countries for the period 1978-88.

Choice of Openness Measure

This paper uses four measures of openness: the black market premium, the Dollar index of outward orientation, the Halevi-Thomas index of trade liberalization, and the actual trade share. The

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[14]Leamer(1988) uses a Hecksher-Ohlin model with nine factors (i.e.capital, three types of labor, four types of land and oil) to estimate net trade flows and trade intensity ratios for 183 commodities at the 3 digit SITC level for 53 countries, including 30 developing countries. The Leamer index is based on the difference between the actual trade share of a country and the trade share that is predicted by the model. Though this approach is quite promising, its greatest limitation for purposes of this paper is the fact that it is available for only one year (i.e. 1982) and for only three Sub-Saharan African countries.

[15]This trade-share measure is based on the deviation of the actual from the predicted trade shares, where the predicted values are obtained from a regression of trade shares on different relevant variables like country size, capital inflows and so on (Syrquin and Chenery 1989) and is also not available overtime.

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choice of these measures is dictated mainly by their availability for a sufficient number of Sub-Saharan African countries over a sufficiently long period.

The black market or the parallel market premium reflects the excess demand for tradables and for foreign assets that is not satisfied by the official foreign exchange market. The greater the controls on the use of official foreign exchange, the larger is the premium on the "black" or parallel market exchange rate because the larger is the excess demand for tradables. It is thus directly related to changes in trade restriction or in openness (May 1982).

One of the two caveats to this relationship weakens it as a proxy for openness. These caveats arise from the fact that demand for tradables is also a function of aggregate demand pressure in the economy and demand for foreign assets is also a function of the degree of political instability. The first implies that the premium on the "black" market for foreign exchange is affected by changes in aggregate demand in addition to changes in trade restrictions. Thus the premium may rise, if macroeconomic imbalances raise aggregate demand, even when there is no rise in import or export restrictions. Fortunately this does not detract from the usefulness of the "premium" as a measure of openness. Increases in aggregate demand with no change in trade restrictions makes the same trade regime more restrictive and thus less open. Domestic prices of import-substitutes will rise and the anti-export bias of the regime will worsen.

On the other hand, when the "premium" changes because the portfolio excess demand for foreign assets is affected by political "news" or internal civil disturbances it does undermine the usefulness of the "premium" as a measure of openness. In short, the "premium" may change due to speculation, even when there is no change in the degree of restrictiveness of the trade regime i.e. in openness.

The Halevi-Thomas index of trade liberalization is based on a subjective assessment of two aspects of the trade reform programs carried out under World Bank's structural and sectoral adjustment loans between 1978 and 1989. The two aspects are: the intensity of trade reform

proposals in the loans and the extent of implementation of those reform proposals by the recipient countries.[16] The countries on which implementation data was available were each assigned a rank as to the level of their proposed reforms. In addition, the degree of compliance with reform proposals was assigned to one of the five levels of implementation: 80%, 60%, 40%, 20%, and 0% of proposed reforms. Zero implementation generally imply near complete reversals of or back-tracking on trade reform. The product of these two series generates the index of trade liberalization, or, in other words, a measure of the change in openness of the economy.[17]

If the proposals were strong and 80 percent of the proposals were implemented, then the Halevi-Thomas index would attain its highest level. One problem with this measure is that the <u>initial</u> trade regime is not incorporated in the measure. Though weak reform proposals with 80 percent compliance would suggest low changes in openness, the reform proposals are weak because the economy may be very open initially. This problem is however likely to be of limited significance, since virtually all sample countries began their reform efforts in 1978 or after, from a highly restrictive trade regime.

The purchasing-power-parity based index of outward orientation index (Dollar 1991a) is based on prices for a common basket of consumption goods collected by Summers and Heston (1988) for the same set of benchmark countries. To obtain price of traded goods, the relative price of consumption goods[18] is regressed on variables like urbanization, GDP per capita (proxy for country's

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[16]This was developed on the basis of detailed information about trade reform proposals from Presidents' Reports on loans and about actual implementation of changes in import tariffs, bans, and licensing and changes in export taxes and restrictions from project completion reports and country economic reports (Halevi 1990, Thomas et. al. 1991).

