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EFFECT OF TRADE LIBERALIZATION ON ALLOCATIVE EFFICIENCY OF THE MANUFACTURING SECTOR IN KENYA

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Abstract

This paper aims at determining the effect of trade liberalization on allocative efficiency of the manufacturing sector in Kenya. For this, the paper employs panel data from 13 industries obtained from secondary sources. Price-Cost Margin is used as a proxy for allocative efficiency while import penetration ratio models trade liberalization policy. Estimation of the empirical model constructed based on hedonic price function convention is done using pooled OLS, fixed effects and random effects models of panel regression. The results revealed that the coefficient of import penetration ratio is consistently positive in all the models and statistically significant in pooled OLS and fixed effects models, implying a positive relationship between import penetration and profit markups of the industries in the sector. In essence, esult points that an increase in import penetration increases the profit markups of industry and therefore overall imports lack pro-competitive effects on domestic prices of manufactured goods in Kenya. The model also features industry concentration index computed as industry share of output. Coefficient of this variable is also positive and consistently significant at 5%. This implies that a high industry concentration leads to a higher Price-Cost Margins. Both industry growth rate and Capital-output ratio increased as independent variables were positive and statistically significant. In general, the results suggest that imports did not have a competitive effect on manufactured goods in Kenya during the period under study, i.e 2001 to 2010, and hence the trade policy did not contribute to allocative efficiency. This could be attributed to heterogeneity between imports and locally produced goods and hence limited competition. Given the results, openness to imports may not guarantee the realization of the goals of competition policy. Diversification of manufacturing production within an environment that will facilitate fair competition and encourage growth is therefore recommended.

Keywords: Allocative Efficiency, Competition Policy, Import Penetration Ratio, Manufacturing Sector, Price-Cost Margin, Trade Liberalization

INTRODUCTION

The manufacturing sector in Kenya plays a vital role in the overall performance of its economy. The sector which mainly constitutes industries processing primary agro-based products such as food and beverage items and basic construction material contributes about 10% of the total GDP and about 13% of the total employment numbers (ROK, 2007). These figures have remained relatively stagnant since the 1980s.

During the early years of Kenya's independence, the sector was characterized by a high degree of restrictions resulting from a deliberate government policy of import substitution, whose aim was primarily to correct its adverse Balance of Payments position and reduce unemployment, presumed to be caused by growing imports. It was hoped that the import substitution policy would also result in inducing growth of industrialization heralding Kenya's quest for accelerated growth (Were, Ngugi, Makau, Wambua, & Oyugi, 2005). The policy employed both tariff and non-tariff instruments to prevent penetration of imports.

The import substitution policies, however, failed to yield the desired effect. The Balance of Payment position worsened with growing imports of capital goods required to set up local industries, the value of the shilling against the dollar and other major foreign currencies diminished and with no meaningful exports to take advantage of the currency situation, the import bill ballooned reducing the foreign currency reserves, imposing a strain on importation of the all-important capital goods thus causing growing unemployment. Attributing the failure of the import substitution strategy to worsening BOP deficit due to growing imports of capital goods could, however, seem to be as a result of misspecification of the policy objectives since that was expected of a developing economy.

Following the failure of the import substitution strategy to spur industrial growth and correct the Balance of Payment deficits, Kenya, in the mid 1980s, abandoned the import substitution policy and embarked on trade liberalization strategy becoming among the first countries to sign a structural adjustment loan with the International Monetary Fund (IMF), which set liberalization of the economy as a precondition for the loan (Gertz, 2008). The World Bank prescription meant that Kenya had to rethink its trade policy by adopting a more open strategy through the gradual elimination of import restrictions on consumer goods imports. The reduced restrictions helped to lower the price of imported goods thus providing a potential reprieve to Balance of payment deficits, but also meant that the young Kenyan manufacturing industries faced increased competition from the imports.

It has been argued that trade liberalization benefits an economy by providing incentives for allocative, productive and dynamic efficiencies to the various sectors (Baldwin & Caves, 1997). With these efficiencies representing key economic objectives of competition policy

(Motta, 2004), trade policy could therefore also be viewed as complementary to domestic competition policies, usually pursued towards the benefit of consumers and the market set up at large.

Few studies have been conducted on the competitive effects of trade liberalization policies that encouraged more imports of manufactured goods in developing countries. A World Bank Report by James Tybout (Tybout, 2001) based on cross-sectional data of Turkey, Cote d'Ivoire, and Mexico sought to establish, among other things, the relationship between trade liberalization and reduced price-cost margins and found that indeed trade liberalization had a competitive effect on prices. The study however only limited itself to data during the early and mid-1980s, few years following adoption of the policy by the counties, thus covering only the early face of trade liberalization experience by these developing countries. Corbo & Mcnelis, (1989) and Yang & Hwang, (2001) used time series data to determine the trend of pricing of manufactured goods during trade liberalization. These studies focused on the impact that imports had on domestic prices during the implementation of liberalization policies. In both cases, it is noted that trade liberalization policies have had some impact on prices of domestic products due to increased competition from imports.

The main purpose of this study is to assess the competitive effect that trade liberalization policy has on Kenya's manufacturing sector using data from thirteen manufacturing industries during the period 2001 to 2010. This period was considered for study as it represents a normal period void of potential data distortions arising from heightened political environment both in the preceding and proceeding periods. In particular, the study focuses on the effect of import penetration on Price-Cost Margins (PCM) of manufacturing industries. Pro-competitive effect as measured by reduced prices and sliming profit margins enhances allocative efficiency translating to surplus gains to consumers. Movements towards gains in allocative efficiency have been identified as one of the key objectives of competition policies including Kenya's competition laws whose guiding principle aim at protecting and improving the consumer s welfare (Gal, 2003). Allocative, productive and dynamic efficiencies constitute ultimate goals of competition policy which confer benefits to the consumer in form of enlarged consumer surplus and better quality of products (Motta, 2004). The study seeks to establish the extent to which the liberalization policy affects the allocative efficiency in the manufacturing sector in Kenya.

