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Import substitution industrialisation and economic growth: Evidence from the group of BRICS countries

Future Business Journal

Provided in Cooperation with:
Faculty of Commerce and Business Administration, Future University

Suggested Citation: Adewale, Aregbeshola R. (2017) : Import substitution industrialisation and economic growth: Evidence from the group of BRICS countries, Future Business Journal, ISSN 2314-7210, Elsevier, Amsterdam, Vol. 3, Iss. 2, pp. 138-158, https://doi.org/10.1016/j.fbj.2017.06.001

This Version is available at:
https://hdl.handle.net/10419/187962

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ScienceDirect

Future Business Journal 3 (2017) 138–158

www.elsevier.com/locate/fbj

Import substitution industrialisation and economic growth – Evidence from the group of BRICS countries

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Received 17 August 2016; received in revised form 14 June 2017; accepted 15 June 2017
Available online 23 June 2017

Abstract

Governments in various countries, irrespective of the country's level of economic growth, seek to initiate macroeconomic policies towards achieving better economic performance in order to advance level of business activities and ultimately, ensure better quality of life for the people. To achieve this, various approaches and interventions are applied in the process, but the outcomes are always different. While some of these policy interventions have culminated in the desired outcomes, quite a few have faltered on the platter of ineptness. This article investigates the importance of import substitution industrialisation (ISI) on the economic performance of the countries in the group of BRICS (Brazil, Russia, India, China and South Africa). Using data from the World Bank Development Indicators from 1960 to 2016 in econometric estimations, this article argues that ISI policy helped to catalyse the industrialisation process of these five countries, with the effects being more convergent in the short run as shown by the GMM, SGMM and impulse response techniques. It is thus recommended that less developed countries should adopt this form of economic integration and home-grown ISI policy to substitute imports in the short run, and embrace liberalisation as higher level of industrialisation is achieved in the long run.
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Gel classification: E02; E61; E65; F15

Keywords: Import substitution industrialisation; Macroeconomic policy; Economic development; Export promotion; The group of BRICS countries; The Washington consensus

1. Introduction

This article is underpinned by Mill's method of concomitant variation. This method is adopted because it identifies a causal connection between two conditions (in this study, import restriction and export promotion) by matching the imperative variations in the conditional parameters. Further, this theoretical basis is considered appropriate because, the regulatory frameworks that restrict imports are largely different from those that promote exports. In addition, the institutional apparatus that are employed in a constricting economic regime are in sharp contrast to those employed in an expansionary system. Creating an avenue to juxtapose these contradicting experiences through Mill's method of concomitant variation helps to situate this study in a novelty space within the body of existing knowledge.

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http://dx.doi.org/10.1016/j.fbj.2017.06.001
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Economic development involves all the government activities and policy initiatives that are directed towards improving the economic wellbeing of a state, through increases in inflow of investment, trade, and job creation (Shafaeddin, 2006; Adams, 2009). These initiatives and policy interventions are somewhat orchestrated based on the leadership style, country's cultural orientation, economic philosophy, global events and natural phenomenon (Hill, 2017). To cope with these issues and forces, countries review and revisit their macroeconomic policies timeously (De Souza, Burlamaqui & Barbosa-Filho, 2005). Evidence indicates that the road to industrialisation by the developed economies emerged from a series of revolutions, coupled with a series of circumstantial policy interventions (Sugihara, 2007).

Leaning on this experience, the pattern followed by the developing economies, especially economies in the group of BRICS is similar to the one adopted by similar economies in the early days of development. The policy stance of those economies were epitomised by protectionist measures that underlay import substitution industrialisation (ISI). The motivation to investigate the economies in the group of BRICS lies in the strategic importance of these countries as industrialisation pace-setters in the developing world. More importantly, the economies of the group of BRICS developed through a series of policy initiatives that were firmly primed on ISI policy instruments that imbibed high tariffs, subsidies, targeted import control and ultimately, export orientation strategy (Makwiramiti, 2011).

Jim O'Neil of Goldman Sachs originally coined the BRICS concept in 2003. The group was established to recognise countries with the fastest growing economies, growing middle classes and favourable markets. This forum was founded in 2009 in Russia initially as a platform to share views on how to respond to the opportunities and challenges that globalisation presents (Wilson, Burgi & Carlson, 2011; Makwiramiti, 2011). The forum is regarded as being economically important given that they are a combination of rapidly developing countries, with strategically important geographical spread across the Americas, Europe, Asia and Africa (Chaudhury, 2009). Their economic prowess, coupled with the vantage geographical position, projects the group of BRICS as an emerging centre of gravity in the global economy (Qobo, 2011; Shasha, 2011). The five countries represent 42% of the world's total population (Wilson et al., 2011:1), with combined nominal GDP of $13.6 trillion (Financial Times, 2013).

Having briefly discussed the evolution of the BRICS, the rest of the article will be arranged as follows. The second section will look at the conceptual relevance of ISI, while the third section will discuss ISI as practiced by the BRICS economies. Section four will discuss the research design and methodology, while section five will contain data analyses and discussion. The last section will conclude the study. This article distinguishes itself from similar studies by alluding to the economic dynamics of the countries in the group of BRICS as a collective and in unison.

This study is intended to present more encompassing perspectives on academic discourse on ISI policy. Although, there are a few documented studies on ISI, the focus of this study is different in scope and context. For instance, the study of Juarez (1992) investigates the political environment of ISI in Colombia where the import of liberalisation was found to be important. Waterbury (1983) investigates the divergence in the macroeconomic policies of two regimes in Egypt and argues that ISI was less favourable to the country's economic development. In addition, Ramachandra (1982) investigates the trend of economic performance in Brazil in a thesis, where the role of ISI was found to be important. It must be pointed out that all of these studies adopted qualitative approach, and their findings were largely exploratory in nature. Therefore, the following research questions are raised:

i. what are the determinants of ISI in BRICS countries?
ii. What is the direction of causality between ISI and economic growth in BRICS countries?
iii. Is there long run relationship between ISI and economic growth in BRICS countries?

Thus, aforementioned research questions induce the following objectives that the study targets to achieve:

i. To identify determinants of ISI in BRICS countries.
ii. To determine the direction of causality between ISI and economic growth in BRICS countries.
iii. To establish existence of long run relationship between ISI and economic growth in BRICS countries.

2. Conceptual relevance of import substitution industrialisation

The ISI policy initiative has been faced with various criticisms over the past decades. The policy initiative was (and still is) criticised by some neoliberal advocates more noticeably in the 1970s and 1980s (Balassa, 1971;

Bhagwati, 1978; Krueger, 1978; Balassa, Bueno, Kuczynski & Simonsen, 1986). Global bodies, especially the Institutions of Bretton Woods agreement (the International Monetary Fund – IMF and the World Bank) and the policy makers, especially the Western hegemons were parts of the badgering. Coined in 1989 by John Williamson, the term Washington consensus has become the bedrock of policy prescriptions of the neoliberal/neoclassical ideologists, hence its disapproval and antipathy from the leftists who see the policy as an embellishment of imperialism rather than diagnosis for economic woes (Williamson, 2004). Contrary to what the neoclassic axiomatically believed to be methodical masterpiece, the neoliberal ideology defied the economic pathway that led the hitherto underdeveloped countries (today the economic powerhouses) to the present accolade (Wade, 2003).

The ISI policy that was adopted in the early industrialisation struggle of most developing economies originated from the evolutionary phases of industrialisation in the advanced economies, 'The growth of import substitution industrialisation has been paralleled by doubts over its continuing viability to support economic growth, paradoxically in countries which have already attained a high degree of industrialisation (Ahmad, 1978:357). These industrialised countries are seen to have architectured ISI and it becomes ironic to uncover the dexterity with which they rewrite their economic history in suggesting that economic development and essentially industrialisation can only be achieved through neoliberalism or its *first cousin*, neoclassic ideology:

> *Almost all of today's rich countries used tariff protection and subsidies to develop their industries in the early stage of their development. It is particularly important to note that Britain and the USA, the two countries that are supposed to have reached the summit of the world economy through free-market, free-trade policies, are actually the ones that most aggressively used protection and subsidies (*Chang, 2012*:44).*

Documented evidence indicates the timeframe during which each of these advanced economies adopted ISI during their developmental phases. For instance, United Kingdom only ended the protectionist policies in 1846 with the abolition of the Com Laws, which had enhanced the industrialisation process of the country (Detlef, 2012). According to Chang (2012), the rulership of Henry the VII during the 16th century was trendy for protecting the main industrial activity in Britain at the time – wool, and the infant industry also benefitted extensively from the protectionist measures that eventually nurtured them to global competitiveness. Quoting Friedrich List, Chang (2012:44) declares that the neoliberal ideology being canvassed by Britain is like "kicking away the ladder with which he had climbed to the top".