[17]The intensity of trade reform proposals is categorized as weak(=1), moderate (=2) and strong (=3) while the degree of implementation is categorized as 80% (=0.8), 60% (=0.6), 40% (=0.4), 20% (=0.2) and 0%. The product of the two is the index of change in openness.

[18]This relative price is (RP) a modified version of the Summers and Heston (1988) definition of relative price. The latter is: $RP = CP_i/P_{u.s.} \times 100$ while the former is: $RP = ep_i/P_{DC} \times 100$ where $P_{u.s.}$ is the price of consumption goods in the USA and P_{DC} is the average price in 72 developing countries.

endowment) and an interactive term of the two. The residual is the percentage deviation (D_{ti}) of the traded goods prices in that country from the average price in developing countries. The outward orientation index is the weighted average of the residual (D_i) and its standard deviation (δ_i)[19].

This index suffers from the problem that it captures distortions from all sources, including trade restrictions. While a reduction in price distortion will raise the outward orientation index, that reduction may reflect reductions in domestic market imperfections instead of reductions in interventions. The index cannot distinguish between them.

The fourth measure used in this study is the simplest available measure of openness. It is based on actual trade performance as reflected in the unadjusted share of total trade in GDP. This measure is flawed in the same way that the use of export performance as a proxy for openness is deficient. The use of this measure implicitly assumes that the higher this share the more open is the economy relative to other economies. However, this may not be the case because trade flows are affected by other factors like country size and/or foreign capital flows (e.g. large countries have small trade shares),[20] as well as by terms of trade changes. Yet, it is a commonly used measure in cross-country growth regressions (Levine and Renelt 1991, Quah and Rauch 1990, Harrison 1991).

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[19]The index is expressed as follows: $D\$I = \dfrac{a_1 D_i + a_2 \delta_i}{100}$ where a_1 and a_2 are estimated coefficients of regression of GDP growth on D_i and δ_i.

[20]The adjusted trade shares seek to overcome this problem in various ways (Syrquin and Chenery 1989, Leamer 1988).

IV. ESTIMATING OPENNESS-PERFORMANCE RELATIONSHIP

This section develops the estimating equation and reports the estimation results. In line with the existing empirical literature we use the augmented production function approach to estimate the openness-performance relationship for Sub-Saharan Africa. We use two estimation methods: the traditional cross-section estimation using period-average and period change data and the fixed-effect estimation using pooled annual data with country dummies to capture unobserved country-specific differences. The estimations are carried out for all Sub-Saharan African countries on which data is available i.e., 27 countries. The regressions on Sub-Saharan African are subjected to sensitivity tests by adding a macro-economic policy variable in the regression, as well as compared with results on non-Sub-Saharan Africa.

Framework for Estimation

We assume a country's production to be characterized by the following aggregate production function.

$$Q = Q\{(K, L); A\} \qquad (1)$$

where Q is real aggregate output and K and L denote capital and labor inputs respectively. "A" is the productivity or efficiency parameter which for the purpose of this study is assumed to be a function of the trade regime (TP) or the degree of openness. Thus

$$Q = Q\{(K,L);A(TP)\} \quad \text{since } A = A(TP) \qquad (2)$$

Thus output growth is a function of the capital stock and the labor force. The policy variable, which in this case is a measure of openness (TP), is also expected to contribute to output. On the basis of earlier discussion, equation (3) shows that the level of real aggregate output (Q) can be higher with the same capital and labor inputs if productivity is higher because of a greater degree of openness (i.e. $Q_{TP} > 0$ where Q_{TP} is the partial derivative).

To express the equation in terms of growth rate we differentiate totally to obtain:

$$dQ = Q_k dK + Q_L dL + Q_{TP} dTP \qquad (3)$$

where Q_i is the partial derivative of Q with respect to the its argument in (1). Dividing equation (3) through by Q and rearranging terms, we get:

$$dQ/Q = e_K \, dK/K + e_L \, dL/L + e_{TP} \, dTP/TP \qquad (4)$$

where dQ/Q, dK/K, dL/L, and dTP/TP are the rates of change of output, capital, labor and of trade policy respectively, and e_i is the elasticity of output with respect to the relevant argument in (2). Based on "new" growth theories this equation suggests that the greater the openness of the trade regime the more rapid is growth because of faster adoption and expansion of technology, for given changes in capital stock and labor force.

