ISI AND NEW INDUSTRIAL CONDITIONS IN LATIN AMERICA AND AFRICA

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Abstract

This paper examines the relationship between industrial value added and economic liberalization for a variety of relatively small economies that adopted import-substituting industrialization (ISI) and export led growth in the past. The strong economic performance by some Sub-Saharan African countries in an era of globalization induces inquiry into the contribution of industry to economic growth for a variety of small economies with different political structures and industrial policies. Using cointegration and time series data, this paper finds that industry value added has a long-run relationship with economic liberalization in the case of Ghana, but not for all countries considered.

Keywords: ISI, Input-Substituting Industrialization, Industry, Latin America, Africa
JEL Codes: F15, F54, L16, L78, L98

1. Introduction

This paper examines the relationship between industrial value added and economic liberalization for a variety of relatively small economies that adopted import-substituting industrialization (ISI) and export led growth in the past. The strong economic performance by some Sub-Saharan African countries in an era of globalization induces inquiry into the contribution of industry to economic growth for a variety of small economies with different political structures and industrial policies. Using cointegration and time series data, this paper finds that industry value added has a long-run relationship with economic liberalization in the case of Ghana, but not for all countries considered.

There is a growing interest in the study of economic growth in Sub-Saharan Africa after three decades of political instability and several years of economic stagnation in some countries. While some countries such as Ethiopia, Ghana, Mauritania, and Rwanda are on track to reach many of the millennium development goals, the IMF and World Bank estimate that some others are track to extreme poverty. Invariably, the performance across countries in the continent and elsewhere varies considerably and the new spurt of achievement in the changing global environment warrants inquiry.

While the author is mindful of political changes that are taking place in some of the African countries, special emphasis is placed on industrialization because of earlier commitments to develop industries under the economic theory of import substitution and the recent development of a vibrant service sector. The core objective of this paper is to evaluate the long-run relationship between industry value added (the contribution of industry to growth) and economic liberalization. For a more robust analysis of the subject matter, the methodology of this paper incorporates comparative analyses at the regional and country levels.

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The paper is structured into six parts. The next section provides an overview of the import-substitution literature in its classic form as it was conceived in Latin America. In the following section I review some of the challenges to the successful implementation of ISI in some of the newly high-performing African countries, and to some extent, in comparison with their Latin American counterparts prior to the era of contemporary globalization. In section four I discuss the transforming attributes of globalization as an intermediating section between the classic era and political and economic changes that were brought about by globalization. The methodology of the paper is subsequently presented to estimate the long-run relationship between liberalization and industry value added as well as the net effect of openness and industry value added in the past and a conclusion is provided at the end of the paper. The next section presents the ISI literature.

2. The ISI literature

Import-substituting industrialization (ISI) is an industrial policy for growth that was first popularized in Latin America from the 1930s (at a time when Sub-Saharan African countries were under colonial administration) to the 1960s (Cardoso and Helwege, 1995). The fundamental premise of ISI is based on the concept that countries desiring sustained economic growth should shift from primary production to manufacturing in order to escape from continuous specialization in low-value activities. ISI has been a strategy for industrialization by almost every country in the world at one time or another. Canada, England, France, Germany, Japan, Russia, and the United States all protected their manufacturers against competition from imports after the Industrial Revolution, and at times for extended periods (Perkins et al., 717). However, the concept was popularized as a strategy for industrial growth by the prominent Latin American economist, Raúl Prebisch, in the 1940s (Hirschman, 1968).

The ISI literature can be classified under the following broad headings: (a) the motives for its implementation in Latin America and Africa; (b) its performance relative to export-led growth (ELG); and (c) the adjustments to its initial effects in Latin America and Africa. The motives for the development of ISI in Latin America are somewhat bifurcated and they can be linked to the consequences of the Great Depression. The Depression adversely affected the export and employment potential of the Latin American economies, but there was also to a revulsion against what was perceived as new imperialism—a theory that was reinforced by the prevailing idea of comparative advantage. The depressed global economy and the unsatisfactory post-colonial economic relationship also made the concept of linkages, backward-linkages to be precise; a very attractive proposition for industrial policy because of the idea that domestic manufacturing can spur the reproduction of inputs or intermediates that would otherwise have to be imported.[1] This contributed to stringent restrictions on trade (Rajagopal, 2006).

[1] The creation and viability of new industries based on the output of older ones create forward-linkages. While backward-linkages are intended to minimize imports and strengthen domestic manufacturing of inputs and consumer goods, forward-linkages actually generate export propensities.

The suspicion that foreign economic motives were intended to exploit developing countries gave rise to the dependency theory (*dependencia*) in Latin America—the theory that the economies of former colonial territories and developing countries were designed to produce raw materials, based on their comparative advantage, and outlets for the much more industrialized developed countries. The theory, as it was postulated in the 1950s, argued that the post-colonial economic relationship creates a permanent state of underdevelopment and dependence as profits from investment in the primary sector of developing countries were also repatriated to the parent countries of investment firms.

It is reasonable to conclude that export-propelled growth in Latin America lasted roughly from the middle of the nineteenth century until the Great Depression (Hirschman, 1968), after which ISI became a very popular industrialization strategy in Argentina, Brazil, and Mexico. ISI became attractive to some Sub-Saharan countries, including Ghana, after political independence. Yet, it is not entirely clear whether the theory of ISI provided an ostensible reason for the protraction of authoritarian rule in some developing countries that wholeheartedly embraced it. Indeed, political philosophy and structure ultimately compromised the prospects of successful ISI as it was originally articulated and intended for the Latin American economies.

Economic performance under the classic ISI has been well documented and the central arguments associated with its implementation are summarized in Table 1. The main tools that facilitated the implementation of the old form of ISI were authoritarian rule, protectionism, taxation, and nationalization. Trade protection consists of restrictive trade policies, which include various forms of tariffs and nontariff barriers. These tariffs and internal taxation became essential not only to protect infant industries, but to assist governments to raise funds so that they can subsidize national industries. Of course, savvy investors had the option to relocate their industries in order to create so called “tariff factories” to avoid the payment of tariffs. By 1962 Prebisch noted that tariffs became prohibitively high in Latin America and in some instances up to 500 percent; on average, the highest rate in the world, which deprived the Latin American economies of the anticipated realization of economies of scale (Hirschman, 1968, 2).