As already mentioned, the competitive effect of the trade liberalization policy on manufacturing sector is measured with regard to allocative efficiency of the sector on the basis of panel data of the industries. Allocative efficiency occurs when there is an optimal allocation of goods and services taking into account consumer preference. At this level, the price is equal to marginal cost (Brumby, 2007). Productive efficiency, on the other hand, occurs where

production takes place at the lowest average cost and this is modeled by the production possibility curve (Nicholson & Snyder, 2010).

While tariff trends over the years following liberalization regime have previously been used to quantify trade liberalization policy (Goldar & Aggarawal, 2004), this measure has been inadequate as it ignores the effects of non-tariff barriers which often are not easily quantifiable (Dijkstra, 1997). To cover for this, this study employs the import penetration measure as a proxy for trade liberalization. The use of import penetration ratio is particularly suitable since the trade liberalization policy in Kenya is mainly associated with increased imports.

Liberal trade policy was adopted by Kenya to replace its import substitution strategy with the hope of correcting Balance Of Payments (BOP) position and spur growth. The policy, however, meant that Kenya opens its manufacturing sector to competition from imports resulting in reduced trade restrictions. Theoretically, increased competition from imports is expected to enhanced welfare gains in form of allocative, productive and dynamic efficiencies. Indeed studies conducted in other parts of the world have indicated a positive correlation between domestic prices and imports. This notwithstanding, arguments also do exist which view open trade as detrimental to growth in local industries leading to premature deindustrialization and concentration of markets (Shafaedeen, 2005). However, few studies have been conducted to estimate the competitive effect of trade liberalization with regard to allocative efficiency in the manufacturing sector in Kenya. This study, therefore, aims at determining the effect of trade liberalization on allocative efficiency in the manufacturing sector and the viability of trade policy as a tool of promoting goals of domestic competition policy. IPR and PCM are used as proxies for trade liberalization and allocative efficiency respectively.

The general objective of the paper is to determine the competitive effect of trade liberalization policy. Specifically, the nature of the relationship between import penetration ratio and price-cost margin and effect of import penetration on the allocative efficiency in the manufacturing sector in Kenya is assessed. From these, policy recommendations to enhance the competitiveness of the sector are drawn.

RELATED LITERATURE

Effects of liberal trade policies are aptly explained by various theories of international trade. David Ricardo's comparative advantage theory explains how trade between countries takes place and stresses on the importance of opportunity cost as the key influence of trade. In this theory, trade occurs when nations have the comparative advantage of producing tradable wares based on opportunity cost (Krugman, Obstfeld, & Melitz, 2010). As such, countries with comparative disadvantage tend to import more. In the initial stages, such imports exert

competitive pressure on inefficient domestic produce causing a fall in prices thus enhancing allocative efficiency in the domestic market. A discussion paper on the theory of customs union (Reizman, 1979), essentially an extension of fundamental theories on international trade, elucidates on how the elimination of trade obstacles enhances efficiency by enlarging the size of consumers surplus. Certain conditions must, however, exist for this behavior to be seen such as, the pre-customs union tariffs must be significantly high, in a manner that substantially inflates domestic prices and trade between partners should consist of homogeneous or near homogeneous goods.

Pro-competitive effects of import liberalization perhaps become clear when a link between elimination of tariff and non-tariff trade barriers and elasticity of domestic demand for local produce is established (Tybout, 2001). With the elimination of barriers to trade, the elasticity of demand increases on account of increased availability of import supply; fall in consumer prices previously factoring tariff charges and a wide range of alternatives, exerting a downward pressure on profit markups.

Considering an alternative theoretical approach based on oligopoly setup characterized by collusive behavior, increased import penetration make cooperative behavior untenable, inducing heightened competition both on prices and quantities (Tybout, 2001). In such collusive environment, import liberalization makes it difficult to detect defection, fundamentally alters the payoff to defecting and participating firms' ability to punish defectors.

The negative effect of import penetration on prices and profit margins notwithstanding, there also exist possibilities that in the long run, import penetration may not necessarily reduce profits but even maybe increase the margins. Heightened import competition may induce industrial units to increase efficiency by adopting better technology and increase Research and Development activities thus sustaining a competitive edge and maintaining or better their margins (Godwar and Aggarwal, 2005).

Conceptual Logic

Trade liberalization generally fosters competition by exposing domestic producers to increased import supplies while providing greater access to technology and investment (Balal, 2000). The 'imports-as-competitive-discipline' is not only a theoretical argument but is also supported by strong empirical evidence (Cadot *et al.*, 2000). The more exposed to international trade is an economy, the more likely and the larger is the pro-competitive impact of trade. In that sense, trade liberalization could act as a substitute or complement to competition policy regimes. The essence of competition policy is to enhance the general welfare of the market by promoting allocative, productive and dynamic efficiencies as measured by how low prices fall, how much is

produced and how much firms spend on Research and Development in an effort to promote innovation that results in better products (Motta, 2005).

The relevance of liberal trade policy on the manufacturing sector, therefore, depends on the extent to which it contributes towards the general principles of competition policy of promoting allocative, productive and dynamic efficiencies in the sector.

Liberalizing imports by reducing tariff and eliminating non-tariff barriers result in increased import supply which serves to reduce market concentration. A caveat for this, however, is that the increased import supply should consist of bundles similar to those produced by domestic manufacturers. Reduced concentration induces more competition resulting in falling prices and profit margins for the benefit of consumers. Increased import supply also widens choice in the market (Goldar and Aggarwal, 2005) making the domestic market more competitive. Such measures are often followed by reduced prices, increased spending on Research and Development and improved quality of domestic produce. In this sense as observed by Godwar and Aggarwal, import completion is viewed as a discipline factor for domestic industries in imperfectly competitive setups.