Estimation Equations

For purposes of estimation we assume a more flexible functional form than is the case in (2) and (4) by allowing a constant term.[21] Thus the two estimation equations used in this paper, expressed in logs, are as follows:

$$\text{Log } Q = B_0 + B_1 \text{ Log } K + B_2 \text{ Log } L + B_3 \text{ Log } TP \qquad (5)$$

and

$$\text{LogDif } Q = C_0 + C_1 \text{LogDif } K + C_2 \text{LogDif } L + C_3 \text{LogDif } TP \qquad (6)$$

where $\text{LogDif } X = (\text{Log } X_t - \text{Log } X_{t-1})$.

The pure cross-section estimations using period-average or period change data apply equations (5) and (6) as shown. The pooled fixed effect estimates based on annual data also use country dummies to capture country-specific differences in economic performance, but are not shown in equations (5) and (6).

Data

The choice of countries and the total number of countries in the regression analysis was dictated wholly by data availability.[22] This relates to limitations on data for physical capital stock and openness measures. The period under study is 1967-87 but since a lot of the trade reforms occurred

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[21]All growth in output may not be captured directly by the arguments of the production function. For example a Hick's neutral technical change not measured directly by the production inputs suggests a non-zero constant term in the production function.

[22]Two of the openness measures were available for a shorter period 1978-87.

in the 1980s, we also estimated the same equations for the shorter sub-period of 1980-87. Though the choice of the terminal year is constrained by the availability of data, it nevertheless covers a longer period, and a substantial part of the 1980s, than the earlier studies.

Data on capital stock, labor, GDP, and different measures of openness was compiled for as many Sub-Saharan African countries as possible for the 1967-87 period. This was obtained from the Supplemental data base[23] of World Development Report 1991. Data on real gross domestic product (GDP) is based on national accounts data in constant 1980 US dollars, with rate of growth of GDP calculated as log differences of real GDP.

Though we have used the largest sample of Sub-Saharan African countries for which all necessary data is available (i.e. twenty-seven, see Table 6) questions may be raised about the homogeneity of this sample of Sub-Saharan African countries. For example, it has been argued that countries like Ethiopia, Liberia, Sudan, Rwanda, Uganda, and Zaire have been characterized by protracted civil wars and internal disturbances and thus their economic performance may not be related to economic policy. Similarly, CFA countries' performance is affected by the fact that they have not had the use of a key policy instrument for improving incentives for tradables (i.e. nominal exchange rate adjustment) which was available to other countries.[24] Of our sample, thirteen countries belong to these two categories.[25]

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[23]The data on physical capital stock is due to Bhalla and Lau (1991) and is calculated from data on annual fixed investment for 1960-87 in constant 1980 US dollars. Capital was accumulated using the perpetual inventory method and a 5% depreciation was assumed to derive the capital stock series in the data base.

[24]It has been argued that their growth performance over the 1980s, has been more dismal than others in SSA (Devarajan and de Melo 1990) and worse than even CFA performance in the 1970s, in part because of their inability to adjust the nominal exchange rate in the face of large external shocks.

[25]These exclusions can reduce the sample of 27 to only 12 Sub-Saharan African countries, a set which is surprisingly similar to the group of SSA countries deemed to be in the "adjustment phase" by Hussain (1992).

Fortunately, this lack of homogeneity in our sample is not a problem in our fixed effect regressions because we use country dummies which capture unobserved country-specific differences in economic performance.[26]

Estimation Results

The fixed effect estimation results show that increased openness has had a favorable impact on economic performance of Sub-Saharan Africa.[27] Differences in openness account for differences in cross-country economic performance. What is even more interesting is that the "coefficients" of openness for Sub-Saharan Africa are not significantly different from those for Non-Sub-Saharan Africa in most cases. The results on openness are also surprising robust to different sample sizes and different measures. All four measures are significant and have the right sign. In fact the results also hold when we control for macro-economic policy.

Cross Section Estimation

Cross-section and fixed effect equations are estimated in both "level" and "difference" forms involving GDP level and GDP growth rate as performance variables. Cross-section estimates use period-average data for "level" and period-growth data for "change," the latter being the difference between the base and terminal years of the period; the other uses year-to-year difference.

The cross-section estimates using period-average data, which is in the tradition of most of the existing literature, yield poor results for Sub-Saharan Africa (SSA). Period averages were computed

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[26]This is also confirmed by the similarity of the coefficient estimates from regressions using the 12 countries (not reported in the paper) and that using the whole sample.