The ISI model achieved some positive results; for example, when private capital was inadequate, ISI stimulated public investment, industrial growth, and national income before it ran out of steam in Ghana and Latin America. But as Prebisch noted, downplaying market forces has unsavory consequences. Very apt summary of the consequences of ISI can be found in the work of Cardoso and Helwege. In its classic form, the industrial policy faced three major limitations: (i) overvalued exchange rates and slow export growth; (ii) the diminution of the agricultural sector; and (iii) falling tax revenues from primary exports, which endangered subsidized industrial investment. Falling revenue generated deficits and persistent inflation as a result of the monetization of deficits. The noticeable effect of ISI on the agricultural sector is evidenced by the decline in employment in the agricultural sector from 1930 to 1980 in Argentina, Brazil, Chile, and Mexico. In Mexico for example there was a decline in the sector of about 43 percent, compared to Chile’s 63 percent (Cardo and Helwege, 91). Similar adverse results can be found in the work of Todaro and Smith and Carbaugh.

As a result of the mitigated failures of ISI, comparative studies have focused on the results of ISI relative to export-oriented growth strategies adopted by some South East Asian countries, including the *East Asian Tigers*—Hong Kong, Republic of Korea, Singapore, and Taiwan—and Japan, China, Indonesia, Malaysia, and Thailand—also considered to be high performing Asian economies (World Bank, 1996). To foster competitiveness, the East Asian governments provided competitive climate for private enterprise, kept their economies open to international trade, and sought foreign technology. By so doing they created high rates of investment and human capital (Carbaugh).

The per capita growth rates associated with the competing theories are mixed, but in general World Bank time series data from 1961 to 1979 show that the South East Asian countries out-performed other countries. In effect, the literature reveals that the evidence in favor of export-led growth is inconclusive (Giles and Williams, 2000(a) and (b); Kónya, 2004). In general, the choice of industrial policy from the dichotomous categories of ISI or ELG may be less sustainable because most developing countries have employed both strategies at different points in time with varying degrees of emphasis and success from the 1940s to the 1970s; for example, some Latin American and South-East Asian countries such as Brazil, Chile, and Thailand have pursued ELG (Todaro and Smith).

Some countries such as Ghana, Nigeria, Botswana, Singapore, Japan, and Taiwan have either focused on inward-oriented growth or exports of primary resources or manufactures. By the end of the 1970s, some of the Sub-Saharan African countries like Ghana, Nigeria and Sierra Leone, unequivocally pursued ISI, but technological innovation by the end of the 1970s brought new prospects and opportunities for the countries to make policy adjustments for internal and external balance, without wholeheartedly renouncing ISI.

The empirical essence of this work is to evaluate the relationship between industry value added and economic liberalization for a variety of small economies that embraced ISI and ELG as a result of globalization and new rules. This investigation is carried out by taking a look at the long-run relationship between industrial growth and liberalization and the net effect of past industrial policy and liberalization.

Specific countries for intensive empirical analysis are taken from the Sub-Saharan African and Latin American regions, including: Botswana, Ghana, Nigeria, Sierra Leone, Argentina, Brazil, Chile, and Mexico. The economic performance of some of these countries is also compared to former East Asian miracle countries like Singapore and the Republic of Korea. The countries generally showed a commitment to ISI and/or ELG, but the changing trade regime poses a probative issue about the contribution of industry to growth and the long-run relationship between openness and industry value added for the Sub-Saharan African countries with remarkable growth. The next section takes a look at some of the challenges that once confronted the high-performing Sub-Saharan countries.

3. Impediments to Successful ISI in Sub-Saharan Africa

Recently acclaimed high-performing Sub-Saharan African countries faced formidable challenges just about the time when their South-East Asian counterparts were making rapid progress in the global economy. For the purpose of theoretical analysis, globalization and new rules are allusions to changes that occurred in the post-1980s. As

such, this paper follows periods of globalization as they are delineated in Carbaugh's *International Economics*.[2] The post 1980s is critical for understanding the attributes of contemporary ISI in Table 1 and the ongoing adjustments that are being made in Latin America and Sub-Saharan Africa. These adjustments have been necessitated by new instruments of international trade and external demands for political reforms by supranational organizations.

Why did it take so long for some Sub-Saharan African countries to be included in the league of high-performing countries? A very impulsive and reasonably accurate answer is that political instability and corruption plagued several Sub-Saharan countries for many years. Endogenous reasons for political instability and their consequences have been extensively reported by Sachs and Warner (1995); Collier, (2007); and Lewin, (2011). Generic attributes of political upheaval in the region usually emanate from a diversity of so-called traps and curses—prominent of which is the resource curse and the accompanying Dutch disease—a situation in which local currencies appreciate to unacceptable levels as a result of windfall income from newly discovered natural resource and consumption of non-tradable goods that compromise the ability of other sectors to embrace technological progress and become competitive in the global economy.

Quite apart from the economic implications of windfall profits, the resource curse perpetuates unproductive rent-seeking activities, corruption, and exploitation of ethnic differences, which exacerbated internecine wars and a contagion of military coups—mainly for political autonomy and control over precious resources—the governance curse that was exhibited in Ghana, Sierra Leone and Nigeria (to varying degrees) and for quite some time. Consequently, with the exception of Botswana, a relatively homogenous society, the Sub-Saharan countries experienced episodes of authoritarian rule and detrimental political instability for multiple decades after political independence. Ethnic tension and underdeveloped politics often compounded the adverse economic policies that stymied all opportunities for relatively superior industrial policy and high economic performance.

In general, Sub-Saharan African politics in the post-independence period was generally counterproductive; for example, a series of military coups occurred in Ghana between 1966 and 1981 when Flight Lieutenant Jerry Rawlings seized political power, suspended the constitution, and banned civilian multi-party politics until 1992 when a new constitution legitimized civilian multiparty politics. In Nigeria, a succession of

[2] The first wave of globalization, which was sparked by the introduction of new technologies and reduction in tariffs and transportation costs, occurred between 1870 and 1914. The second wave of discernible globalization occurred between 1945 and 1980, and was marked by trade liberalization and specialization based on comparative advantage. Technological innovation facilitated the shift from sail to steamships and brought about a much more extensive use of the railway system. The second wave of globalization, 1945-1980, was characterized by specialization in manufacturing and agglomeration of industries to attain vertical linkages. The post 1980s witnessed the Internet Revolution, but also countries like China, India and Brazil were integrated into the world markets for manufacturers when international capital flows also became significant (Carbaugh, 4-5).

military coups occurred in 1966 which ultimately culminated in a civil war that lasted from 1967 to 1970. Military dictatorship ensued and lasted for a period of about 9 years and the country returned to democratic rule in 1999. Sierra Leone experienced 4 military coups and 2 abortive attempts between 1967 and 1997 and a decade long civil war between 1991 and 2001. Endogenous political turmoil in Sub-Saharan Africa interfaced with exogenous factors of trade relations, creditor overindulgence, inflation, debt crises, and inconvertible currencies. However, this paper will limit its empirical discussion to industrial policy and the accompanying political and economic considerations that are consequential.