Measuring Allocative Efficiency

Allocative efficiency refers to the welfare gains as reflected in reduced prices resulting from an efficient market environment (Motta, 2005), achieved when a firm can profitably charge at a price which equals the marginal cost of production. This occurs when the degree of market concentration is reduced on account of increased competition. More often than not, assuming static costs, such fall in prices reduces the profit margins of firms, essentially making the profit margins monotonic transformation of prices. Figure 1 illustrates the loss of allocative efficiency resulting from an extreme form of market concentration.

A firm is said to have realized allocative efficiency if it is operating with the optimal combination of input (Badunenko et al., 2006). This, therefore, implies the measurement of allocative efficiency ideally requires utilization of information on input prices. Traditionally, this rationale has provided an approach to the measurement of allocative efficiency as a ratio of technical efficiency to cost efficiency of firms. However, information on input prices is often not easily available especially for manufacturing industries causing difficulties in empirical analysis.

In view of the challenges in the traditional approach to this measurement, new studies have suggested alternative methods which do not necessarily require the use of input prices. Badunenko et al. (2004) consider that allocative efficiency can be estimated using input and output quantities and profits.

This study, however, uses the PCM of industries as a measure of allocative efficiency. This is based on the assumption that allocative efficiency manifests itself in the market in the form of reduced prices and assuming an unchanging cost of production, leads to a fall in the profit markups of industries.

In a study investigating effects of trade liberalization on domestic prizes in Koreas manufacturing sector (Yang and Hwang, 1999), allocative efficiency in the sector was measured in terms of changes in producer price index. The study concludes that increase in import penetration of manufactured goods had a pro-competitive effect as reflected in resulting fall in producer prices which was ultimately transmitted to the market in form of falling consumer prices. In yet another study on trade liberalization and performance of manufacturing industries in India (Goldar and Aggarwal, 2005), allocative efficiency of industries is considered as given by current economic profit over sales plus the competitive return to capital over revenue. This view is based on the assumption that PCM is a monotonic transformation of profit markups give static unit expenditure on labor and intermediate inputs (Tybout, 2001). Whereas producer price index would be an ideal representative of allocative efficiency, being void of assumption on static costs, this study uses Price-Cost Margin since data on Producer Price Index is not available.

Empirical Review

The extent to which trade liberalization has impacted the manufacturing sector varies from country to country. In general, however, trade liberalization policies have been found to exert pro-competitive pressure in domestic markets. In a paper investigating the effects of liberal trade policy on domestic prices in Korea (Yang and Hwang 1999), revealed a negative relationship between Import Penetration Ratio (IPR) and prices. The research based on panel data of 18 manufacturing sectors estimated a functional equation featuring producer price index of the sector as the regressand and a host of independent variables including Import Penetration Ratio, the Herfindhal-Hirschmann Index of concentration, unit cost of labour, unit cost of intermediate material and market demand, over the period between 1983 and 1995. The results of the estimates using pooled OLS method indicated that coefficient of import penetration ratio was negative and had a statistically significant influence on domestic producer price index. The magnitude of the coefficient of IPR revealed that a 10% increase in IPR leads on average to a fall in domestic prices of 40%. The inference drawn from these results is indeed, import penetration had a considerable and significant restraint effect on Korea's domestic prices.

A study focusing on effects of trade liberalization in some Latin American countries suggested that trade liberalization had generally improved the competitiveness of industrial production in those areas (Dijkstra, 1997). According to this study, increased import competition enhanced both allocative and X-efficiencies of industries implying exertion of both static and dynamic effects. Import competition was attributed to structural changes in Latin America industries through reallocation of resources from inefficient production to focus on sectors of comparative advantage. The structural changes in production patterns also lead to growing manufacturing exports of products which the region had a comparative advantage.

A research conducted on sugar industry in Kenya revealed that restrictive trade in the market for sugar has had a negative effect on the price of the commodity. This is a clear indication of efficiency loss associated with high tariff rates and non-tariff trade barriers. According to the report, the cost of allocative inefficiency associated with restrictive quotas and government regulations in the sector was estimated to have been fluctuating between 6.80 and 9.04 percent of Gross Domestic Product (GDP) since 2003 (Kipruto, 2010). This is an equivalent of an annual average of 43.68million dollars since protective policies in the sugar sector was introduced in Kenya. This according to theories explaining international trade is due to lack of competition.

A study covering four Indian industries (Krishna & Mitra, 1998) established a considerable fall in profit markups in the period immediately following post-reforms of trade policy allowing increased imports. The markup parameters for three of the industries recorded a sharp decline in values less than one which effectively suggested the industry incurred losses. Such losses could have been an indicator of the competitive effects of import supply exposing the inefficiency of the sectors. Work on trade liberalization and price-cost margin in Indian industries based on panel data of 137 classified at three digit level between 1980 and 1998 (Godwar and Aggarwal, 2005) established a negative relationship between liberal trade policies and profit markups. The study utilized levels of tariff and non-tariff barriers as proxies for open trade policy. The results of the econometric analysis revealed that lowering of tariffs and removal of non-tariff barriers on imports of manufactured goods in the 1990s had a significant pro-competitive effect on highly concentrated Indian industries, diminishing the price-cost margin. The coefficient of restriction was consistently positive and significant at 1% level.

Contrary to findings of most studies reviewed, a paper based on company-level data between 1980 and 1997 found that profit markups increased in the period following trade liberalization in India (Srivastava, 2001). This trend was predominantly evident in industries producing consumer goods such as food products, plastic, and rubber, leather and publishing and printing. Reasons given for this trend is that consumer goods faced little competition from

imports during the period under study probably due to an entrenched preference for homegrown products following decades of protectionism and propaganda that promoted local goods through the swadeshi movement.