[27]The openness variable performs poorly in the traditional cross-section equations using period-average data.

for 1967-87 and 1981-87 for each variable.[28] Table 1 estimates for "level" from shows that only one measure of openness is significant at 10% level for Sub-Saharan Africa for the period 1967-87. Though cross-section equations using period-difference data (i.e.equation 6) can be expected to capture the total change in openness over the period better than the period average, the coefficients on openness shown in Table 2 are insignificant.

The weakness of the openness-performance link in the cross-section results is perhaps not surprising.[29] Most developing countries, including those in Sub-Saharan Africa experienced large annual swings in commercial and exchange rate policies over the last two decades, which is not well captured by any measure of change averaged over such long periods. The average degree of openness for a period of several decades or even the average change in openness over such a long period hides significant variations in individual country policy and performance.

Fixed Effect Estimation

The two equations (i.e. 5 and 6) are re-estimated using annual pooled data for the same variables. To control for unobserved country-specific differences affecting the level or growth rate of GDP, we included a dummy variable for each country. Tables 3 and 4 report estimates from regressions using pooled annual "level" data and annual "change" data respectively.

The fixed effect results for the "level" form in Table 3 shows that all four measures of openness are significant at the 1 % level for the period 1967-87. Except for the "premium" measure of openness, the same is true for the sub-period 1981-87. Thus after controlling for changes in capital and labor inputs, increased openness accounts for better economic performance in Sub-

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[28]The Halevi-Thomas index and the Dollar index are available for shorter periods i.e. 1978 -87 and 1977-87 respectively, than the other two measures.

[29]Harrison (1991) also finds considerably poorer estimates of openness-performance links in the cross-section estimates relative to the fixed-effect estimates.

Saharan African countries. The openness coefficients for trade share index is the largest and that for the black market premium is the smallest. On one measure a 10 percent increase in openness leads to around 5 percent rise in output, whereas on another measure a 10% rise generates only 1.5 percent rise in output. In view of the problems with measures of openness (Pritchett 1990) this range of estimates is probably to be expected.

The fixed effect estimates for the equation in "difference" form show that the GDP growth rate is also positively affected by increased openness as Table 4 confirms. Both the measures, trade share and the black market premium are significant for the period 1967-87;[30] only the former is significant for 1981-87.

As for the other variables in the regression, all significant coefficients for capital stock and labor have the right signs. The unobserved country-specific differences subsumed in country dummies (not shown in Tables) have a significant effect on their performance as well. Thus their absence from the regression would create an omitted variables problem.

Sensitivity to Inclusion of Fiscal Policy Variable

In general coefficient estimates from cross country regressions of economic performance are found to be highly sensitive to omitted policy variables (Levine and Renelt 1992)[31] This is perhaps not surprising. If more prudent fiscal policies tend to accompany increases in openness[32], then excluding fiscal variables from our regressions may have lead to mistakenly identifying the gains in

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[30]The Halevi-Thomas measure and the Dollar index were not significant, in part because there was very little annual movement in those discrete indices.

[31]Levine and Renalt (1992) find that the positive association between trade shares and GDP growth disappear in cross-section of countries that included government consumption: Harrison (1991) found the same thing for the trade-share measure of openness; however several other measures remained robust.

[32]Trade reforms and fiscal adjustment have often accompanied each other under World Bank adjustment loans (see Thomas, Matin, Nash 1990).

economic performance to increased openness instead of to more prudent fiscal policy i.e. the omitted variable bias. In that case the inclusion of the fiscal variable in our cross-country regression could render the openness measure statistically insignificant.

Sensitivity tests suggest that all the estimated significant coefficients on openness remain significant after inclusion of a fiscal variable. We re-estimated the fixed effect equations after adding a fiscal policy term e.g. GDP share of government consumption.[33] Table 7 reports the estimated coefficients for measures of openness and for the fiscal policy variable. All significant coefficients on openness continue to remain significant in both the "level" and the "difference" form of the equations for the period 1967-87. In addition, except for the coefficient on the black market premium measure, all other coefficient estimates are not significantly different in regressions with and without the fiscal policy variable. The same is true for the shorter period (1981-87), except for the Halevi-Thomas measure, which become insignificant when the fiscal variable is included.