Of the Sub-Saharan African countries that have been considered, Ghana, which became politically independent in 1957, embarked on a pioneering experiment with ISI under Nkrumah. The initial ISI strategy was conceived primarily as a means of achieving economic independence and growth, rather than as a response to foreign exchange needs. It was not until 1962 that reference was made to improving the balance of payments situation as a primary reason for encouraging domestic production (Steel, 1972).

The classic Latin American paradigm of government finance, which coalesced around a political philosophy of socialism in Ghana, became the main instrument of industrial policy as an antidote, if not revulsion against what was perceived as western imperialism. Investment in infrastructure and in a wide range of manufacturing activities, including: domestic production of previously imported consumer manufactures, the expansion of building materials industry, and the development of electrical and mechanical industries, became the basis of industrial expansion. The fundamental socio-economic theory was that only government can find the means to promote the basic services and industries that are essential prerequisites to intensive and diversified agriculture, speedy industrialization and increased economic productivity.

Construction and expansion of state industries did not proceed as quickly as expected, but by 1966 the share of gross manufacturing output by state-owned firms reflected substantial increases above the levels in the 1960s while private share fell. Although rapid government intervention in manufacturing contributed to an average annual growth rate of 11 per cent in real gross manufacturing output during this period, there was no concomitant growth in the economy as a whole. The annual growth rate of GDP in constant prices declined steadily from 4.8 per cent in 1961 to 1.1 per cent in 1966, due largely to lagging production in agriculture and forestry (Steel, 215). Thus, the evidence is less convincing that classic form of ISI was very successful in achieving an increase in income during the earlier periods of its implementation in Ghana. Steel finds that it may have been partly responsible for the decline in real per capita income, to the extent that it diverted resources away from other sectors.

A foreign exchange crisis ensued as government expenditures increased. Total expenditures rose by 42 per cent and the budget deficit in 1960-1 increased to about 23 percent of expenditures. The balance-of-payments deficit on the current account almost doubled from $75 million to $148 million and reserves dropped by more than half to $206 million (Steel, 217). The Government responded to fiscal imbalance by raising tariffs and utilizing import licensing (foreign suppliers' credit) to finance projects—another tool in the tool box of classic ISI (see Table 1). The import licensing system,

established in December 1961, became the primary determinant of the pattern of investment and production in manufacturing as a result of its control over machinery, materials, and parts.[3] Import licensing raised the cost of production and contributed to inefficiencies.

The implementation of classic ISI was not significantly different in Nigeria and Sierra Leone. ISI became the first industrial strategy of the two countries. In Nigeria, it was adopted to attain external balance (Briggs, 2007).[4] The underlying theory of trade policy in Nigeria was to provide effective protection to local manufacturing industries through quantitative restrictions and high import duties. During this period, all imports from Japan were placed under import license. Machinery and spare parts imports were restricted and exchange controls on the repatriation of dividends and profits were enforced. Restrictions were also applied to capital goods, spare parts and non-essential imports (Briggs, 7).

Export duties ranging from 5 to 60 percent were also applied to agricultural exports such as cocoa, rubber, cotton, palm oil, palm kernel and ground nuts in the 1960s and early 1970s. However, in 1973 these duties were eventually abolished, as a result of the oil boom and the need to promote agricultural exports as part of the export diversification strategy. Although ISI strategy continued even after the Nigerian civil war in 1970, trade policy between 1970 and 1976 became less restrictive, partly as a result of post-war reconstruction. The movement to liberalization was reversed in 1977 when the acquisition of import licenses became a requirement for the importation of a wide range of imported finished goods, some of which were outrightly banned. This renewed restrictive trade policy culminated in the banning of 82 items in 1979 (Briggs, 8). ISI policy in Sierra Leone was closely aligned with the capitalist or market genre of Nigeria, but with stifling levels of currency dependence that made the attainment of external balance a challenging proposition.

The first few years of the ISI development strategy after political independence in Sierra Leone registered average annual growth rate of 4 percent without significant loss of reserves and relatively low inflation rates. The government relied on the export of cash crops and taxes on farmers to finance the ISI projects and as a result, the exports of cash crops and diamonds had to be intensified. However, reduction in the world prices of cash crops and the increase in diamond smuggling led to a reduction in export revenues. The mismatch of required revenues and the requirements for ISI implementation led to a heavy reliance on official foreign loans and budget deficits. By

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[3] Yet, the classic form of ISI in Ghana sometimes operated in counterintuitive ways. Bilateral trade agreements with countries of socialist orientation, increased imports of goods, for example sheet glass, which could have been produced locally. This ultimately endangered local industries like State Glass Manufacturing Corporation, which had to close down production of sheet glass in 1966. Coincidentally, the 1966-68 period showed a clearer trend towards ISI as the import to gross national product fell steadily (Steel, 223).

[4] By the 1970s there was a movement to indigenization or a form of privatization under the Nigerian Enterprises Promotion Act of 1977, which was an improvement on a 1972 Act. See also the unpublished work of Famade Oyedele (May 2009), "Industrial Policy and Incentives in Nigeria overtime: 1960 till date;" available from neocgroup.com

the 1970s the agricultural and industrial sectors were in trouble. Substantial debt obligations were accumulated, which caused high inflation, the depletion of international reserves, and non-autonomous devaluation of the leone.

Pegging the leone to the pound sterling engendered symmetric monetary policy. When the sterling was devalued in 1967, it was considered necessary to devalue of the leone concomitantly to avoid trade disruptions and maintain access to credits offered by the International monetary Fund (IMF) (Dixon-Fyle, 1978). But the market-oriented ISI policy had in-built monopolistic weaknesses, regulatory peculiarities, and economic reciprocities of corruption that made its sustainability impractical. The imposition of exchange controls, misinvoicing, and inflated interest charges created uncertainties and inflationary pressures as businesses passed on the cost of hedging to consumers (Dixon-Fyle, 1978).