As evident from empirical results in most of the studies reviewed, increased penetration of imports exerts competitive pressure on local markets causing both domestic prices and profits markups to fall. Most of these works were based on panel data either at industry or company level and measure for trade policy is constructed at a micro level. Limited studies are however available discussing the pro-competitive effect of liberal trade policies in Kenyan context. This paper, therefore, attempts to determine this relationship.

METHODOLOGY

This paper employs panel data analysis of thirteen manufacturing industries over ten years, for the period 2001 and 2010. This period was considered for study as it represents a normal period void of potential data distortions arising from heightened political environment both in the preceding and proceeding periods. Panel data is a dataset in which the behavior of entities is observed over time. The rationale for using panel data is drawn from the nature and objectives of the study which seeks to examine the effects of a phenomenon (trade liberalization) on competition attribute of a sector consisting of sub-components (industries). The data used is drawn from secondary sources including publications of the Kenya National Bureau of Statistics such as Statistical Abstracts and Economic Surveys.

Model Specification

Arguments of this paper are hinged on the theory of price which contends that price occurs as a result of interaction between factors which influence demand and supply. Given that the aim of the study is to determine whether trade liberalization has significant pro-competitive effect in Kenya's manufacturing sector, PCM shall, therefore, be the variable of interest.

The rationale for centering the study on the theory of price is drawn from fact that allocative efficiency as an aspect of competition policy is best measured using domestic prices (Motta, 2005). Assuming constant costs of labor and intermediate inputs, increased competition forces prices to fall thereby reducing the Price-Cost Margin. In building the model, a hedonic price function is used. Hedonic price model attempts to decompose price into its main characteristics to facilitate regression analysis and determine the relative significance of each variable in the model (Triplet, 2006). Effects of trade liberalization on allocative efficiency of the manufacturing sector will also be determined in this model by considering import penetration ratio as an important variable affecting domestic PCM. Exposure to import competition is

expected to result in lower prices hence reducing the PCM since import increase elasticity of demand (Goldar, Agarwal: 2004). As alluded to earlier, import penetration ratio computed as the ratio of the value of the country's imports of final goods and services to the value of total trade (exports plus imports) of goods and services are used.

To facilitate comparison between the significance of trade liberalization and market structure, a variable representing the degree of market concentration is also introduced. Conceptually, highly concentrated markets are less competitive with demand being relatively inelastic. This often provides an incentive for higher prices, increasing the PCM hence making PCM inversely related to market concentration. This study employs a measure of the ratio of output share of industries to total sectors output as a variable representing industrial competitiveness as a proxy for market concentration. In deriving this variable, the convention for determining the sectoral Hirschmann Index for competitiveness (Mikic & Gilbert, 2009) is used. This is in lieu of the more appropriate Herfindahl-Hirschman Index of concentration, computed as the weighted average of an industry market concentration based on firms market share by sales (Viscusi, Harrington, & Vernon, 2005) due to inaccessible data on market share for the various industries. The relationship between the variables is expressed in a functional form as follows:

$$PCM_{it} = f(IPR_t, CONI_{it}, K\_Q_t, IGR_{it})$$

From the equation PCMit represent Price-Cost Margin of industry "i" at time t, IPR stands the countries Import Penetration Ratio, CONI represents index of industrial competitiveness computed as the percentage of an industries output to total sector output during a given period of time and stands as a proxy for concentration index, K_Q represent the general capital-output ratio and IGR represents industry growth rate. IPR represents import penetration ratio.

Since effects of import competition on domestic prices are expected to be significant in a highly concentrated local industry (Yang and Hwang, 1999), a variable that represents the relationship between the degree of concentration and import penetration is also introduced to determine the extent of influence on Price-Cost Margin of this interaction.

The specified model shall be estimated using industrial level panel data to determine the pro-competitive effects of trade liberalization on the manufacturing sectors heterogeneous units.

Data and Definition of Variables

The data for this study is based on secondary sources drawn from various reports, specifically Statistical Abstracts and Economic Surveys published by the Kenya National Bureau of Statistics. The use of secondary data is suitable for this study since information on the key

variables of the model is more comprehensive and is collected directly by the Kenya National Bureau of Statistics.

Data on the dependent variable i.e price cost margin (PCM), which is used as a proxy for allocative efficiency, is computed as the difference between the total value of output for respective industries and the aggregate costs for the period 2001 to 2010 across thirteen manufacturing industries. In this case, the aggregate cost of production is the summation of the value of compensation of employees and value of inputs as reported in various Statistical Abstracts and Economic Surveys published by the Kenya National Bureau of Statistics. In a paper reviewed for this study, Producer Price Index was preferred as a proxy for allocative efficiency (Yang and Hwang, 1999). However, this could not be used in this study since very scanty data is available. The choice of price-cost margin is therefore taken as the closest representation of allocative efficiency of the sector.

$$PCM_{it} = [OUTPUT_{it} - (COE_{it} + INPUT_{it})]$$

Where, COE = Compensation of Employees, OUTPUT = Value of output for a given industry at a given time t, PCM = Price-Cost Margin, INPUT = Value of intermediate inputs.

Data on the degree of concentration is computed based on the convention for determining sectoral Hirschmann Index which measures the degree of competitiveness of sectors in an economy (Mikic and Gilbert, 2009). Application of this method at sectoral level permits the determination of relative strength of the industries in the manufacturing sector in terms of their share of total output. Intuitively, a greater share of output is expected to correspond with greater PCM. This is consistent with the Herfindahl-Hirschman Index (HHI) of concentration measure (Viscusi, Harrington and Vernon, 2005) which various results have shown a positive relationship between the index value and PCM (Goldar and Aggarwal, 2005) which connotes an inverse functional relationship between the degree of concentration and allocative efficiency.

$$CONI = (s_i / S) * 100$$

Where, CONI=Concentration Index (Competitive measure), s= value of output share of industry "i", S=Value of total sectoral output

Trade liberalization is measured by IPR. While some of the previous studies have used tariff trends over the years to quantify the policy, import penetration ratio is considered a suitable proxy for the policy as it takes into account effects of non-tariff barriers ignored by tariff trends. The import penetration ratio is computed as a ratio of imports to total trade – exports plus imports. Data on the annual value of imports and domestic exports is drawn from Economic Surveys for the period of study, 2001 – 2010. Whereas industry-specific data would be desirable

to capture industry-specific effects of trade liberalization, classification of trade data in a form not consistent with Standard Industrial Classification at three digit level has necessitated a much broader measure. The following formula is used to compute the measure.

$$IPR_t = (LM_t / EX_t + IM_t)$$

Where, IPR =Import Penetration Ratio at time t, IM = Value of Imports, EX= Value of domestic exports.