Thus the estimated positive openness-performance relationship found for Sub-Saharan Africa is surprisingly robust to sample periods, to different measures of openness and to the inclusion of fiscal policy variable. However, it appears that prudent fiscal policy i.e. decline in the GDP share of government consumption has a significant positive effect on economic performance of Sub-Saharan Africa.[34] This is consistent with the available empirical finding in cross-country regressions in the literature.

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[33]Declining shares of government consumption are generally associated with more prudent fiscal policy, because excessive government consumption affect growth adversely.

[34]In fact the inclusion of this fiscal variable improves the explanatory power of cross-country regressions.

Comparison With Non-Sub-Saharan Africa

The openness-economic performance relationship in countries of Sub-Saharan Africa are also found to be comparable to the relationship estimated for countries of non-Sub-Saharan Africa (Tables 8 to 11). The fixed effect results for Non-Sub-Saharan Africa is also more significant than the corresponding cross-section results (compare Tables 10 and 11 vs. 8 and 9). For this group too, the coefficients for the trade share measure is the largest and that on the black market premium is the smallest.

Though most of the estimated coefficient on a given measure of openness (Dollar index is the exception) for non-SSA group is higher, they are statistically not significantly different. Only three of the openness coefficients for non-SSA are significantly higher than for Sub-Saharan Africa. This is consistent with some of the earlier cross-country findings (Kavoussi 1984, Ram 1985), where the openness coefficient for low income countries were smaller than that for non-low income countries.

V. CONCLUSIONS

Though the paper does not delve empirically into the exact mechanisms and processes through which openness affects economic performance in Sub-Saharan Africa, it does provide persuasive evidence that differences in openness (both its level and change) do account for cross country differences in economic performance of countries in that region. The results indicate that countries in the Sub-Saharan African region which enhanced the openness of their trade regimes have, on average, tended to perform better than those that have not. This cross-country evidence, developed in this paper, on a positive openness-performance relationship in Sub-Saharan Africa is surprisingly robust. Our results not only hold across different measures of openness, and different time periods, but also when a macro-economic policy variable is included in the regressions.

What is more surprising is that the estimated openness-performance link in Sub-Saharan Africa is not very different from that in Non-Sub-Saharan Africa over the period studies. Most of the coefficients on openness are statistically not significantly different for the two groups. Where they are different, the coefficient for Non-Sub-Saharan Africa is greater.

Further empirical research on the openness-performance relationship for Sub-Saharan Africa could proceed along the following two directions. First, more aggregative cross-country aggregative analysis of openness-performance link should be carried out, by developing other measures of openness. Second, more microeconomic analysis of the openness-performance relationship should be undertaken. Aggregative cross-country work cannot sharply discriminate among different hypotheses about the mechanisms and processes through which openness affects economic performance, as well as about the non-trade policies or factors that impede or facilitate those mechanisms and processes.

TABLE 1

CROSS SECTION ESTIMATION USING PERIOD AVERAGE DATA

Sub-Saharan Africa

$$(\text{Log GDP} = b_0 + b_1 \log K + b_2 \log L + b_3 \log^{TP})$$

	1967-87				1981-87			
	(1)	*(2)*	*(3)*	*(4)*	*(1)*	*(2)*	*(3)*	*(4)*
Trade Shares (TP1)	-1.63 (-1.40)	-	-	-	-1.64 (-1.40)	-		-
Black market Premium (TP2)	-	0.001 (0.56)	-	-	-	0.001 (0.56)	-	-
HT Index (TP3)	-	-	0.23 (1.40)	-	-	-	0.19 (1.36)	-
D$ Index (TP4)	-	-	-	0.09* (1.72)	-	-	-	1.09 (1.65)
Capital Stock (K)	0.84*** (9.40)	0.76*** (11.2)	0.72*** (7.60)	0.74*** (12.9)	0.84*** (9.39)	0.77*** (11.2)	0.67** (6.65)	0.78*** (8.11)
Labor (L)	0.17 (1.34)	0.30 (4.12)	0.47 (4.17)	0.33 (5.42)	0.17 (1.34)	0.30 (4.13)	0.41 (2.34)	0.19 (1.45)
N	27	27	15	26	27	26	15	26
Countries (No.)	27	27	15	26	27	26	15	26
$\bar{R}2$	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.93

Note: Intercept results are not reported and t-statistics are reported in parenthesis.