While the Sub-Saharan African countries experienced political instability and industrial reversals from the 1960s through the 1980s, the relatively stable Botswana was able to avoid the detrimental Dutch disease and register impressive average per capita growth rates of about 11 percent between 1961 and 1979 that are superior to the South-East Asian and Latin American countries (author's computation from the World Bank's World Development Indicators and Global Development Finance). Ironically, the country has relied heavily on the exports of diamonds—the source of resource curse in some Sub-Saharan African countries. To minimize the volatility curse, the government established savings funds and avoided typical procyclical behavior and real exchange rate volatility (Lewin, 2011).

By the start of the 1980s, the ISI strategy, which was designed to kickstart national development for convergence with more industrialized or high performing countries, revealed common challenges in the form of exorbitant financial costs, budget deficits, currency overvaluation, and anemic growth for the Sub-Saharan African countries. Yet, all was not lost. In some Latin American and Sub-Saharan African countries, ISI had already made important contributions to infrastructural growth. Ghana and Nigeria emerged as two of the most industrially advanced countries in Sub-Saharan Africa (Olukoshi, 2001). Public financing of industrial projects paved the way for the provision of human and physical capital in Ghana; just as ISI stimulated industrialization in Argentina, Brazil, Chile, and Mexico. Technological changes in the global economy and the new architecture for economic cooperation, which includes legal instruments and obligations, have catapulted some of the Sub-Saharan African economies to new requirements for industrialization and economic growth. The next section takes a look at the transforming attributes of globalization.

4. The Transforming Attributes of Globalization in Sub-Saharan Africa

The contemporary phase of globalization brought about legal and economic changes for economic cooperation. New international instruments, deemed essential to promote socio-economic cooperation, require the harmonization of international and municipal laws, while the improved technological innovation makes it more difficult to erect barriers to the flow of goods, services, and ideas. Accordingly, technological innovation transformed the philosophy of industrial linkages from backward to horizontal—a situation where the interdependence of productive units to attain economies of scale, does not require industrial relocation, or the domestic manufacture

of inputs with outsourcing and the development of assembly lines. Table 1 summarizes the paradigmatic shift.

Authoritarian rule is incompatible with globalization and the modern requirements for industrialization and growth. Globalization promotes democracy both directly and indirectly. The direct link comes from the fact that rural farmers are now able to bypass the dominant classes and castes by taking their produce directly to markets, thereby loosening the control of traditionally hegemonic groups. Indirectly, globalization creates enlightenment and a new bourgeoisie that demands increased political participation and access to markets (Bhagwati, 2004; Kpinpuo, 2011). Of equal importance, has been the changing attitude of the international community and supranational organizations to nondemocratic rule. Supranational institutions like the IMF and World Bank have used their clout when it comes to additional financing and debt relief.

Table 1: The Changing Structure of ISI in Latin America and Africa

Classic Latin American ISI*	**New Conditions for Industrialization**
Authoritarianism	Democratic Regimes
Protectionism	Measured Liberalization
Taxation for industrialization	Capital inflows for industrialization
Nationalization	Privatization
Backward/Vertical linkages	Horizontal Linkages
Raw-Materials-Oriented Export	Export Diversification

***** It must be noted that several Latin American countries have moved away from the proto-type ISI.

By the end of the 1980s, donors became more intolerant of undemocratic governments, even when their economic policies were less objectionable. For example, the World Bank targeted the political barriers to economic development and raised expectations for political reform, which forced authoritarian regimes to focus on governance, with emphasis on transparency and consultation in policy-making—political conditionality. As a result, atavistic socialism in Ghana, as propagated by the Provisional National Defense Council (PNDC) under the auspices of Flight Lt. Jerry Rawlings after the seizure of political power in 1981, had to be abandoned because of the World Bank's and IMF's inspired structural adjustment programs. Between 1983 and 1992, Ghana implemented six IMF reform packages in which the most severe of austerity measures were put in place. Adjustment restored economic growth in various sectors and created favorable prospects for industrialization (Boafo-Arthur, 1999).

Financial and trade liberalization have facilitated affordable financing for industrialization. Currently, there is a very rich and abundant literature on financial liberalization, some of which can be found in the writings of Gurley and Shaw, 1955; Feldstein and Horioka, 1980; Fielding 1997 and 1993; Ndikumana 2000; and Yongo-Bure, 2011). An analysis of the relationship between financial development and growth can be found in the work of Benhabib and Spiegel (2000). However, Sub-Saharan African countries have vacillated between protection and some form of liberalization in an attempt to achieve measured liberalization. In general, the economic woes of the 1960s and 1970s necessitated structural adjustments and new

requirements for industrial development in Sub-Saharan Africa. These structural reforms imposed economic conditionalities that did not accommodate the pristine forms of protectionism in the 1950s and 1960s. In Nigeria, the structural adjustment program of 1986 was intended to promote investment, diversify exports, and promote privatization for industrial efficiency (Briggs, 2007, 8).[5] The National Economic Empowerment and Development Strategy (NEEDS), which was adopted in 2003 does not only seek liberalization and transfer of technology, it is geared towards poverty alleviation, now subsumed by programs promoted by supranational organizations.

Like Ghana and Nigeria, Sierra Leone also had to reform its trade policy as part of a structural adjustment program in 1986 and 1989 proposed by the IMF and World Bank. Despite the liberal trade and exchange rate policies, the balance of payments position worsened. The current account deficit increased from US $59.7 to US$126.5 millions between 1989 and 1995 and the GDP growth rate averaged -4.03 between 1990 and 1995 (Kawusu, 2000). In addition to trade reforms, there have been political reforms, including the movement to representative government and political decentralization (Srivastava and Larizza, 2011). Notwithstanding earlier reversals, in the first decade of the twenty first century, some Sub-Saharan African countries have achieved impressive growth performance to converge with countries that attained enviable growth rates in the 1990s; see Figure 1.