It was also established that ISI was adopted in the United States, and the policy was institutionalised through various protectionist measures (Persky, Ranney & Wiewel, 1993). According to these authors, the 'buy Oregon' programme of 1983, the 'buy Chicago' programme, the St Paul's "Home-grown Economic" project as well as various other 'buy local' campaigns of the 1920s were all designed to ensure that the "programme of import substitution mobilises local resources in a manner that greatly enhances their productivity" (Persky et al., 1993:21). These authors further contended that the ISI programmes initiated over those industrialisation periods of 1920s, riding on the laurel of similar practices that were adopted in the early 1860s, were intended to ensure that the local producers were competitive enough to counter imports into their domestic markets when the markets are opened (Chang, 2012). The measures were also adopted to ensure that these local manufacturers were competitive enough to invade very distant markets, which happened eventually as many America-originated multinational corporations invaded almost every nook and crannies of the world market, and they are today the largest market participants in offshore investments both in volume and in revenue.

This economic reality possibly prompted Bairoch (1993:30) to describe the United States as the "mother country and bastion of modern protectionism". According to Bairoch (1993), although protectionism in the United States dates back to 1860s, the continent recorded the highest global tariff volume in 1920s and the protectionist measures adopted by the United States during that period was unequal in global economic history. Even prior to the 1920s, government policies in the United States have always been embedded in protectionism. For example, President Ulysses Grant who ruled the United Sates between 1869 and 1877 was quoted by Chang (2012:45) to have retorted, "Within 200 years, when America has gotten out of protection all that it can offer, it too will adopt free trade". The proposition that almost all the advanced economies adopted the ISI policy at some point in time was further espoused by the German experience. In fact, Germany was regarded as the 'mother nation' of protectionism, according to Chang (2012). France, the Netherlands, Switzerland, and the industrialised Asian countries such as Korea and Japan were not immune to these ISI protectionist practices in the early days of their industrialisation.

In summary, while the advanced economies such as United States and Britain canvass for limited social spending in the developing world, they structurally engender social justice in their shores. In specific, the Temporary Assistance for Needy Families (TANF) program in the United States provides a safety net of about 60 monthly salaries for those that lose their jobs. According to Lemieux (2013:227), the welfare-state functions cover 57 percent of total government expenditures in the United States. The figure stands at 63 percent for the typical euro zone country.

3. Why ISI?

The ISI industrial policy is premised on the realisation that economic development and more specifically, industrialisation can only be achieved by developing local capacity that is capable of substituting imports in order to reduce or possibly eliminate economic leakages. This policy became popular in today's developing economies shortly after the Second World War, essentially because production resources were directed away from household manufacture to war armaments during the war by the developed economies and the cost of living skyrocketed shortly after the war, which exerted pressure on the meagre foreign reserves of the developing economies (Ahmad, 1978).

The second driver of this policy was the global economic meltdown, which affected the prices of the primary products that constituted (and still constitutes) the major exports of the developing economies. As hypothesised by Prebisch (1959), low demand and inelasticity of supply will continuously lead to a decline of primary commodity prices, which the economies of most developing countries depend on, thereby necessitating material beneficiation in order to ultimately boost exports. However, it is impossible for any economy to export manufactured goods without building the indigenous infrastructure required for such production (Ahmad, 1978).

Moreover, ISI is seen as a catalyst to achieve economic diversification (Shafaeddin & Pizarro 2007). Evidence from the industrialised economies suggests that economic diversification is achievable within the policy frameworks of ISI. In that, the mechanisms deployed in the implementation of this policy (reduction of tariffs on input resources, high import duties or locally manufactured goods, exchange rates differential, and eventual abolition of export duties) help the developing economies to garner the requisite industrial experience to embark on competitive exportation of manufactured goods (Schmitz, 2007).

From the foregoing, it becomes imperative that the developing countries were compelled to adopt policy initiatives that galvanises material beneficiation in a globally competitive manner – hence, the justification for the adoption of ISI policy at the early phase of their industrialisation. As observed by Naseem (1973:36), “if it can be determined that the crucial bottleneck facing a country is that of foreign exchange and if exports are not perfectly elastic at a given price, the obvious strategy for such a country is to embark on the policy of import substitution or the domestic production of importables”. The argument for economic diversification also bears forth for the adoption of ISI policy by the developing economies. More specifically, in order to diversify an economy, it is important to embark on indigenous capability development or more appropriately, indigenous technological capability enhancement. To achieve this, the need for strong government intervention and some form of protectionism are inevitable (Schmitz, 2007).

To buttress the importance of ISI in achieving economic diversification, Irwin (2002) contends that resources become more efficient and productive when diverted away from agriculture and redeployed to manufacturing. Clearly, one of the most crucial challenges that confront the developing economies is the concentration of higher percentage of its workforce in the primary/extractive sectors such as agriculture and labour-intensive mining. As rightly observed by Gerschenkron (1962:26), “in every instance of industrialisation, imitation of the evolution in advanced countries appears in combination with different, indigenously determined elements”, which suggest that the neoliberal ideology being canvassed by the developed country is an epitome of oblivion or paradoxical hypocrisy.

Given the circumstantial parameters that surround the adoption of ISI policy by the developing economies, a blanket criticism of this policy by the advanced economies appears to be defeating. Perhaps the most compelling justification for the criticism emanates from what List (1966:368) referred to as “kicking the ladder” of industrialisation away from the less privileged economies. Evidently, if “every change begins from the place one is at now… choices are massively constrained by the legacies of the past” (Schmitz, 2007:16).

3.1. ISI in the BRICS group of countries

The ISI policy intervention was adopted by all the countries in the group of BRICS at different stages in their industrialisation phases. Although, all the five countries benefitted significantly from the adoption of the instruments of this policy, the level of benefits derivable by each country varied significantly. In this section, a synopsis of the policy will be presented for each country. This presentation is not intended to trace the economic history of each of the countries, but rather to lay a contextual basis for the argument that follows in the other sections in this article. The countries' appraisal will be done in a chronological order, starting with Brazil and ending with South Africa.

3.1.1. Brazil

The ISI policy in Brazil dates back to the 1930s, especially during the rulership of President Getulio Dornelles Vargas. President Vargas ruled Brazil between 1930 and 1954. During his tenure in office, he institutionalised indigenous technological and industrial development, and initiated policies towards improving agricultural proceeds and ultimately efficient utilisation of agricultural surplus (Abreu, Bevilacqua & Pinho 1996). President Vargas was able to create appropriate linkage between the agriculture sector and manufacturing, which translated into effective and efficient utilisation of agricultural rents in galvanising the initial industrialisation process of the country. The drive of the President to create indigenous capability eventually resulted in the establishment of the state-owned oil corporation – the Petrobras Brazilian in 1953 (Cason & White, 1998).

President Juscelino Kubitschek took over power in 1954 and ruled until 1961. During his regime, he built on the state industrialisation capacity created through the ISI policy and promoted exportation in targeted industries. The ISI policy remained intact, embedded with various tariffs, duties and taxes, while the export drive was aided by state incentives – subsidy (Wagner, 1981). The period between 1962 and 1968 was characterised by various uncertainties and economic instability and there was no clear-cut economic achievement until President Emilio Medici came into power in 1969 and ruled until 1974.