TABLE 2

CROSS-SECTION ESTIMATION USING "PERIOD DIFFERENCE" DATA

Sub-Saharan Africa

(Log dif GDP = C_0 + C_1 log dif K + C_2 log dif C + C_3 log dif TP)

	1967-87			1981-87		
	(1)	(2)	(3)	(1)	(2)	(3)
Trade Shares	-0.09 (-0.65)	-	-	0.016 (0.16)	-	-
Black market Premium	-	-0.022 (-0.95)	-	-	-0.009 (-0.67)	-
HT Index	-	-	0.17 (1.02)	-	-	0.09 (1.34)
Capital Stock (K)	0.37*** (3.29)	0.39*** (3.82)	0.34** (2.48)	0.36** (2.81)	0.29** (2.32)	0.36** (2.07)
Labor (L)	0.15*** (0.32)	0.11 (0.26)	0.96 (0.13)	0.29 (0.46)	0.26*** (0.42)	1.23 (1.23)
N	25	25	15	25	25	14
Countries (No.)	25	25	15	25	25	14
$\bar{R}2$	0.249	0.339	0.318	0.172	0.10	0.176

Note: Country dummy results are not reported; t-statistics are shown in parenthesis.

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TABLE 3

FIXED EFFECT ESTIMATION USING POOLED ANNUAL LEVEL DATA

Sub-Saharan Africa

(Log GDP $= b_1 \log K + b_2 \log L + b_3 \log TP + b_4$ Dummies)

	1967-87				1981-87			
	(1)	*(2)*	*(3)*	*(4)*	*(1)*	*(2)*	*(3)*	*(4)*
Trade Shares (TP1)	0.52*** (4.43)	-	-	-	0.40*** (3.69)	-	-	-
Black market Premium(TP2)	-	-0.001*** (-3.0)	-	-	-	-0.001 (-1.47)	-	-
HT Index (TP3)	-	-	0.02** (1.95)	-	-	-	0.03*** (2.80)	-
D$ Index (TP4)	-	-	-	0.15*** (18.1)	-	-	-	0.14*** (10.5)
Capital Stock (K)	0.40*** (17.1)	0.37*** (16.8)	0.49*** (6.13)	0.44*** (19.4)	0.44*** (7.82)	0.40*** (6.99)	0.50*** (6.4)	0.42*** (7.36)
Labor (L)	0.34*** (5.06)	0.27*** (4.41)	0.46*** (5.09)	0.25*** (3.9)	0.35*** (3.56)	0.36*** (3.72)	0.52*** (5.4)	0.34*** (3.35)
N	558	472	122	546	180	182	97	182
Countries (No.)	27	26	16	25	27	26	16	25
$\bar{R}2$	0.987	0.991	0.998	0.987	0.997	0.997	0.999	0.998

Note: Country dummy results are not reported and t-statistics are in parenthesis.

TABLE 4

FIXED EFFECT ESTIMATION USING POOLED ANNUAL DIFFERENCES

Sub-Saharan Africa

(Log dif GDP = C_1 log dif K + C_2 log dif L + C_3 log dif TP + C_4 Dummies)

	1967-87		1981-87	
	(1)	*(2)*	*(1)*	*(2)*
Trade Shares (TP1)	0.02* (1.64)	-	0.06*** (3.05)	-
Black market Premium(TP2)	-	-0.004** (-2.00)	-	-0.002 (-0.77)
Capital Stock (K)	0.51*** (8.67)	0.48*** (6.18)	0.55*** (3.72)	0.21 (1.39)
Labor (L)	1.08* (1.67)	0.93 (1.05)	3.81 (1.50)	0.68 (1.39)
N	558	335	182	144
Countries (No)	27	25	27	20
$\bar{R}2$	0.146	0.122	0.202	0.018

TABLE 5

IMPACT OF OPENNESS IN SSA: A SYNTHESIS

(1967-87)

	Openness Variable	Fixed Effect Estimation		Cross Section Estimation	
		Level	Difference	Level	Difference
1.	Trade Shares	>0***	>0***	<0	<0
2.	Black Market[b] Premium	>0***	>0***	<0	>0
3.	Trade Liberalization Index (HT Index)	>0**	>0	>0	>0
4.	Outward Orientation Index (D $ Index)	>0***	>0	>0*	

***   Indicates significant at 1 percent level; ****** indicates significant at 5 percent level; ***** indicates significant at 10 percent level.