The capital-output ratio, K_Q, is constructed taking the quotient of gross capital formation, K and gross domestic product at market price, Y, both at constant prices. This variable measures the overall capital intensity of the economy and signifies the importance of adopting new technology on price-cost margin.

$$K\_Q_t = K_t / Y_t$$

Industry growth rate is derived by taking the ratio of the difference of an industry's output between two periods and the initial output level, symbolized by q. industry growth rate represents the role of changes in output levels on industry's profit markups.

$$IGR_{it} = (q_{2_{it}} - q_{1_{it}}) / q_{1_{it}}$$

To ensure consistency of analysis results and allow interpretation of the coefficients in elasticity form, the model for estimation is transformed by taking the natural log of price-cost margin. The equation for estimation, therefore, appears as follows:

$$\log PCM_{it} = \alpha_0 + \beta_1 IPR_t + \beta_2 CONI_{it} + \beta_3 K\_Q_t + \beta_4 IGR_{it} + \varepsilon_{it}$$

Where, PCM = Price-Cost Margin of ith industry at time t, IPR =Import Penetration Ratio, K_Q = Capital Output Ratio, CONI = Concentration Index (output share of industry), IGR = Industry Growth rates, α=constant term, β = parameters of independent variables, ε = error term.

ANALYSIS AND RESULTS

Descriptive Statistics

Table 1 presents a summary of these statistics. On average, for the period 2001-2010, the manufacturing sector in Kenya was viewed as profitable since its mean PCM is positive with an average of Kshs.6706.41 million. The Imports Penetration Ratio (IPR) measure reflects the degree to which import satisfies domestic demand. This Index has been taken to reflect the extent of overall trade liberalization. On average the percentage of imports relative to total external trade was 69.06%. this implies that imports accounted for 69.06% of the total value of trade for the period ranging 2001-2010. With a minimum of 66.23% and a maximum of 71.07%, this could be interpreted as over-reliance on imports by all sectors of the economy.

Concentration Index (CONI) representing output share of the industries indicates that the manufacturing sector is not competitive since a single industry in the sector has a maximum market share of 41.26%. Highly concentrated industries mean that the sector has considerable market power which in essence forms a recipe for allocative inefficiency. Import Penetration Ratio (IPR) is consistently above 0.5 on average suggesting a high degree of openness to imports. Conceptually high import penetration allows for enhanced import competition on local production which is expected to induce fall in prices and enhanced allocative efficiency. This, however, is only possible where there exists some degree of homogeneity between the local production and imports. The figures of both the PCM and IPR data reflects an increasing trend in both, signaling a possible positive correlation between the two. The positive correlation between these two is against theoretical expectations of competitive effect of import supply and could hence be attributed to overall heterogeneity between imports and manufactured products in Kenya. During the period covered in the study, the capital-output ratio (K_Q) had a mean of 0.200113 (20.01%) and recorded a maximum of 0.255217 (25.523%) and a minimum of 0.151589 (15.157%).

Table 1 Descriptive Statistics

Using the observations 1:01 - 13:10

Variable	Mean	Median	Minimum	Maximum
PCM	6706.41	2977.00	127.000	42676.0
IPR	0.693363	0.697173	0.662316	0.710689
CONI	0.0769231	0.0398404	0.00691365	0.412583
IGR	0.0920640	0.0944885	-0.605064	0.649027
K_Q	0.200113	0.197528	0.151589	0.255217

The industry growth rate (IGR) during the period recorded an average of 9.23% with the highest growth rate being recorded at 64.9% and a minimum of -60.51%.

Correlation coefficients show the degree and direction of the relationship between variables. Table 2 indicates that PCM is strongly and positively related with concentration index, a proxy representing the share of the output of industries, implying that the higher the degree of output share of an industry, the higher the level of PCM which essentially reflects industry's profitability. This is consistent with the theoretical expectation of negative relationship between the degree of concentration and allocative efficiency of firms. The import penetration ratio is also seen to be positively related to PCM. This implies that a rise in import penetration is associated

with an increase in profit markups. At the industry level, this trend is seen as contradicting the expected negative relationship as imports are generally expected to have a competitive effect exerting a downward pressure on prices and reduced profitability. This observation should, however, be interpreted cautiously given that construction of the import penetration ratio is based on aggregate trade data and may therefore not fully capture industry-specific influence. Since on aggregate, the economy relies on import the bulk of which are machinery and fuel (RoK, 2010), imports are therefore viewed as profit-enhancing. Industry growth rate (IGR) correlates positively with both profit markups and capital-output ratio. This is expected as an increase in industry's output, possible through expanded scale over time, induces increasing profits assuming increasing returns to scale. On the other hand, increasing capital-output ratio enhances productivity. As expected, capital-output ratio correlates positively with price-cost margin. The capital-output ratio measures the overall capital intensity and reflects the impact of adopting new technology which ordinarily enhances productivity and improves the profitability of industries.