The regime of President Medici was regarded as the most successful regime in Brazil, not only on macroeconomic policy achievement, but on social prosperity as well. The period between 1968 and 1973 was simply dubbed the period of "Brazilian miracle" (Wagner, 1981; Guimarães, 2004). During this period, Medici reduced the incentives for import substitution and promoted export of manufactured goods. He redirected the policy focus from light-to-medium industry to heavy industry (machineries and heavy equipments) (Guimarães, 2004). This economic diversification intervention yielded immediate fruit as the tax to GDP ratio increased tremendously. This increase improved investor confidence in the economy and the country suddenly became juicy to whet the appetite of global financial investors. This development exposed Brazil to unprecedented financial crisis, which almost resulted in economic crisis. However, the ability of Brazil to have whither the storm of challenges posed by the economic openness (liberalism), and still managed to emerge as one of the rapidly developing economies, lies on the institutional capacity that the country establish during the ISI regimes (Cason & White, 1998).

3.1.2. Russia

The adoption of ISI policy in Russia falls in the same thoughtful line with the Western history. The Russia Republic, as the leading part of the defunct Soviet Union, was once an economic and political superpower. As such, it is not surprising that the Federation equally adopted ISI just as done by the rest of today's highly industrialised economies. Industrialisation processes began in Russia, albeit comparatively slowly around the middle of the 1880s (Gerschenkron, 1962). According to this author, the slowness in the pace of industrialisation process in Russia was occasioned by the institutional confinement of the Russian youth to land ploughing at the expense of deploying them to manufacturing activities (*serfdom*), contrary to the industrialisation experiences of Germany and Austria. However, the country was able to turn the tides in 1861 when the *serfdom* policy was dismantled, and the youths were emancipated into industrial activities.

The periods after the abolition of *serfdom* did not yield any sporadic increase in industrialisation until mid-1860s when an increase in the railroad construction became a growth driver (Dutkiewicz & Trenin, 2011). To ensure accountability in the rapidly increasing state's tax base, the government reformed most of the national institutions, including the treasury and the financial market (Gerschenkron, 1962). A mass reorientation exercise was also conducted in a bid to eradicate the public distrust in the banking system and financial institutions in general (Gregory, 1994). Realising the importance of landmass, especially the contribution of agriculture to the rapidly developing

Russian economy, the government embanked on boundary expansion wars against the Western European countries (Spulber, 1962; Millar, 1990). The war mongering exercise necessitated the country expanding its military competence, which at a time equalled (and in some respect, superior) to the capability of the United States (Millar, 1990).

The economic policy of Ivan Vyshnegradsky between 1887 and 1892 was extremely commendable. According to Reddaway (1935), Ivan was appointed the head of the Ministry of Finance between 1887 and 1892 and he initiated institutional processes to overcome the unremitting budget deficit experience of the time. After his replacement with Sergei Witte in 1893, the efficiency of the railway system was ensured and the Chinese Eastern Railway was constructed, which ultimately improved government revenue, the tax base and eventually reduced the government deficits substantially (Spulber, 1962). The institutional intervention in the Russian economy (ISI instruments) helped the economy to develop necessary safety net as well as competitive advantage in heavy industrial capability in a way that eventually paved way for economic liberalisation that followed at a later stage (Gregory, 1994).

The tenure of President Vladimir Putin from 2000 brought back some of the state-intervention mechanisms and the contemporary Russian economy is far more protected than most of the economies in the developing world. Some lessons were learnt from the fall of the Soviet Union, which explains why Russia readopted the quasi-ISI policy that propelled its rapid industrialisation process in the first place (Dutkiewicz & Trenin, 2011), through the reintroduction of hitherto protectionist measures within the export-orientation paradigm. It must be noted also, that the Russia's rise to industrialisation stardom was enhanced by the country's resource endowment, which earned it comparative advantage in a host of manufacturing sectors, especially the heavy industrial development (such as railroads, agriculture, and competent human capital). It can thus be reasonably concluded that Russia benefitted immensely both economically and militarily through the ISI policy framework. More specifically, Russia built its military and economic capabilities that launched the Russia Federation into the global economic advancement and political relevance.

3.1.3. India

The Indian ISI experience was in no way different from the experience of the rest of BRICS group of countries. The adoption of ISI in India dated back to 1920s, albeit with a great undertone of colonial influence that engendered some degree of liberalisation (Schmitz, 2007; Mukherjee, 2012). The period prior to the political independence of India in 1947 was characterised by domestic antipathy towards the colonial (British) business interests in the country. The peak of this aversion was the orchestration of the doctrine of *swadeshi* (self-sufficiency) movement, which was meant to promote the nationalist ideology in the country by patronising only products made in India. It must be pointed out, however, that while the mercantile community, the peasant traders and the *shroffs* (bankers or money-changers) canvassed for and endorsed *swadeshi*'s proclamation and its *first cousin*, the nationalism movement, the larger Indian businessmen were controverts (Chenoy, 1985), which were epitomes of ISI.

An understanding of the Indian economic policy development can best be categorised into four periods, namely the period between 1947–1956, 1957 to 1960, 1961 to 1965 and 1966 until date. The first two periods were characterised by the usual post-independence uncertainties and policy vicissitudes. Although, the pre-independence revulsion of the British business hegemony in the country influenced the policy directions, the lack of support from the domestic moguls as well as the finical/economic crises that the country experienced during this period further constituted a peculiar challenge.

The series of contradictory holdings reflected in the 1948 report of the Economic Programme Committee (EPC), which proposed a nationalist political ideology that underpins a socialist economic system (Kumar, 1995). The report of the committee reserved an extensive part of the economy, ranging from the manufacturing of consumables through to cottage, banking, finance and insurance policies and public utility. More specifically, the overarching focus of the industrialisation strategy was to develop local capability in heavy industries including the machinery-manufacturing sector. As noted by Kumar (1995:3228–9) “The scope of import substitution extended to almost everything that could be manufactured in the country” and this macroeconomic stance was fortified with high tariffs and quantitative restriction on imports.

However, the policy document was rejected by the local mogul, which precipitated the introduction of a refined policy document barely three months later with the Industrial Policy Statement (IPS – Chenoy, 1985). According to Chenoy (1985), in the new policy, although the new industrialisation strategy was still underpinned by ISI, there was some degree of flexibility in the practicability of the proposition. For instance, the antagonism against foreign capital

was toned down, and the period for the transfer of foreign capital within India to local business interests was elongated.

A year later, the intransigency of the gravamen between the political class and business elites on policy direction led to the replacement of the IPS policy with a more draconic ISI policy, which was surprisingly opposed by some big Indian bourgeoisies that urged the political leadership to revisit the swadeshi orientation. The prevailing recession and deflationary crises of 1952/53 period however, forced a convergence on the relevance and indispensability of foreign capital to the Indian economy, as all parties agreed on inflow of foreign capital that would boost domestic industrialisation exercise.

After a series of policy vicissitudes, there was noticeable review to the workings of ISI in India. The general lack of policy direction that characterised the immediate post independent years was replaced in 1966 with a clear guideline, specific industrial objectives and priorities under the auspice of the Second Industrialisation plan (Sen, 1982). The new policy was strictly directed towards expanding the consumer goods sector, through ISI policy instruments. The main principle behind this policy decision was to create an oligopolistic market structure that is capable of expanding the export base of the economy, by discouraging importation (Krugman, 1984). Although, the policy also emphasised the need to promote exports in the face of import restriction, attract foreign capital to bolster the low level of domestic savings, devaluation of the national currency (the *rupe*) and the decontrol of investment in heavy industry (Sen, 1982; Patibandla, 1992).

The liberalisation efforts that began in the late sixties eventually paid dividend as the domestic consumption expanded and this expansion culminated in further growth and local capacity building in other sectors, especially the heavy industry (Chaudhury, 2009). The ability of India to extend its import substitution from consumables to heavy industry further helped the country to realise its *swadeshi* targets as local skills capacities were developed and indigenous technological competence was achieved. It can then be reasonably concluded that the ISI policy was successful in India because the country was able to "haltingly extend import substitution to intermediate and capital goods" (Ahmad, 1978:357). It becomes evident that the ISI policy helped India to develop its automotive, Information and Communication Technology as well as acted as catalyst for the export promotion agenda of the country.