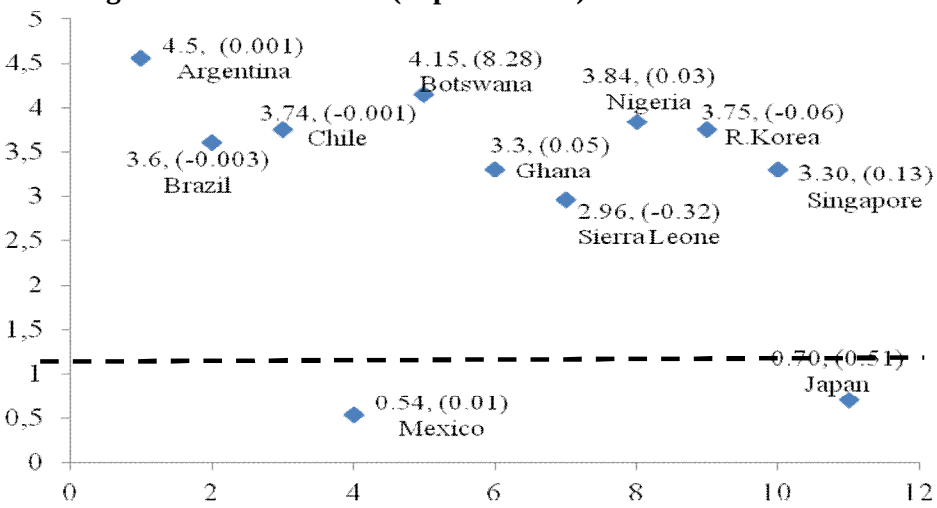
While the effects of liberalization on industrialization is of probative value in this paper, the evidence suggests that Sub-Saharan African countries that have become more transparent and democratic are now converging with Botswana and other high performing countries. The effects of liberalization are not instantaneous, partly because of the lingering intransigence of pre-existing industrial structure and the lag effect of policies to respond to new liberalization requirements, or as in the case of Sierra Leone, the distortionary effects of war. Subair (2011) finds that in the case of Nigeria, inherent internal contradictions of industrial policy may have weakened the base of industrial development even before the movement to liberalization. The public sector is trimmed, but the indigenous private sector is normally incapable of compensating for fiscal restraint, with deleterious short-term effects for industrialization. Reliance on foreign capital inflows is real.

The performance of Ghana after liberalization is particularly revealing, highlighting the idea that the success of liberalization requires joint commitments and fair prices for underpriced Sub-Saharan African exports. For example, the World Bank Trade indicators for 2009/10 show that despite the recent global recession, Ghana managed to register robust real (in constant 2000 U.S. dollars) trade growth of 7.4 percent in 2008. The growth in trade in 2008 was primarily driven by exports and imports. Goods exports increased by an estimated 29.8 percent in 2008, compared to 12 percent in 2007, primarily as a result of the increase in the production of gold and cocoa, the country's dominant exports. Gold production was boosted by continued investment in the industry due to the favorable price of gold on the world market, while cocoa

[5] Diversification is intended to shift from overdependence on the capital-intensive oil production, which produces about 95 percent of foreign exchange earnings and about 80 percent of budgetary revenues based on CIA estimates; see also the unpublished work of Oyedele.

production was driven up by an increase in the domestic producer price paid by the government.

Figure 1: Average Annual Per Capita GDP Growth (2001-2010) and Changes in Gini Coefficient (in parenthesis)*



*Changes in the Gini Coefficient are computed for assorted periods based on data availability form World Bank.org and the Central Intelligence Agency (CIA): Argentina (1986-2009); Brazil (1981-2009); Chile (1987-2009); Mexico (1984-2008); Botswana (1976-2010); Ghana (1988-2006); Sierra Leone (1989 and 2003); Nigeria (1985-2004); Singapore (1998 and 2009); Japan (1993 and 2008); and Republic of Korea (1998 and 2009).
Source: Authors computation.

The marginal propensity to import has been found to be highly correlated with increases in national income, suggesting that trade reciprocities are essential for liberalization to achieve its intended growth-effect in the face of national income asymmetries (Warburton, 2010). Ghana survived the recent global crisis partly because the prices of cocoa and gold soared, suggesting of course, that the revenue or net trade effect was also inextricably linked to price increases and foreign absorption.[6]

Globalization has not been entirely detrimental to the Sub-Saharan African countries. The tendency for the formerly poor-performing Sub-Saharan African countries to catch-up with the rather high performing countries can be attributed not only to political and financial reforms, but technology transfer. China's arrival has improved Africa's infrastructure and boosted its manufacturing and Africa's enthusiasm for technology is boosting growth. All this is happening partly because Africa is at last getting a taste of peace and decent government (*The Economist*, 15).

What are the sources of growth? Is there a long-run relationship between the once revered industrialization and liberalization? Not surprisingly, *The Economist* has identified two significant sources of growth in Africa; (i) technology transfer and (ii)

[6] Increases in the price of gold during the global downturn could be attributed to the economic uncertainties and loss of confidence in convertible currencies which motivated domestic and foreign investors and/or speculators to flock to gold.

political stability. "Mobile phones have penetrated deep into the bush" and "more than 600m Africans have one." "The phones make boons like savings accounts and information on crop prices ever more available" (*The Economist*, 83). Political stability is generating a stronger middle class and a robust presence of foreign investment and Chinese entrepreneurs. Is globalization generating a Sub-Saharan African miracle?

The East Asian miracle will be remembered not only for growth that was spurred by industrialization, but for policies that targeted income inequality and investment in human capital. Figure 1 shows that the high-performing countries of Sub-Saharan Africa still have some work to do to reduce income inequality. For example, with the exception of Sierra Leone, changes in the Gini coefficient are positive and exceedingly high for the best performing Sub-Saharan African country, Botswana. The next section of this paper presents the methodology for an examination of the long-run relationship between liberalization and the contribution of industry to growth (industry value added) in the high-performing countries of Sub-Saharan Africa, the Sub-Saharan and Latin American regions, and a random selection of other countries.

5. Methodology

The empirical essence of this paper is to measure the relationship between industry value added and liberalization (openness) from 1970 to 2010, given the globalizing and changing structure of industrialization in Latin America and Sub-Saharan Africa. The range of the study has been partly influenced by data availability for openness. The key probative issues are: Is liberalization transforming the potential of industry to contribute to growth? If so, is there a long run relationship between liberalization and industry value added? To answer these questions, this paper investigates the long-run relationship between industry value added and liberalization since short-term systematic or stochastic deviations can distort the theoretical significance of this relationship if there is any.