Table 2 Correlation coefficients,

Using the observations 1:01 - 13:10

5% critical value (two-tailed) = 0.1723 for n = 130

PCM	IPR	CONI	IGR	K_Q	
1.0000	0.2059	0.7349	0.2097	0.2833	PCM
	1.0000	-0.0000	0.0411	0.7056	IPR
		1.0000	0.0669	-0.0000	CONI
			1.0000	0.0643	IGR
				1.0000	K_Q

A significant observation from the matrix is the strong positive correlation between import penetration ratio and the capital-output ratio as indicated by a correlation coefficient of 0.7056. This reflects overall pro dynamic-efficiency effects of imports on the domestic economy. The zero correlation coefficient between import penetration and concentration index (CONI) suggest a high degree of heterogeneity between domestic manufacturing output and overall import supply.

Figure 1 illustrates the heterogeneity of PCM across industries. From the graph, it is evident that PCM varies significantly across industries. Three of the industries (food and manufacturing, chemical and allied and non-metallic minerals) particularly exhibit extensive variations in PCM. The food and manufacturing industry consistently recorded high output share

of the thirteen industries featured during the period of study. Heterogeneity of PCM across other ten industries is not as pronounced as in the case of food manufacturing, chemical and allied and non-metallic industries. This variation could be attributed to the high degree of homogeneity in these three industries which lends them substantial market power and greater temptation to price production well above marginal

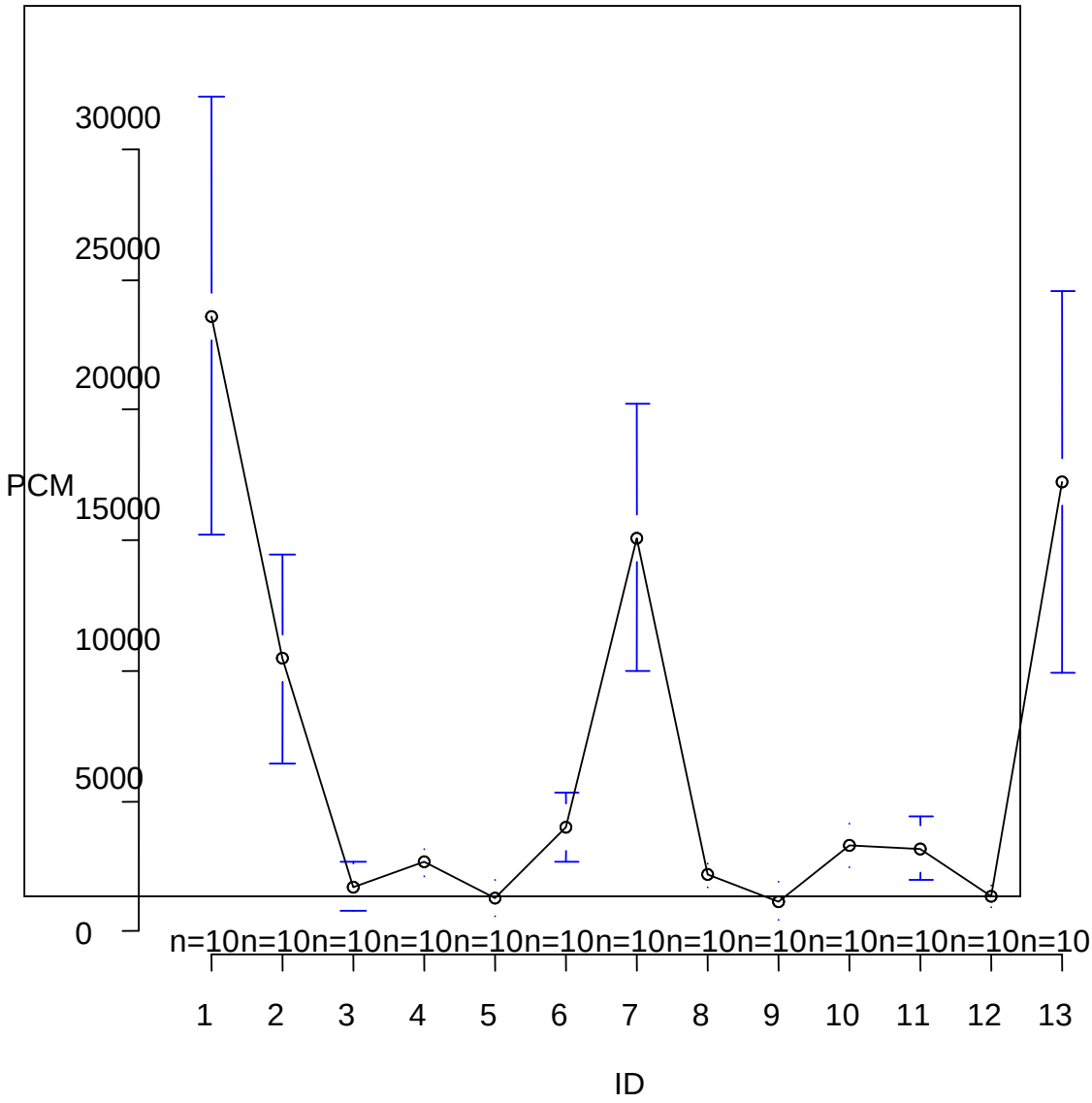

Figure 1: Heterogeneity across Industry

KEY: PCM – Price-Cost Margin

ID – Industries

1-Food and Manufacturing, 2-Beverage and Tobacco, 3-Textile and Clothing, 4-Leather and Footwear, 5-Timber and furniture, 6-Paper and paper products, 7-Chemical and Allied, 8-Plastics and rubber, 9-Transport equipment, 10-Metal and allied products, 11-Clay and Glass, 12-Electric and non-electric machinery, 13-Non-metallic minerals.

Cost as compared to the remaining ten with relatively greater levels of competition and hence limited market power and reduced markups.

Figure 2 shows the trend in PCM across years. From the graph, it is evident that PCM recorded a general upward trend between period 2001 and 2010. This corresponds with growing production across industries in the sector during this period mean PCM seemed to have remained relatively stagnate. Period between 2003 and 2006 recorded a gradual increase in sectors markup. 2007 – 2008 and 2009 – 2010 recorded a sharp rise in mean Price cost margin of the sector.