3.1.4. China

Having looked at the ISI policy instrumentation in India, we now proceed to an overview of this policy stance in China. In recent past, China boasts a rapidly developing economy with unprecedented levels of industrialisation and poverty alleviation. According to Li and Vinten (1997:183) "Over the next two decades and next century, the world major economy will move from traditional European and US to the big emerging markets – Asian countries, especially the Chinese economic area which is expanding rapidly in this decade". These authors further suggest that the Chinese economy grew by more than four times in 1994 compared to its productivity capacity in 1987. In spite of the global financial and economic uneasiness in 2012, the Chinese economy remains the largest recipient of foreign capital inflow (especially, FDI) at US $124 billion of which capital flow into the service sector surpassed that of the manufacturing sector (UNCTAD, 2013: xvi).

Evidence suggests that the current economic prowess of China is premised on the country's unique macroeconomic policy initiative that was adopted between 1950 and 1995 (Li & Vinten, 1997). These policies were primed on a balanced juxtaposition of two development models - Mao's closed economy (ISI) and Deng Xiao Ping's economic liberalisation approach (Export-Oriented Industrialisation – EOI). According to Zhu (2006), China followed the route of the rest communist states essentially from the beginning of 1950s towards the end of 1970s, but with a unique liberalisation flavour that has been dubbed – "market socialism with Chinese characteristics" (Zhu, 2006: 271).

Chinese economic miracle began during the era of Mao Zedong in 1949. Premised on the Karl Marx ideology with the intent to fight/destroy imperialism, the regime of Mao concentrated fully on building Socialism with Chinese Characteristics, in a way that promotes economic, political, cultural, social and ecological progress of the Republic (Kueh, 2006). To achieve this, Mao primed his policy focus on positioning China as both economic and military superpower.

During the regime of Mao, especially from the beginning of the 1950s to the end of the 1970s, China fully embraced centralised planned economy, which was underpinned by a series of land reforms, fiscal control mechanisms, compulsory purchase of domestic produce, tight market controls, centrally planned wage/income determination and price control (Ka & Selden, 1986). Li (2003) summarised Mao's percept of China's major problem

as being land related, essentially given that the vast majority of Chinese (nearly 200 million farming households) were domiciled in the rural areas. The political leadership of Mao therefore adopted the policies of the Great Leap Forward, which was orchestrated to develop Chinese economy in a way that lessens the country's dependency on the USSR, while launching the country into a global military superpower concomitantly (Li & Vinten, 1997; Zhu, 2006). This policy revised individual land ownership into a communal one in order to improve productivity and to promote equitable distribution of farmland in the face of the rapidly growing Chinese population.

To address poverty and a series of inequalities in the Republic, Mao essentially shied away from the full-fledge conscripts of the ideals of communism, and he adopted a liberal economic leadership within a totalitarian political framework (Chang & Wen, 1997). Although, the regime adopted ISI as its overarching macroeconomic springboard, efforts were made to promote exports in tandem. The main restriction untoward the free market economy was premised on those commodities that were considered essential to social stability (such as oil, electricity and water), and these sectors were largely featherbedded by the whims and caprices of the regulatory framework (Barnett, 1981; Tokuda, 2007). Today, the government still heavily regulates these essential services.

Mao's desire to stimulate industrialisation in China necessitated focussing attention on developing industrial infrastructure under the auspice of ‘walking on two legs’ slogan that was primed on mechanised farming (Watkins, undated; Li & Yang, 2005). The macroeconomic policy of the government proved successful, especially by engendering a communal work ethic, coordinated through the pyramidal central control. Although, Mao's regime was largely regarded as the anchor of modern Chinese economic success, his regime was faulted for global isolation (especially isolation by the USSR and the United States – based on their strategic importance as at then).

Shortly before Mao's death in 1976, Xiaoping Deng published three documents that focused on his political agenda of Four Modernisation. This political focus was directed at agriculture, industry, science technology and national defence. Watkins (undated) summarised these political focus as “electricity in the rural areas, industrial automation, a new economic outlook, and greatly enhanced defense strength” (Tisdel, 2009). The ten-year plan that was released by the ruling party in February 1978 was directed mainly towards developing Chinese heavy industry, as well as its military armament (Schram, 1994; Tokuda, 2007). The regime of Deng was synonymous with astute positive disposition towards economic liberalisation, which was a precursor for accessing the much-needed foreign capital to spur the lingering Chinese economy.

This macroeconomic rebalancing was also necessitated by the drive to access world market for the excess domestic production as a way to further the rapid industrialisation agenda. The reforms orchestrated during Deng's rulership has been credited with the recent economic achievement of China, premised on the platforms provided by the Confucian cultural orientation, political institution as well as macroeconomic fundamentals, which the regime engendered (Sanders, 1999; Tisdel, 2009).

Although, there were a series of revision and redefinition of the existing macroeconomic policies by the succeeding political leadership after Deng, these leaders continue to build on the CCP's Mao industrialisation and economic development ideology (Heilmann & Shih, 2013). To summarise the success of macroeconomic intervention in China, Tisdel (2009: 288) states: “The implication of the above discussion is that the rapid economic growth of the Chinese economy in the last 30 years is due to positive leadership of the CCP, and that continuing improvements in the welfare of the Chinese people depend on the quality of that leadership being sustained”.

3.1.5. South Africa

The ISI experience in South Africa is similar to that of Brazil, albeit with country-specific undertone. A modification of Tisdel (2009) observation about the success of China's macroeconomic policy explains the current state of economic development and the economic prospect of the country. For instance, while the Chinese economy is driven by a partisan blend of cultural, political and economic philosophies, the South African economy is underpinned by political history that spawned its economic philosophy. In living history, South Africa is the only country where full-fledged apartheid political ideology was implemented for decades. To this extent, some understanding of the political history of South Africa is required to nuance the country's macroeconomic policy dynamics.

Documented evidence suggests that South Africa adopted the customary African-orientated economic openness. The country had well-established economic relations with Arabian and Asian countries long before the arrival of the Europeans in 1806 (Ross, 1983). The country was famous for its exports of a range of products, such as gold, copper, millet, grains, and coconut to the Middle East and Indian Ocean economies (Rugumamu, 2005). Just like other parts

of Africa, by the beginning of the 19th century, local trade had existed for centuries in most parts of Southern Africa. The mineral revolution that began in 1867 when diamond was first discovered prompted a lot of Western interests in the country and, this stimulated resource interests eventually precipitated not only European economic domination but absolute political control.

The Union of South Africa was created in 1910, headed by General Louis Botha, the first Prime Minister of the Union. Given the political advantage, the English took total control of every economic means of the country, and apartheid policy was introduced and reinforced with the promulgation of the Black Labour Relations Regulation Act 1973. Between 1910 and 1922, the Botha and Smuts governments further reinforced racial discrimination by radically tilting the social and economic structures of the country with the intent of creating conditions conducive to a successful and profitable exploitation of South Africa's mineral wealth (Moritz 1994). To boost foreign earnings, this regime incentivised mineral exports and created a globally integrated economy. However, the oppression of the English was challenged by the election victory of socialist Labour Party combined with nationalist-orientated National Party, which strongly opposed the economic and colonial power of the English.

The electoral victory of this coalition shifted the economic philosophy of the government from economic liberalisation to economic nationalism in the form of protectionism and a full-fledged ISI was adopted. The regime advocated economic self-sufficiency through a policy of import substitution, which selectively but extensively, encouraged local industry via exorbitant import quotas. ISCOR (the Iron and Steel Corporation) was established in 1928 to boost the productivity of heavy industry (Soludo, Ogbu, & Change, 2004). Due to inherent problems associated with apartheid, especially global isolation, Prime Minister Vorster, who ruled South Africa between 1966 and 1978, strengthened the ISI economic policy as part of its industrial strategy, which was designed to lessen South Africa's dependency on foreign suppliers of strategic goods. This was achieved by implementing these ISI-related initiatives:

- The availability of large subsidy for import substitution was decided on.
- Strategic industries like SASOL and Armscor were developed and enlarged.
- Large subsidies were provided for industrial development in the homeland border areas.

These interventions were insufficient to avert the looming economic collapse, deepening economic crises the capital flight that resulted from divestment by multinational corporations and continued political tensions. This catastrophe, inter alia, culminated the transition to a non-racial democracy in 1994 (Nattrass & Terreblanche, 1990).