Econometric Variables and Operationalization: Openness or liberalization can be measured in multiple forms to reflect various research objectives and a very good summary of some of these measurements can be found in the work of Squalli and Wilson (2011). In the context of this research, openness refers to the volume of trade relative to the global volume. Measures of openness or trade share (TS), which are also inherently based on country characteristics (*i*), estimate a country's openness as a share of national income (trade benefits):

$$Openness = \frac{(Exports + imports)_i}{GDP_i} . \qquad (1)$$

This measurement of openness is not always suitable and may create counterintuitive results. For example, when the TS measurement is used, the world's largest trading country, the USA, is considered to be a closed economy because its trade share of total economic activity is very low by world standards, which makes it closed to trade benefits (Squalli and Wilson, 2011). In measuring openness (liberalization), I follow the concept proposed by Squalli and Wilson, which is a country's relative share of world trade to show the extent to which each country or region trades with the rest of the world. A country's relative trade share of world trade is restated in the form of Equation 2:

$$RS_i = \frac{(X + M)_i}{\sum_{j=1}^{n} (X + M)_j}; \qquad (2)$$

where, in this case, RS_i is for the relative share of country i, X is for exports as a percent of GDP (to control for relative income disparities), M is for imports as a percentage of GDP and sigma is the usual summation sign for the volume of world trade for all countries, j, as a percentage of global income. Information for the computation of this ratio has been obtained from the World Bank's World Development Indicators (WDI) and Global Development Finance (GDF).

This operationalization attempts to develop a measure that reflects trade outcome reality by capturing two dimensions that describe trade openness. The open economy is defined as one that exhibits a relatively high share of trade to overall economic activity and substantial interaction and interconnectedness with the rest of the world. That is, an open economy must trade heavily and must be a substantial contributor to world trade. The importance of these two dimensions lies in the ability to focus on actual trade flows rather than potential trade flows associated with socioeconomic, geographic and demographic factors (Squalli and Wilson, p.1747).

A visual inspection of the available liberalization data is reported in Table 2 for individual and regional comparative analysis. Since the 1970s the Sub-Saharan African region has been more open relative to its Latin American counterpart, with Botswana contributing more to global trade than the average contribution of Sub-Saharan Africa. As a regional matter, it is apparent that liberalizing Sub-Saharan countries are catching up with former high-achievers (see Figure 1 also).

Table: 2 Openness (Liberalization) 1970-2010 (average percent of world trade)

Country	**1970-1980**	**1981-1990**	**1991-2000**	**2001-2010**
Sub-Saharan Africa				
Botswana	3.29743	3.090426	2.167489	1.507326
Ghana	0.98742	0.743254	1.614469	1.614723
Nigeria	1.098776	1.162643	1.912354	1.361612
Sierra Leone	1.671329	1.065825	1.063886	1.00588
Sub-Saharan Africa*	**1.648488**	**1.400756**	**1.337433**	**1.254059**
Latin America & The Caribbean (LAC)				
Brazil	0.519182	0.455989	0.420359	0.492499
Argentina	0.40858	0.410074	0.4524	0.756128
Chile	1.169311	1.390114	1.373791	1.379583
Mexico	0.314329	0.36044	0.618237	0.568759
LAC*	**0.807088**	**0.821966**	**0.915433**	**0.857996**
South East Asia				
Malaysia	2.632031	3.791088	4.329879	3.730707
Rep. of Korea	1.718441	1.735631	1.457629	1.547278
Thailand	1.299495	1.49657	2.142607	2.555425

* For all income levels. Source: Author's computation from the World Bank's World Development Indicators and Global Finance Data.

A strong relationship between liberalization and growth has been detected. For example, Dollar and Aart (2001) find that "globalizers" outperformed "nonglobalizers" and rich countries by attaining higher average growth of real GDP than in the 1980s and 1990s.

The definition of industry corresponds to that of the International Standard Industrial Classification (ISIC), which includes value added in manufacturing, mining, construction, electricity, water and gas. Value added is computed as the net output after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Industrial value added is supposed to contribute to national income via transmission channels like private compensation and public income.

This variable is important because widespread diffusion of information technologies, has led to innovation and use of efficient labor as a result of the emergence of many new forms of digital product transmission and delivery, which has profound effects on the entire value chain of many creative industries. The growth of industrial output or value added leads to an increase of tangible and intangible capital such as machines and computers (tangible capital), and know-how, research and development (R&D), and goodwill (intangible capital).

The Solow model with augmenting human capital is a revealing restatement of the connection between growth and the augmenting effects of technology and human capital when humans spend some time accumulating skills (Lucas, 1988; Mankiw et al., 1992; Jones, 2002); especially when capital is made easily available and accessible. Consider the following Cobb-Douglas production function with augmenting effects:

$$Y = K^{\alpha}(AH)^{1-\alpha}; \qquad (3)$$

where Y is for output, K is for capital stock, A is for the labor-augmenting effects of technology, H is for skilled labor, and alpha is for the proportion of the contribution of the inputs to output. If individuals in an economy, say a developing economy, accumulate human capital by spending more time to learn or acquire new skills, then effective units of skilled labor, H, can be increased by increasing learning skills (Jones, 2002); and therefore, the compensation for acquired skill. Equation 4 represents the relationship between skill and efficiency:

$$H = e^{\psi u}L; \qquad (4)$$

where ψ is a positive constant and u is for the amount of time time devoted to acquiring new skills when labor is unskilled.

It can be seen that by increasing u, a unit of unskilled labor increases the effective units of skilled labor H.[7]

[7] $\frac{d \log H}{du} = \psi \Rightarrow \frac{dH}{du} = \psi H$; so for example of 1 year (a unit) is spent acquiring education, psi captures the effect of the time spent on output; see Jones, p.55. It must be noted that output can also be defined in terms of capital per effective worker; see Perkins et al. p.129.