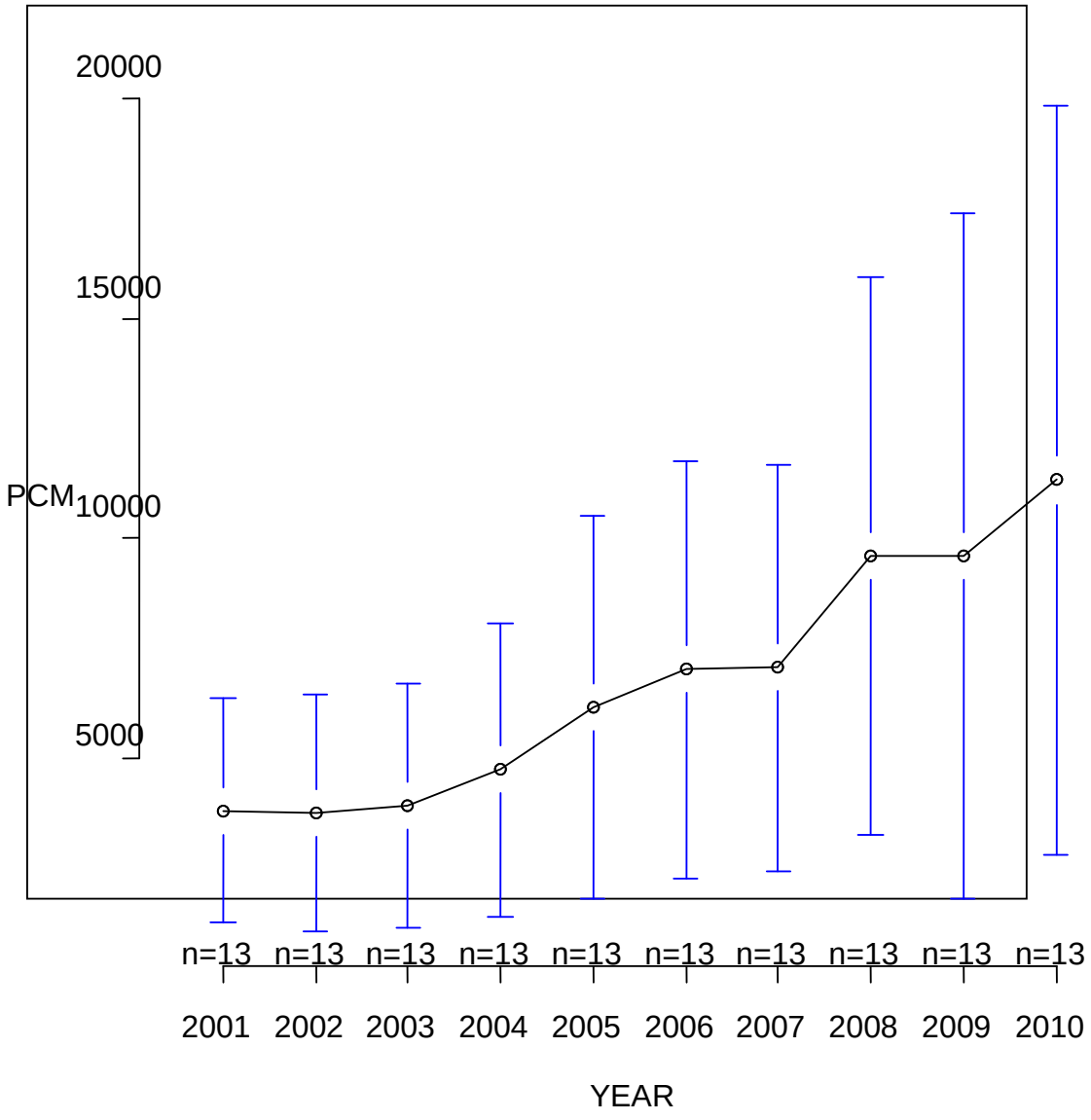

Figure 2: Heterogeneity Across Years

Figure 3 depicts the trend in IPR, used as a proxy for liberalization trade policy. The graph shows fluctuations in the ratio of imports to total trade. However, there is a generally positive trend indicating that the ratio of imports to total trade increased during this period. This could be taken to mean that in general, the trade policy regime during this period encouraged imports. A comparison of figure 4 and figure 5 shows that both profit markups of the manufacturing sector and the overall imports increased during the period 2001 to 2010.