The political and economic history took another dimension since the political emancipation of the country in 1994. Upon readmission into the global economic community, the country adopted a series of economic reforms that are capable of engendering access to global markets and capital as dictated by the institutions of Washington consensus (Magubane, 2002). These macroeconomic policies were primed on liberalisation of the economy to foreign competition, astringent fiscal and monetary policies, privatisation of state-owned assets, and the labour market liberalisation. More specifically, the post-apartheid era in South Africa has been characterised by an open market economy that adopts all the vestiges of export-oriented industrialisation. One may then reasonably suggest that ISI helped to develop South Africa's mining sector, supported energy and power generation to fuel the economy, and transformed the country's military capabilities as a result of her extensive participation in global trade.

4. Research methodology

This study investigates the possible effects of the macroeconomic policies that supported import substitution industrialisation in relation to economic growth in the developing world, with a specific reference to the group of BRICS. The study adopts measurable indicators of instruments of trade restriction and economic growth as suggested by literature. According to literature, ISI policy is primed on the use of instruments of trade policy such as tax (on the demand side) and subsidy (on the supply side). These variables are adopted in this study with some degree of modification. The modification is largely due to availability of suitable data and the challenges of finding accurate proxies.

According to previous studies, the importance of trade openness to economic growth is substantial (Kandiero & Chitiga 2003; Klasra 2009). According to these authors, economic openness helps a country to leverage its comparative advantage by specialising in the production of goods and services that yield comparative advantage,

while it imports those goods and services that yield comparative disadvantage. Stiglitz (2002) as well as Hill (2014) also buttress this asseveration. However, a few other studies found inconclusive evidence as regards the impact of trade openness on economic growth (Wheeler & Mody, 1992; Ponce, 2006). By definition, economic openness depicts the extent to which an economy is opened to foreign competition, through its active participation in trade and investment. This relationship is largely captured through import/export nexus.

In this research, economic openness is proxied by tariff on all imported products (*ALTAR*). Tariff barrier is chosen as a proxy for economic openness in this study because the application of tariffs is one of the cardinal launchpads of ISI, especially on imported manufactured products. Our choice of tariff barrier (on the demand side) also necessitated the inclusion of subsidy (on the supply side) to the estimation (*SUBSY*). Subsidy is proxied by total subsidy for all exports. We also introduced trade balance (*TRDBAL*), which is taken as a nominal value of balance of trade account. Other variables used in this study include employment in agricultural sector (*AGRICEM*), which is taken as a percentage of total employment. We use consumer price index to proxy inflation (*INFLTN*), and total government reserve (*TTRESV*) is used as a proxy for current account balance. This variable is also used to measure government policy on budget deficit (or surplus). Manufacturing value added (*MANVADD*) is used in this study to gauge the extent of material beneficiation during the periods covered in the study as a way of measuring the contributions of ISI to the industrialisation process of the sampled countries.

Furthermore, literature suggests that various measures can be used to measure economic growth. For example, Hicks (1969) as well as other recent scholars (Allen & Ndikumana, 2000; Asiedu, 2002; Chakrabarti, 2003; Asheghian, 2004; Adams, 2009) have used real Gross Domestic Product (GDP) to proxy economic growth. However, Sen (1999) view economic growth from humanity perspective. According to Sen, economic growth is best measured through improvement in human capital development, household poverty reduction, social freedom, political opportunity, population growth and so on. In this study, real GDP is used as a measure of economic growth as the most convenient proxy.

4.1. Estimation technique

The data used in this study is sourced from the World Development Indicators (WDI), an arm of the World Bank. The dataset is generated for the affected countries for the period from 1960 to 2016 (a period of 57 years). The time range of the data is informed by availability of usable data. However, there are missing data in between the study scope, but interpolation and extrapolation techniques were employed to take care of missing data. It should be noted that the dataset used in this study does not extensively cover the periods when ISI was adopted in the sampled countries, but the wide period adopted helps to capture the historical trend of events in a transitory manner. This observation is strengthen by the fact that macroeconomic policy framework like ISI normally takes a long time before its full effects on macroeconomic fundamentals become evident (Root, 1994; Rodriguez & Rodrick, 2000).

The theoretical expectation is that there should be both positive and negative relationship between the response variable and the explanatory variables. The literature survey supports this assumption, as the variations in the macroeconomic fundamentals that are proxied by the explanatory variables are expected to affect economic growth of the countries under considerations. Further, economic growth is expected to be positively correlated with total national reserves, given that economies are expected to grow as export capacity increases more than imports. The following paragraph discusses the model specification, data analysis and the concluding remarks.

The econometric equation depicts real growth as the response variable. As such, the following model is proposed for estimation:

$$GDPPPP_{it} = \alpha_i + \beta_1 TRDBAL_{it} + \beta_2 AGRICEM_{it} + \beta_3 SUBSY_{it} + \beta_4 INFLATION_{it} + \beta_5 TTRESV_{it} + \beta_6 MANVADD_{it} + \beta_7 ALTAR_{it} + e_{it}$$

The estimation is conducted with fixed and random effect methods but Hausman test suggested the appropriate method. The study further estimated generalized method of moments (GMM) and system generalized method of moments (SGMM) to control for endogeneity.

4.2. Data analysis

This study investigates the relationship between the measurable indicators of ISI and economic growth in a panel environment. In the estimation, *t* depicts time and *i* depicts country. The analysis begins with unit root test to determine stationarity of the panel data, which is a precursor for cointegration test; and closely followed by cointegration test, causality test, fixed and random effect methods estimation and generalized method of moments estimations.

Table 1 shows the stationarity test of the panel series for this study. The study employed Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), Fisher-ADF, Fisher-PP and Breitung unit root detection techniques to establish existence of non-stationarity in the panel series. The tests were conducted at none, only drift, drift and trend at levels for real Gross Domestic Product (GDPPPP) proxy for economic growth, trade balance (TRDBAL), employment in agricultural sector (AGRICEM), total subsidy for all exports (SUBSY), consumer price index (INFLATION), total government reserve (TTRESV), manufacturing value added (MANVADD) and tariff on all imported products

Table 1
Panel unit root test results.

Series	Model	LLC	IPS	Fisher-ADF	Fisher-PP	Breitung
GDPPPP	None	3.29965 (0.9995)		0.81980 (0.9999)	0.54654 (1.0000)	
	Constant	7.29908 (1.0000)	5.19415 (1.0000)	5.90698 (0.8230)	4.47550 (0.9234)	
	Constant and trend	5.27847 (1.0000)	5.75999 (1.0000)	3.49940 (0.9671)	2.20169 (0.9945)	5.46066 (1.0000)
TRDBAL	None	-3.25927 (0.0006) ***		29.8640 (0.0009) ***	24.4340 (0.0065) ***	
	Constant	-0.49333 (0.3109)	-1.17539 (0.1199)	17.4146 (0.0657)*	13.6747 (0.1884)	
	Constant and trend	-1.58761 (0.0562)	-1.57686 (0.0574)*	16.9419 (0.0757)*	12.3004 (0.2655)	-0.89240 (0.1861)
AGRICEM	None	-5.12480 (0.0000) ***		52.7788 (0.0000) ***	152.243 (0.0000) ***	
	Constant	-1.30676 (0.0956)*	-0.48333 (0.3144)	14.5473 (0.1495)	36.8959 (0.0001) ***	
	Constant and trend	-2.46955 (0.0068) ***	-3.52006 (0.0002) ***	29.7776 (0.0009) ***	73.1319 (0.0000) ***	-2.15951 (0.0154) **
SUBSY	None	0.03949 (0.5158)		20.2150 (0.0273)**	19.4534 (0.0349)	
	Constant	-0.82244 (0.2054)	0.30383 (0.6194)	16.0940 (0.0970)*	9.59429 (0.4768)	
	Constant and trend	0.45529 (0.6755)	-0.55338 (0.2900)	38.9620 (0.0000) ***	50.9475 (0.0000) ***	3.27901 (0.9995)
INFLATION	None	4.55982 (1.0000)		2.11047 (0.9954)	1.62007 (0.9985)	
	Constant	7.17135 (1.0000)	7.73708 (1.0000)	0.77843 (0.9999)	0.62692 (1.0000)	
	Constant and trend	1.70677 (0.9561)	5.00646 (1.0000)	1.92566 (0.9969)	0.87679 (0.9999)	7.13527 (1.0000)
TTRESV	None	-0.80208 (0.2113)		28.1538 (0.0017) ***	21.6518 (0.0170)**	
	Constant	0.80421 (0.7894)	1.64600 (0.9501)	15.9671 (0.1006)*	11.6742 (0.3075)	
	Constant and trend	-1.13564 (0.1281)	1.53380 (0.9375)	7.70726 (0.6574)	2.77841 (0.9862)	4.45328 (1.0000)
MANVADD	None	-1.31781 (0.0938)*		10.8439 (0.3698)	9.66888 (0.4700)	
	Constant	1.35488 (0.9123)	1.24330 (0.8931)	6.98164 (0.7272)	7.85756 (0.6427)	
	Constant and trend	-0.50277 (0.3076)	0.65722 (0.7445)	6.47252 (0.7741)	5.76989 (0.8342)	0.85086 (0.8026)