Diagnostic Tests

The choice of econometric model is prefaced by a series of revealing diagnostic tests. The diagnostic tests are intended to investigate whether there is a possibility that a long-run relationship exists between liberalization and industry value added for Sub-Saharan African countries that are now showing phenomenal growth, but which had also showed an inclination to develop their industrial base by utilizing ISI policies. Regrettably, I could not find useful data for industry value added in the case of Nigeria. However, data for the Sub-Saharan African countries as a region, some Latin American countries, and the Latin American and Caribbean region, are subjected to identical tests for broader analysis. This research considers three diagnostic tests: (i) unit root tests (the Augmented Dickey-Fuller test) for the individual series, the results of which are reported in Table 3; (ii) the Engle-Granger test, and (iii) the Johansen Cointegration Test, the results of which are reported in Table 4 and the bottom of Table 6. The tests reveal that the variables are cointegrated in the case of Ghana, but not for all countries that have shown a commitment to ISI and ELG. With the exception of Sierra Leone and Chile, the variables generally reflect a random walk process but do not show a cointegrating relationship. See tables 3 and 4 in the Annex.

Table 2 reveals that these countries are relatively small economies and that this smallness has the potential of impacting the joint development of liberalization and industrialization over a period of time. As a regional matter, authoritarianism and political instability continue to be a problem for some Sub-Saharan African countries and the diagnostic test results, which are reported in Tables 3 and 4, in the Annex, reflect the difficulties that are associated with mapping out the relationship between industrialization and openness. Some of the varied arguments that speak to the multiple challenges for discerning a long-run relationship between liberalization and industrial policy are: (i) that openness may not necessarily generate industrial contributions to growth in small economies with infant industries; (ii) that political instability and nondemocratic rule are not permitting a fuller understanding of the relationship between openness and the contribution of industry to economic growth; (iii) that the contribution of industry to economic growth is mostly driven by internal factors, a fundamental argument for the implementation of ISI; and (iv) that political and economic reforms, as exemplified by Ghana, can help us to theoretically conclude that there is a long-run relationship between economic liberalization and industrial contribution to economic growth.

Table 5: Contribution to National Income by Sectors (percentages)*

Country	Agriculture	Industry	Service
Botswana	2.1	45.8	52.8
Ghana	29.9	18.6	51.4
Nigeria	30	32	38
Sierra Leone	51.3	22	26.7
Argentina	8.5	31.6	59.8
Brazil	5.8	26.8	67.4
Chile	5.1	41.8	53.1
Mexico	3.9	32.6	63.5

* All values are for 2010, except Botswana (2009). Source: CIA World Factbook.

In reality, globalization is now creating opportunities for the relatively small economies to develop a vibrant service sector that can become highly competitive with the industrial sector. In fact, Table 5 shows that the service sector of some of these economies, with the exception of Sierra Leone, which is emerging from a decade long war, is contributing much more to national income than agriculture and industry. The contribution of the service sector to national income ranges from 26.7 percent in Sierra Leone, to 67.4 percent in Brazil for the cross-section of countries. Yet, there are externalities that can be derived from the development of the service sector as a result of inter-sectoral linkages (see also Guisan and Exposito, 2008).

Econometric Model

The preceding diagnostic tests indicate that a cointegration model is suitable for investigating the relationship between openness and industry value added in the case of Ghana. Though the variables may not be individually susceptible to systematic changes, they are individually highly susceptible to stochastic changes, partly because of nonsystematic shocks to the global economy. More so, the effects of liberalization are not instantaneous and they may exhibit significant long-run effects. As a result of these theoretical underpinnings, the preferred econometric model for this paper is cointegration. Cointegration has several attractive properties, including an estimation of the speed of adjustment to long-run equilibrium when the instantaneous effects and equilibrium relationships are unknown. An underlying expectation is that economic series will not drift too far apart in the long-run. The fundamental cointegration model with the implied regularity conditions or assumptions is defined by Equation 5:

$$I_{VAD} = \alpha + \beta_1 L + u_t; \qquad (5)$$

where I_{VAD} is the industrial value added as a percentage of GDP, α is a constant, β_1 is a cointegrating parameter, L is for liberalization or openness of a country or region in terms of relative share of global trade, and u_t is the usual stochastic expression of the standard cointegrating equation. The specified cointegrating Equation 5 denotes that the stochastic expression, u_t, is stationary after it has been subjected to a unit root test when the industry value added and liberalization series individually follow a random walk process that is typical of macroeconomic series; for example, consumption, income, prices, exchange rates, interest rates, and investment. Subjecting the stochastic expression to a pre-test is intended to avoid the spurious regression syndrome originally detected by Granger (1986). That is, a linear combination of the series cancels out the stochastic trends in the two series (Gujarati and Porter 2009). The Engel-Granger and Johansen cointegration tests (*infra*) are used to ascertain the presence or lack thereof of a cointegrating relationship. Equation 5 can be dynamically and more succinctly restated as follows:

$$I_{VAD} = \begin{bmatrix} I_{VAD}, 1 \\ I_{VAD}, 2 \\ . \\ . \\ . \\ I_{VAD}, T \end{bmatrix}_{T=41} \qquad L = \begin{bmatrix} L, 1 \\ L, 2 \\ . \\ . \\ . \\ L, T \end{bmatrix}_{T=41} . \qquad (6)$$

The variables will be cointegrated if a cointegrating vector, β_1, exists, such that when the value added of industrialization does not drift too far apart from the changes in economic liberalization, the relationship of the variables can be said to be in equilibrium:

$$[I_{VAD}\ L]\beta_1 \text{ implies that } [I_{VAD} - L] = 0 \qquad (7)$$

The cointegration model is a highly regarded procedure to detect long-run relationships when economic variables are determined to be cointegrated and it is also gaining momentum in the field of forensic economics (Sargan, 1984; Granger, 1986; Engle and Granger, 1987; Rubin, 2004; Ramirez, 2006; and Torayeh, 2011). As an extension of the cointegration model, the error correction model (ECM) estimates the discrepancy between the short- and long-run equilibrium when economic theory suggests that there is a long-run relationship between variables and that net contributions in the short-run also affect dependent variables. In effect, the ECM shows the extent to which the changes in industrial value added is a function of changes in liberalization as well as the past differences of the variables; more pointedly:

$$\Delta I_{VAD} = \beta_0 + \beta_1 \Delta L + \gamma(L_{t-1} - I_{VADt-1}) + u_t; \qquad (8)$$

where ΔI_{VAD} is for the changes in industrial value added, ΔL is for changes in liberalization and $L_{t-1} - I_{VADt-1}$ is for the divergence of the variables from their long-run relationship in the past. It should be noted that a positive gamma coefficient is required for the variables not to drift too far apart when an assumption is made that undesirable shocks are not expected and that the values of the variables that have been obtained are not susceptible to changes; that is, $\Delta L = u_t = 0$.