Notes:

a.   Pooled annual data regressions include country dummies.

b.   Since ">0" implies more openness (less distortion) has a positive effect on growth, therefore for black market premium the table shows "70" when the estimates show that a higher level of premium or distortion affects performance negatively.

TABLE 6

COUNTRIES INCLUDED IN THE REGRESSIONS

Sub-Saharan Africa

1.	Burundi
2.	Benin
3.	Central African Republic
4.	Cote d'Ivoire
5.	Cameroon
6.	Congo
7.	Ethiopia
8.	Gabon
9.	Ghana
10.	Burkina Faso
11.	Kenya
12.	Liberia
13.	Madagascar
14.	Mali
15.	Mauritania
16.	Mauritius
17.	Malawi
18.	Nigeria
19.	Rwanda
20.	Sudan
21.	Senegal
22.	Togo
23.	Tanzania
24.	Uganda
25.	Zaire
26.	Zambia
27.	Zimbabwe

Non-Sub-Saharan Africa

1.	Argentina
2.	Bangladesh
3.	Bolivia
4.	Brazil
5.	Chile
6.	China
7.	Colombia
8.	Costa Rica
9.	Algeria
10.	Egypt
11.	Guatemala
12.	Haiti
13.	Hungary
14.	Indonesia
15.	India
16.	Jamaica
17.	South Korea
18.	Sri Lanka
19.	Morocco
20.	Mexico
21.	Malaysia
22.	Nicaragua
23.	Pakistan
24.	Panama
25.	Peru
26.	Philippines
27.	El Salvador
28.	Syria
29.	Thailand
30.	Turkey
31.	Venezuela
32.	Yugoslavia

TABLE 7

SENSITIVITY OF OPENNESS-PERFORMANCE ESTIMATES TO FISCAL POLICY[1]

Measures	Annual Level Data 1967-87		Annual Change Data 1967-87		Annual Level Data 1981-87		Annual Change Data 1981-87	
	Openness	Gov't Consumption	Openness	Gov't Consumption	Openness	Gov't Consumption	Openness	Gov't Consumption
Trade Shares	0.57*** (4.72)	-0.88*** (-5.24)	0.03* (1.83)	-0.08*** (-4.41)	-0.41*** (3.73)	0.11 (0.49)	0.07*** (3.35)	-0.03 (-0.77)
Black Market Premium	-0.0001** (-2.55)	-0.63*** (-3.42)	-0.005** (-2.12)	-0.06** (2.35)	-0.00001 (0.76)	0.29 (1.17)	-0.0001 (-0.03)	-0.03 (-0.70)
HT Index	0.03** (1.93)	0.43 (1.43)			-0.004 (-0.35)	0.06 (0.17)		
D $ Index	0.13*** (15.82)	0.96** (5.49)			-0.12** (8.41)	0.09 (0.39)		

Note:1/   Fiscal policy is proxied by the times Series Data on GDP share of government consumption which was available for 23 countries only. These regressions thus involve a slightly smaller sample than those in Tables 1 to 4, but their adjusted R-squares improve with the inclusion of this variable. T-statistics are in parenthesis.

TABLE 8

CROSS-SECTION ESTIMATION USING PERIOD AVERAGE DATA

Non-Sub-Saharan African Countries

$$(\text{Log GDP} = b_0 + b_1 \log k + b_2 \log L + b_3 \log TP)$$

	1967-87				1981-87			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Trade shares	0.79* (1.68)	.	.	.	-0.62 (-1.61)	.	.	.
Black market premium	.	-0.001 (-0.08)	.	.	.	-0.001 (-0.45)	.	.
HT Index	.	.	0.05 (1.09)	.	.	.	0.06 (1.24)	.
DS Index	.	.	.	0.03 (0.93)	.	.	.	0.05 (1.40)
Capital Stock	0.81*** (21.1)	0.81*** (22.7)	0.91*** (14.5)	0.83*** (21.8)	0.84*** (24.7)	0.83*** (23.5)	0.90*** (13.5)	0.86*** (23.8)
Labor	0.12*** (3.30)	0.15*** (4.47)	0.14*** (2.76)	0.15*** (4.09)	0.14*** (4.04)	0.16*** (4.68)	0.15*** (2.65)	0.15*** (4.05)
N	32	32	30	30	32	32	30	30
Countries (No.)	32	32	30	30	32	32	30	30
$\bar{R}2$	0.983	0.982	0.980	0.983	0.986	0.985	0.979	0.987

*Note: Intercept results are not reported; t-statistics are shown in parenthesis.