Notes: Null: Unit root (assumes common unit root process): Levin, Lin & Chu (t*) and Breitung (t-stat)
Null: Unit root (assumes individual unit root process): Im, Pesaran and Shin (W-stat), ADF - Fisher (Chi-square) and PP - Fisher (Chi-square)
***, ** and * are 1%, 5% and 10% significance level respectively

Table 2
Panel cointegration test results.

Trace test				Maximum Eigenvalue test			
H_0	H_1	λ-trace statistic	p-value	H_0	H_1	λ-max statistic	p-value
GDPPPP, AGRICEM, ALTAR, INFLATION, MANVADD, SUBSY, TRDBAL and TTRESV							
r=0	r ≥ 1	255.6	0.0000*	r=0	r ≥ 1	117.8	0.0000*
r ≤ 1	r ≥ 2	148.7	0.0000*	r ≤ 1	r ≥ 2	89.32	0.0000*
r ≤ 2	r ≥ 3	69.90	0.0000*	r ≤ 2	r ≥ 3	34.80	0.0001*
r ≤ 3	r ≥ 4	40.18	0.0000*	r ≤ 3	r ≥ 4	18.71	0.0442*
r ≤ 4	r ≥ 5	25.95	0.0038*	r ≤ 4	r ≥ 5	12.22	0.2705
r ≤ 5	r ≥ 6	18.96	0.0408*	r ≤ 5	r ≥ 6	9.028	0.5295
r ≤ 6	r ≥ 7	14.68	0.1442	r ≤ 6	r ≥ 7	11.49	0.3205
r ≤ 7	r ≥ 8	9.837	0.4549	r ≤ 7	r ≥ 8	9.837	0.4549

Notes:
Probabilities are computed using asymptotic Chi-square distribution.
*Rejection of the null hypothesis of no cointegration at least at the 10% level of significance.

Table 3
Panel causality test results.

Model	Null hypothesis	w-statistic	zbar-statistic	p-value	Direction of relationship observed
A	AGRICEM does not homogeneously cause GDPPPP	3.25963	1.21098	0.2259	No Causality
	GDPPPP does not homogeneously cause AGRICEM	3.52554	1.48473	0.1376	
B	ALTAR does not homogeneously cause GDPPPP	4.64402	2.63619	0.0084***	ALTAR ⇔ GDPPPP
	GDPPPP does not homogeneously cause ALTAR	7.75242	5.83624	0.0000***	
C	INFLATION does not homogeneously cause GDPPPP	10.0154	8.16592	0.0000***	INFLTN⇒GDPPPP
	GDPPPP does not homogeneously cause INFLATION	3.59908	1.56044	0.1187	
D	MANVADD does not homogeneously cause GDPPPP	8.13984	6.23508	0.0000***	MANVADD ⇔ GDPPPP
	GDPPPP does not homogeneously cause MANVADD	4.96792	2.96964	0.0030***	
E	SUBSY does not homogeneously cause GDPPPP	4.12593	2.10283	0.0355**	SUBSY ⇔ GDPPPP
	GDPPPP does not homogeneously cause SUBSY	5.44210	3.45780	0.0005***	
F	TRDBAL does not homogeneously cause GDPPPP	7.48152	5.55736	0.0000***	TRDBAL ⇔ GDPPPP
	GDPPPP does not homogeneously cause TRDBAL	6.88867	4.94703	0.0000***	
G	TTRESV does not homogeneously cause GDPPPP	8.22896	6.32683	0.0000***	TTRESV ⇔ GDPPPP
	GDPPPP does not homogeneously cause TTRESV	3.89573	1.86584	0.0621*	

Notes: ***, ** and * are 1%, 5% and 10% significance level respectively.

(ALTAR). We adopted a series of unit root tests in order to establish a strong order of integration, given that one method would augment the deficiency in the other.

The unit root tests reveal that real GDP is not stationary at level in Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), Fisher-ADF, Fisher-PP and Breitung unit root tests at no drift and trend, only drift and trend with drift estimation. These results suggest that we need to conduct first difference estimation for real GDP series in BRICS countries. The unit root tests further reveal that most of ISI indicators such as trade balance (TRDBAL), employment in agricultural sector (AGRICEM), total subsidy for all exports (SUBSY), consumer price index (INFLATION), total

government reserve (TTRESV), manufacturing value added (MANVADD) and tariff on all imported products (ALTAR)) in BRICS countries are not stationary at level using Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), Fisher-ADF, Fisher-PP and Breitung unit root tests. These unit root tests results suggest the need for cointegration test for long run relationship between economic growth and ISI estimators in BRICS countries (Table 2).

In this study, we conducted combined Johansen-Fisher cointegration test in which the null hypothesis is no cointegration. The Johansen-Fisher cointegration test is superior to other residual-based one way cointegration tests, as it generates results for the entire panel set. The estimation follows vector autoregression (VAR) process for the combination of the panel series using Fisher-Trace and Fisher-Maximum Eigenvalue tests. The panel cointegration test results show that six tests of trace value statistics are in support of existence of cointegration in the series and four tests of maximum Eigen-value statistics show the presence of cointegration in the series. Thus, at least ten vectors of the cointegrating equations have presence of panel cointegration. This indicates that there is long run relationship between economic growth (GDPPPP) and measurable indicators of ISI - trade balance (TRDBAL), employment in agricultural sector (AGRICEM), total subsidy for all exports (SUBSY), consumer price index (INFLATION), total government reserve (TTRESV), manufacturing value added (MANVADD) and tariff on all imported products (ALTAR)). The direction of relationship among the combined variables is further evaluated through robust Dumitrescu–Hurlin (2012) causality test.

The Dumitrescu–Hurlin causality test is adopted because of its superiority to other methods of causality (Geweke, 1984). The causality test is conducted to determine the direction of causality among variables under consideration – economic growth (GDPPPP), trade balance (TRDBAL), employment in agricultural sector (AGRICEM), total subsidy for all exports (SUBSY), consumer price index (INFLATION), total government reserve (TTRESV), manufacturing value added (MANVADD) and tariff on all imported products (ALTAR) in BRICS countries. The study conducted univariate causality test in which the causal-effect of ISI indicators and economic growth are introduced into the system separately – one after the other. The null hypotheses are "not homogenously cause" and if otherwise, the study rejects the null hypotheses.

The empirical results from Table 3 show that there is no causal relationship between economic growth (GDPPPP) and employment in agricultural sector (AGRICEM) in BRICS countries but there is unidirectional causal relationship from consumer price index (INFLATION) to economic growth (GDPPPP) in BRICS countries. And, the remaining indicators (tariff on all imported products (ALTAR), manufacturing value added (MANVADD), total subsidy for all exports (SUBSY), trade balance (TRDBAL) and total government reserve (TTRESV)) have bidirectional causal relationship with economic growth (GDPPPP) in BRICS countries. This done, it is considered important to determine the effects properties of the model for estimation (Table 4).

The Hausman test is employed to determine the appropriate panel model (fixed or random effect) for estimation of economic growth in BRICS countries. The Hausman test result for economic growth model in BRICS countries shows that the chi-square is 10,120.31 and the probability value is 0.0000. The study rejects the null hypothesis (H_0) since p-value of chi-square is less than 1 percent significance level (i.e. $0.0000 < 0.01$), thus, fixed effect model is deemed appropriate for economic growth estimation in BRICS countries. Though, fixed effects modelling can be expensive in terms of degrees of freedom if there are several cross-sectional units (Baltagi & Levin, 1992; Gujarati & Porter, 2009). However, since the Hausman test favoured fixed effect model, the study used fixed effect model to estimate the effects of ISI variables on economic growth in BRICS countries.