Given the regularity conditions, a change in industrial value added can then be re-written to capture the direction and pace of movement towards equilibrium:

$$\Delta I_{VAD} = \gamma\left(\frac{\beta_0}{\gamma} + L_{t-1} - I_{VADt-1}\right); \qquad (9)$$

Where $(\beta_0/\gamma) + L_{t-1}$ is the equilibrium value of industrial value added in the past. For the prospective long-run equilibrium to be realized, there should be an increase in the industrial value added to national income (economic growth) if last period's equilibrium value for industry value added exceeded its actual value, indicating that if industrial value added fell short of the desired equilibrium level, then Equation 9 can be re-written as:

$$\frac{\beta_0}{\gamma} + L_{t-1} - I_{VADt-1} > 0 \text{ or } \frac{\beta_0}{\gamma} + L_{t-1} > I_{VAD}. \qquad (10)$$

The empirical findings of this paper are reported in Table 6. The data show that in the long-run economic liberalization can contribute about 1 percent to Ghana's industrial value added. As expected, the net value (gap) of openness and industrial performance in the past $[D(L_{t-1}) - D(I_{VADt-1})]$ also makes minimal but significant contribution to national income via the industrial value added. In the past, industrial value added fell short of the desired level (see Table 6 and Equation 10), which suggests that industrial value added needs to be increased if error correction should take place in the liberalization-industry relationship. This finding is not surprising because of the increasing role of the service sector relative to the industrial sector. It is

worthwhile to note that the gamma coefficient has a negative sign to appropriately reflect the order of the variables in *Eviews*. This coefficient is normally used to estimate the speed of adjustment towards equilibrium.[8] A brief conclusion follows.

Table 6: Long-Run Relationship between Industry and Openness and Error Correction[ϕ]

Variables	Coefficient	Standard Error	t-statistic
I_{VAD}	1		
L_{t-1}	-1.152494	0.11	-10.32*
C	-0.60		
Short-Run			
γ	-0.61	0.19	-3.13*
$D(I_{VADt-1})$	0.28	0.18	1.51
$D(L_{t-1})$	0.01	0.28	0.05
C	-0.004		
Akaike Criterion	0.246310		

[ϕ] Estimates provided by *Eviews 7*. Johansen cointegration diagnostic test results: Ho: no cointegrating equation. Trace statistic= 17.8 and p-value = (0.02). * Denotes significance at the 95 percent level of confidence .The Akaike [Information] Criterion = $T \log |\Sigma| + 2N$, where T is the number of useable observations, $|\Sigma|$ is the determinant of the variance-co-variance matrix of the residuals, and N is the number of parameters to be estimated.

6. Conclusion

This paper finds that the classic form of ISI is no longer tenable in the context of contemporary globalization and that relatively small open and developing economies must now skillfully manage liberalization in order to attain industrial growth. Globalization brings about changing attributes that are no longer compatible with authoritarian rule. In addition to economic conditionalities, social planners must now deal with political conditionalities (political reforms) that are demanded by supranational organizations and the exogenous global community of nations. Changes in the global economy have now made the service sector a very vibrant sector and economic integration has the potential for technology transfer to assist the development of both the industrial and service sectors through efficient labor.

Diagnostic tests reveal that industry value added and openness can share a long-run relationship that is not extensively discoverable, especially because of natural and idiosyncratic country characteristics. Some countries are naturally still resistant to full scale liberalization in order to protect infant industries, just as political instability and adverse economic conditions threaten the industrial vitality of some developing countries.

Ghana provides a theoretical example of a long-run relationship between industry value added and economic liberalization even when countries have a very vibrant service sector. This study finds that in the case of Ghana, the contribution of

[8] Elbadawi (1997) proposes the long-run may be estimated in real time as T= (log(1-τ))/(log(1-γ), where T is the number of periods needed to return to equilibrium, τ is a hypothesized value of dissipation rate, say 95%, and γ is the speed of adjustment.

liberalization to industry value added is not very robust but that such a relationship cannot be discounted. As a policy matter, small open and developing economies that wish to pursue industrialization must now take into consideration the new realities of globalization, the sequencing of liberalization, and the internal political conditions that are essential for industrial and economic growth. Invariably, the changing dynamics and preconditions for industrial growth will now require the joint cooperation of wealthier and poorer or smaller nations.

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Annex

Table 3: Augmented Dickey-Fuller Unit Root Tests, Ho: Series have a unit root (p- values for t-statistic in parenthesis)

Country/Region	Industry Value Added	Economic Liberalization
Botswana	Fail to reject (0.46)	Fail to reject (0.83)
Ghana	Fail to reject (0.80)	Fail to reject (0.61)
Sierra Leone	Fail to reject (0.06)	Reject (0.005)
Sub-Saharan Africa	Fail to reject (0.18)	Fail to reject (0.33)
Argentina	Fail to reject (0.31)	Fail to reject (0.15)
Brazil	Fail to reject (0.47)	Fail to reject (0.02)$^{\phi}$
Chile	Reject (0.004)	Reject (0.02)
Honduras	Fail to reject (0.11)	Fail to reject (0.16)
Mexico	Fail to reject (0.09)	Fail to reject (0.40)
Latin America & Caribbean	Fail to reject (0.46)	Fail to reject (0.14)

$^{\phi}$ At the 95 percent level of confidence.

Table: 4 Engle-Granger Cointegration Tests, Ho: Series are not cointegrated (p-values for z-statistic in parenthesis)*

Country/Region	Industry Value Added	Economic Liberalization
Botswana	Fail to reject (0.83)	Fail to reject (0.98)
Ghana	Reject (0.03)	Reject (0.04)
Sierra Leone	Fail to reject (0.15)	Fail to reject (0.26)
Sub-Saharan Africa	Fail to reject (0.67)	Fail to reject (0.35)
Argentina	Fail to reject (0.70)	Fail to reject (0.52)
Brazil	Fail to reject (0.94)	Fail to reject (0.30)
Chile	Fail to reject (0.07)	Fail to reject (0.15)
Honduras	Fail to reject (0.57)	Fail to reject (0.53)
Mexico	Fail to reject (0.52)	Fail to reject (0.91)
Latin America & Caribbean	Fail to reject (0.76)	Fail to reject (0.46)

* Lag-length is based on Akaike Information Criterion (AIC). It is noteworthy that the AIC is not significantly different from the Schwarz criterion.