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TABLE 9

CROSS SECTION ESTIMATION USING "PERIOD DIFFERENCE" DATA

Non Sub-Saharan African Countries

$$(\text{Log Dif GDP} = C_0 + C_1 \log \text{dif K} + C_2 \log \text{dif L} + C_3 \log \text{dif TP})$$

	1967-87				1981-87			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Trade Shares (TP1)	0.14** (2.41)	-	-	-	0.06 (1.77)	-	-	-
Black market Premium	-	-0.02 (-1.21)	-	-	-	-0.02 (-1.50)	-	-
HT Index	-	°	-0.20 -(1.98)	-	-	-	-0.07 (-0.80)	-
Capital Stock	0.57*** (6.47)	0.69 (7.19)	0.62*** (8.25)	-	0.70*** (7.02)	0.80*** (7.08)	0.62 (3.56)	-
Labor (L)	0.30 (1.07)	0.13 (0.38)	0.33 (0.96)	-	0.16** (2.17)	0.07 (0.77)	-0.13 (-0.12)	-
N	29	24	16	-	31	26	16	-
Countries (No.)	29	24	16	-	31	26	16	-
$\bar{R}2$	0.721	0.700	0.848	-	0.857	0.868	0.472	-

Note: Intercept results are not reported; t-statistics are shown in parenthesis.

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TABLE 10

FIXED EFFECT ESTIMATION USING POOLED ANNUAL LEVEL DATA

Non-Sub-Saharan African Countries

(Log GDP = b_1 log K + b_2 log L + b_3 log TP + b_o Dummies)

	1967-87				1981-87			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Trade Shares (TP1)	0.54*** (6.12)	-	-	-	0.36*** (3.52)			-
Black market Premium (TP2)	-	-0.0001*** (-3.96)	-	-	-	-0.0001 (-0.92)	-	-
HT Index (TP3)	-	-	0.01 (1.18)	-	-	-	0.013 (1.17)	-
DS Index (TP4)	-	-	-	0.19*** (18.8)	-	-	-	0.23*** (12.1)
Capital Stock (K)	0.53*** (35.1)	0.57*** (41.0)	0.71*** (10.55)	0.59*** (21.6)	0.67*** (13.99)	0.68*** (13.5)	0.71*** (9.43)	0.67*** (10.02)
Labor (L)	0.21*** (5.83)	0.17*** (4.87)	-0.07 (-0.46)	-0.09 (-1.18)	0.05 (0.45)	-0.03 (-0.34)	0.02 (0.129)	-0.35 (-2.43)
N	661	658	135	364	221	224	108	140
Countries (No.)	32	32	16	27	32	32	16	27
$\bar{R}2$	0.996	0.995	0.998	0.997	0.999	0.999	0.998	0.999

TABLE 11

FIXED EFFECT ESTIMATION USING POOLED ANNUAL DIFFERENCES

Non-Sub-Saharan African Countries

Log dif GDP = c_1 log dif k + c_2 log dif L + c_3 log dif TP + C_4 Dummies)

	1967-87		1981-87	
	(1)	*(2)*	*(1)*	*(2)*
Trade Shares (TP1)	0.02* (1.92)	-	0.04*** (3.23)	-
Black market Premium(TP2)	-	-0.003** (-2.16)	-	0.0001 (0.03)
Capital Stock (K)	0.65*** (13.52)	0.68*** (12.3)	0.46*** (4.07)	0.50*** (3.99)
Labor (L)	-0.05 (-0.25)	0.11 (0.51)	0.14 (0.54)	0.16 (0.59)
N	628	508	220	189
Countries (No)	32	31	32	30
$\bar{R}2$	0.334	0.338	0.396	0.368

Note: Intercept results are not reported; t-statistics are in parenthesis.

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