Table 4
Model specification test.

Hausman test	
	Economic growth model
chi-square	10,120.31***
p-value	0.0000

Notes: H_0: Random effect model is appropriate, H_1: Fixed effect model is appropriate
***, ** and * are 1%, 5% and 10% significance level respectively.

Table 5
FEM and REM result analysis for economic growth in BRICS countries (Dependent variable: GDPPPP).

Independent variables	Fixed effect	Random effect
Constant	6.626733*** [13.32] (0.000)	7.832581*** {12.86} (0.000)
TRDBAL	2.79000*** [3.49] (0.001)	2.72000** {1.97} (0.049)
AGRICEM	-0.0338484*** [-3.13] (0.002)	-0.2187492*** {-23.26} (0.000)
SUBSY	-0.001031 [-0.29] (0.768)	0.0147716*** {2.80} (0.005)
INFLATION	0.016875*** [7.25] (0.000)	0.0035558 {1.03} (0.302)
TTRESV	0.4582848*** [4.35] (0.000)	0.137965 {0.79} (0.431)
MANVADD	-0.0824531*** [-4.66] (0.000)	-0.0373277* {-1.89} (0.058)
ALTAR	-0.0065146 [-1.24] (0.214)	0.0230409*** {2.77} (0.006)
Total panel observations	285	285
R-square	0.6080	0.3393
F-statistic	60.49*** (0.0000)	–

Notes: Values in parentheses [], { } and () are t-statistic, z-statistic and p-value.
***, ** and * are 1%, 5% and 10% significance level respectively

The combined empirical results for economic growth using fixed and random effect models are presented in Table 5. The exact model for this study is fixed effect model as suggested by Hausman test but the random effect model is also estimated for comparison. The fixed effect model revealed that trade balance has positive significant impact on economic growth at 99 percent level of confidence in BRICS countries, and consumer price index has positive impact on economic growth with 1 percent statistical significance level in BRICS countries. The empirical findings further revealed that total government reserve has positive impact on economic growth with statistical significance at 1 percent in BRICS countries.

The employment in agricultural sector and manufacturing value added are negatively related to economic growth but statistically significant at 1 percent significance level in BRICS countries. But total subsidy for all exports and tariff on all imported products have negative impact on economic growth and statistically insignificant to economic

Table 6
GMM and SGMM result analysis for economic growth (Dependent variable: GDPPPP).

Independent variable	One-step estimation	
	GMM	**SGMM**
Constant	0.0312701 [0.27] (0.791)	-0.2046154** [-2.33] (0.020)
GDPPPP (-1)	0.9760463*** [88.63] (0.000)	0.9904788*** [141.91] (0.000)
TRDBAL	5.5000*** [3.85] (0.000)	5.06000*** [4.59] (0.000)
AGRICEM	0.0025036 [1.25] (0.210)	0.0029819* [1.79] (0.073)
SUBSY	0.0004308 [0.69] (0.490)	0.0006391 [1.21] (0.226)
INFLATION	0.0010046** [2.23] (0.026)	0.0012778*** [3.52] (0.000)
TTRESV	0.1044181*** [5.18] (0.000)	0.0984164*** [5.66] (0.000)
MANVADD	0.0004414 [0.13] (0.895)	0.0062897** [2.29] (0.022)
ALTAR	0.0042075*** [4.12] (0.000)	0.0057792*** [6.63] (0.000)
Number of observations	275	280
Number of groups	5	5
Observations per group	55	56
Number of instruments	273	328
Wald χ^2	20,795.30*** (0.0000)	48,087.78 *** (0.0000)

Notes: Values in parentheses [] and () are z-statistic and p-value.
***, ** and * are 1%, 5% and 10% significance level respectively
GMM: Arellano-Bond dynamic panel-data estimation
SGMM: Arellano-Bover/Blundell-Bond system dynamic panel-data estimation

growth in BRICS countries at least at 10 percent significance level. The results implied that 1 unit increase in trade balance, consumer price index and total government reserve increase economic growth in BRICS countries; but 1 unit decrease in employment in agricultural sector, total subsidy for all exports, manufacturing value added and tariff on all imported products raise the level of economic growth in BRICS countries.

The random effect model shows that trade balance, employment in agricultural sector, total subsidy for all exports, manufacturing value added and tariff on all imported products are statistically significant to economic growth at least at 10 percent significance level but consumer price index and total government reserve are statistically insignificant to economic growth at least at 10 percent significance level in BRICS countries. The overall significance of the regressors (trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products) to economic growth are evaluated through the F-statistic. The F-statistic is 60.49 with probability value of 0.0000; and since the probability value is less than 1 percent (i.e. $0.0000 < 0.01$), it is suggested that regressors are jointly statistically significant to economic growth in BRICS countries.

The R-square shows the rate of variations in economic growth caused by the exact components (trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products) of the model. The result shows that R-square is 0.6080, this implies that exact components of the model caused 60.8 percent variations in economic growth but random terms caused 39.2 percent variations in economic growth in BRICS countries.

The empirical results of the effect of lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products to economic growth is presented in Table 6, in which one-step technique of generalized method of moments (GMM) and system generalized method of moments (SGMM) were employed.

The GMM of Arellano-Bond dynamic panel-data estimation and Arellano-Bover/Blundell-Bond system dynamic panel-data estimation were employed to estimate the short-run coefficients of lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products in BRICS countries. The study also estimated generalized method of moments (GMM) and system generalized method of moments (SGMM) to control for any endogeneity that may exist in the fixed effect model.

The empirical results of one-step generalised method of moments (GMM) of Arellano-Bond dynamic panel-data estimation shows that lag of economic growth, trade balance, consumer price index, total government reserve and tariff on all imported products are statistically significant to economic growth in BRICS countries at least at 5 percent significance level. But, employment in agricultural sector, total subsidy for all exports and manufacturing value added are statistically insignificant to economic growth in BRICS countries at least at 10 percent significance level.

The overall joint significance of lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products to economic growth in GMM estimation is tested through Wald chi square test. The Wald chi square is 20,795.30 with probability value of 0.0000. This implies that lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products are jointly significant to economic growth in BRICS countries.

Table 7
Diagnostic test for one-step estimations.

Test	Economic growth model	
	GMM	SGMM
Sargan test of overidentifying restrictions	$chi^2(264) = 467.92$ $prob. > chi^2 = 0.0000$	$chi^2(319) = 749.7142$ $prob. > chi^2 = 0.0000$

Note: Sargan test of overidentifying restrictions: H_0: overidentifying restrictions are valid

The results of one-step system generalised method of moments (SGMM) of Arellano-Bover/Blundell-Bond system dynamic panel-data shows that lag of economic growth, trade balance, employment in agricultural sector, consumer price index, total government reserve, manufacturing value added and tariff on all imported products are statistically significant to economic growth in BRICS countries at least at 10 percent significance level. The joint significance of lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products to economic growth in BRICS countries is validated by Wald chi square value of 48,087.78 with probability value of 0.0000 in SGMM estimation.

The results of GMM and SGMM show that lag of economic growth, trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products have positive impact on economic growth in the short run but the impact of the regressors on economic growth are mixed in the long run as shown in the fixed effect model (FEM) in BRICS countries. The mixed results suggest the need for further robustness check, which prompted the use of Sargan test to establish the validity of the instruments.

Further to the estimations, Table 7 presented the results of the diagnostic tests for the dynamic economic growth model. It is important to point out that validity of generalised methods of moment (GMM) and system-generalised methods of moment (SGMM) depend strictly on the diagnostic tests of Sargan test of overidentifying restrictions for instrumental variables. The dynamic panel models (GMM and SGMM) do not assume normality and it allows for heteroscedasticity which can be controlled through valid instrumentation (Baltagi, 2008). Thus, the study employed Sargan test of overidentifying restrictions to validate the instruments of the estimated models in this study.

The Sargan tests evaluate the entire set of overidentifying instruments of the models. The results for the economic growth model shows that the chi-square statistics and p-values are, GMM: $\text{chi}^2 = 467.92$ with p-value $= 0.0000$; and SGMM: $\text{chi}^2 = 749.7142$ with p-value $= 0.0000$. As such, the study rejects the null hypothesis and conclude that overidentifying restrictions are not totally valid. This implies that some instruments of the model are not valid but the power properties of the model is sufficient for policy making since the Wald chi-square confirms the joint significance of key instruments in the estimation, namely trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products to economic growth in BRICS countries.

We further probe the resilience of the instruments to innovation shocks in order to determine their response pattern and speed. This is done through impulse response analysis, which we build on the vector error correction model (not reported). The result of the impulse response is presented in Fig. 1:

The results contained in Fig. 1 shows the response of economic growth to Cholesky one standard deviation/innovation shock in trade balance, employment in agricultural sector, total subsidy for all exports, consumer price index, total government reserve, manufacturing value added and tariff on all imported products in BRICS countries. The impulse response measures the unit shock applied to each series and its effect on the VAR system. The essence of this is to detect time path of various shocks and how VAR system reacted to the shocks.

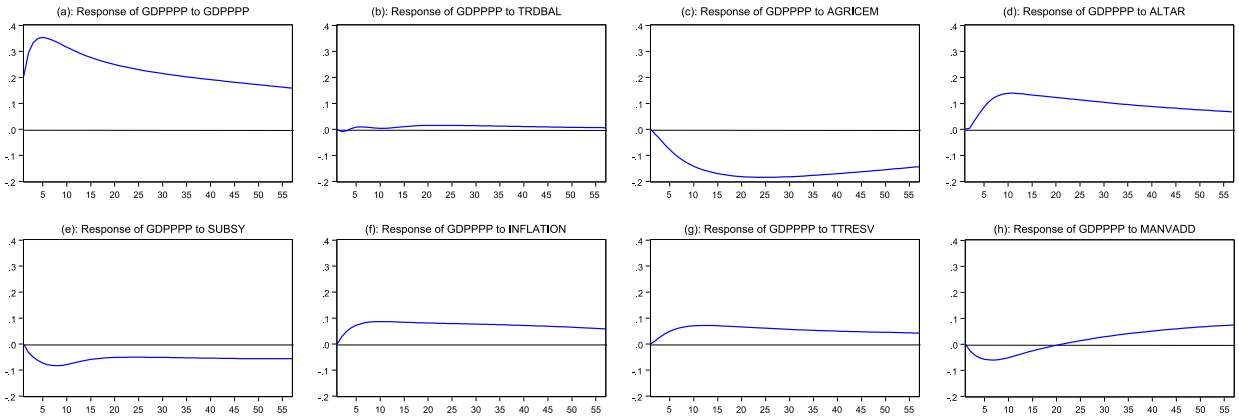

Fig. 1. : Cholesky one standard deviation/innovation shocks in growth model.

The Panel (a) in Fig. 1 revealed that economic growth reacted to one standard deviation/innovation positively both in the short and long run. At the beginning, the positive reaction of economic growth to own shocks is an increasing trend to period 10 but started to nosedive at the 11th period till 57th period in BRICS countries. The shocks in trade balance has little or no effect on economic growth in BRICS countries both in the short and long run as the panel (b) of Fig. 1 shows the trend of the standard deviation of trade balance hover around zero.

In addition, economic growth in BRICS countries reacted to shocks in employment in agricultural sector negatively both in the short and long run as shown in panel (c) of Fig. 1. The shocks in tariff on all imported products has increasing positive reaction on economic growth in the short run in BRICS countries but decreasing reaction on economic growth in the long run as revealed by panel (d) of Fig. 1. Panel (e) of Fig. 1 shows that the shocks in total subsidy for all exports halts economic growth in BRICS countries with negative response in the short and long run. The panel (f) of Fig. 1 shows that economic growth in BRICS countries reacted to innovations in consumer price index positively in the short and long run but attained peak at period 22nd. The innovations in total government reserve has positive reactions on economic growth in BRICS countries both in the short and long run as revealed by panel (g) in Fig. 1. Though, economic growth reacted to innovations in manufacturing value added negatively in the short run but at period 22nd, economic growth started a positive reactions to shocks in manufacturing value added till the 57th period.

5. Conclusion and discussion

This article investigated the relationship between import substitution industrialisation (ISI) and economic growth in the BRICS countries. The literature review laid the conceptual basis for the relevance and appropriateness of the ISI as growth driver in the developing country during the early industrialisation stages. Reference was made to the significant roles played by the macroeconomic policy framework in the now developed economies, during the fledgling industrialisation process. Evidently, the appropriateness of this policy intervention by the developing countries in order to catalyse the process of industrialisation was justified by the fact that all the now developed economies have adopted the ISI policy at a point in time, before they later embraced economic liberalisation when they attained certain threshold of industrial development.

The results of the empirical analyses were in many folds. In the first instance, the cointegration tests show evidence of long run relationship among the variables under consideration. It was established that there is meaningful relationship between the dependent variable (real growth) and the measurable indicators of import substitution industrialisation policy framework. The causality tests that follows suggested strong causal relationship among the variables. Of particular interest is the strong bidirectional causal relationships between growth and tariff on all imported products. This result suggests that reduction on all imported products may halt growth. The result clearly indicates that a prudent but cautious management of tariff regime is important to boost growth. The same can be said of all other variables, save for employment in agriculture sector (AGRICEM) that shares no causal relationship with growth and inflation that shows unidirectional causal relationship with growth – flowing strongly from inflation to growth. The general conclusion from this result is a strong indication that most of the measurable indicators of ISI do influence growth.

Further, the result of the relationship between growth and ISI measurable indicators, using both GMM and SGMM, as well as one-step estimations in GMM and SGMM suggest strong relationship between growth and ISI measurable indicators. Of particular interest are the strong relationships between growth and trade balance, which suggests that an improvement in trade balance, which is the cardinal macroeconomic target of ISI, will improve growth. The analyses further suggests that a reduction in primary sector employment (agriculture) will fuel growth, in the same vein that a reduction in subsidy directed towards export promotion would help to galvanise growth. In addition, it is observed from the analyses that stemming manufacturing value added will galvanise growth, essentially because of inflation pressure on growth. The findings also indicates that tariffs on importation has to be managed carefully because of its negative effects on growth, especially in the fixed effects GMM. This may imply that most of the imports are composed of manufacturing input materials and machinery.

Concluding the analyses, the impulse response analysis suggests that growth responds to trade balance unitarily over the period under consideration, while the response to subsidy was negative, but slightly more resilient than employment in agricultural sector. This result indicates that any shock on these two variables (AGRICEM and SUBSY) will negatively and significantly halt growth. This strongly supports the underpinning principles of ISI and

lends credence to the strategic importance of instruments of trade restriction on effective implementation of ISI, especially in the short run. Further, response of growth to innovation shocks on tariffs spurs growth, which later rallies gently towards decline, as opposed to innovation shock on manufacturing value added that triggered spontaneous noticeable decline in growth (during the ISI period) and became significantly and positively sustained in the long run (as export promotion is initiated).

The analyses contained in this study clearly demonstrates the strategic importance of ISI macroeconomic policy as a possible catalyst to catapult an economy out of import dependency towards industrialisation that could ultimately help to build export capacity. The analyses confirm the short and long run relationships between growth and ISI measurable indicators, in a chronological manner that supports import substitution in the short run and exports promotion in the long run. This affirms the prodigy of Mill's method of concomitant variation in not only the application of policy initiatives but the outcome of such policies.

A conclusion can thus be drawn, both from literature account and econometric estimations, that the ISI macroeconomic policy defies the self-defeating prophesy levied against it by the institutions of Washington consensus and other adversaries. Essentially criticisms that the policy stimulates economic despondency, retards growth and kills competition in the domestic industrial sector – all that has been established in this study to be inadequate and somewhat inappropriate. It is thus suggested that developing economies, especially less industrialised economies should consider import substitution in the short run, and export promotion in the long run as the country develops sufficient manufacturing capacity that is capable of stimulating export.

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