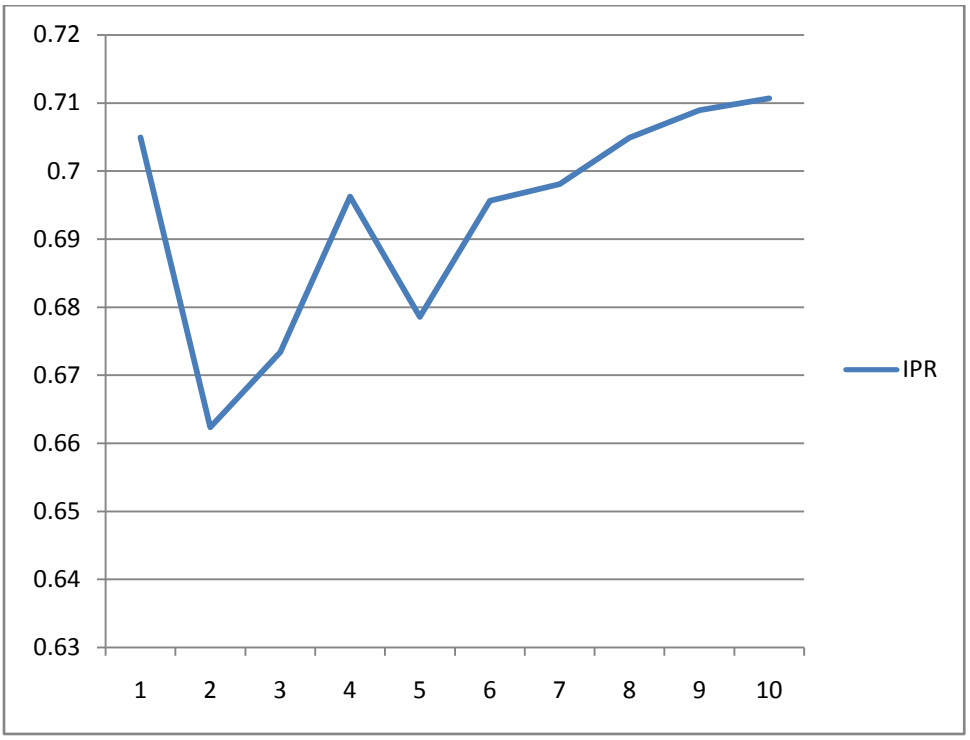

Figure 3: Trends in Import Penetration Ratio (IPR)

Key: Y-axis = Import penetration ratio, X-axis = Period (2001-2011)

The relationship between PCM and Import penetration Ratio is graphically illustrated in a scatter XY diagram in figure 4 plotting PCM against IPR. The graph slopes upward to the right from a Y-intercept indicating that the two variables are positively related and that with respect to Import Penetration, the profitability of the sector is positively non zero. This diagram illustrates that an increase in Import Penetration is positively associated with a general rise in profits markups across industries in the manufacturing sector which is an indication of the nature of imports in Kenya which on aggregate do not exert competitive pressure on goods produced by the manufacturing sector. The bulk of imports are capital and intermediate goods.

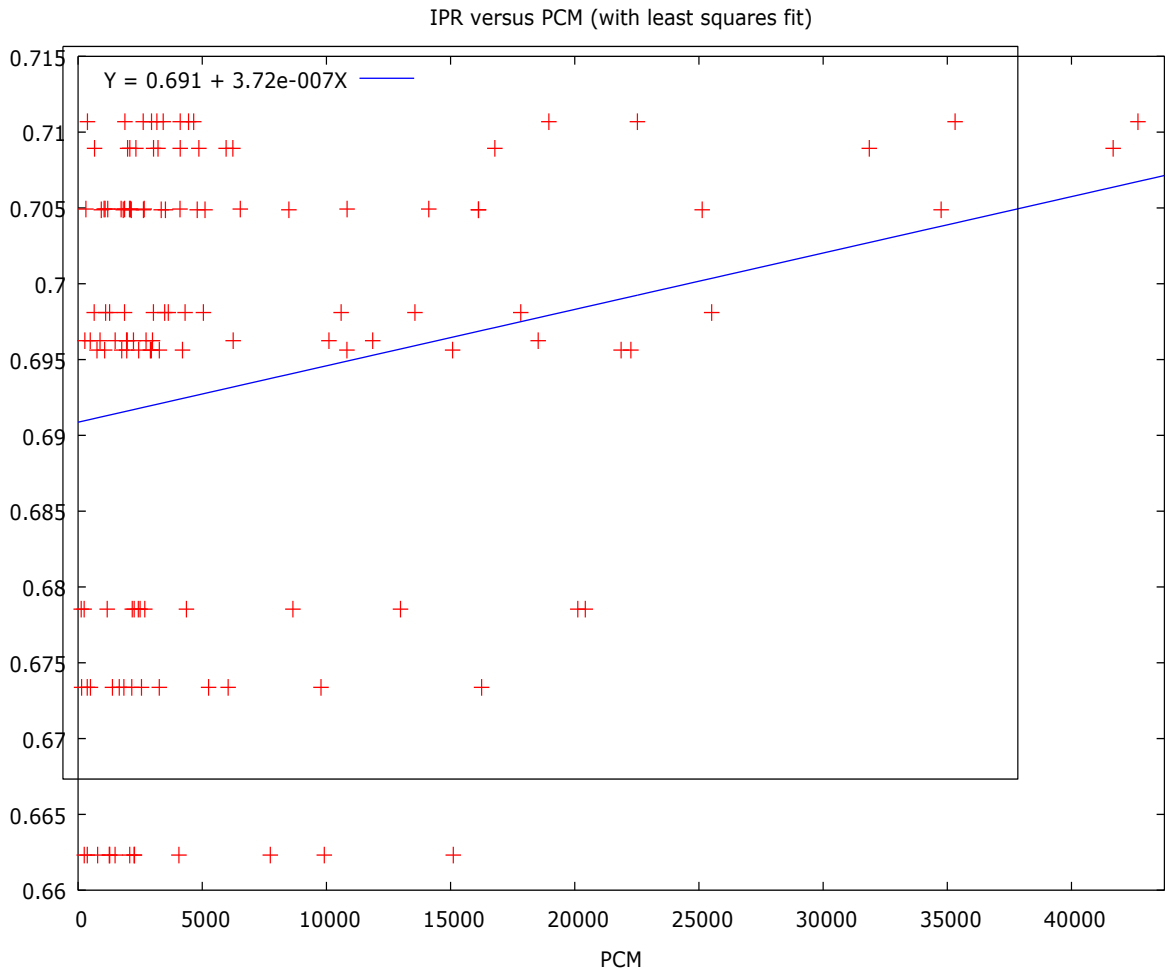

Figure 4: Import penetration ratio versus price-cost margin

The reason for this is drawn from the structure of Kenya's imports which portray a huge portion of the import bill as going towards intermediate goods not produced in Kenya such as capital machinery and fuel products (RoK, 2010).

The relationship between the dependent variable PCM and industry share of output, representing the degree of concentration is depicted in figure 5. The curve takes a positive slope from a Y-intercept suggesting that industries profit markups increase with an increase in output share. Technically this is interpreted as a negative relationship between the degree of concentration and allocative efficiency of the sector.

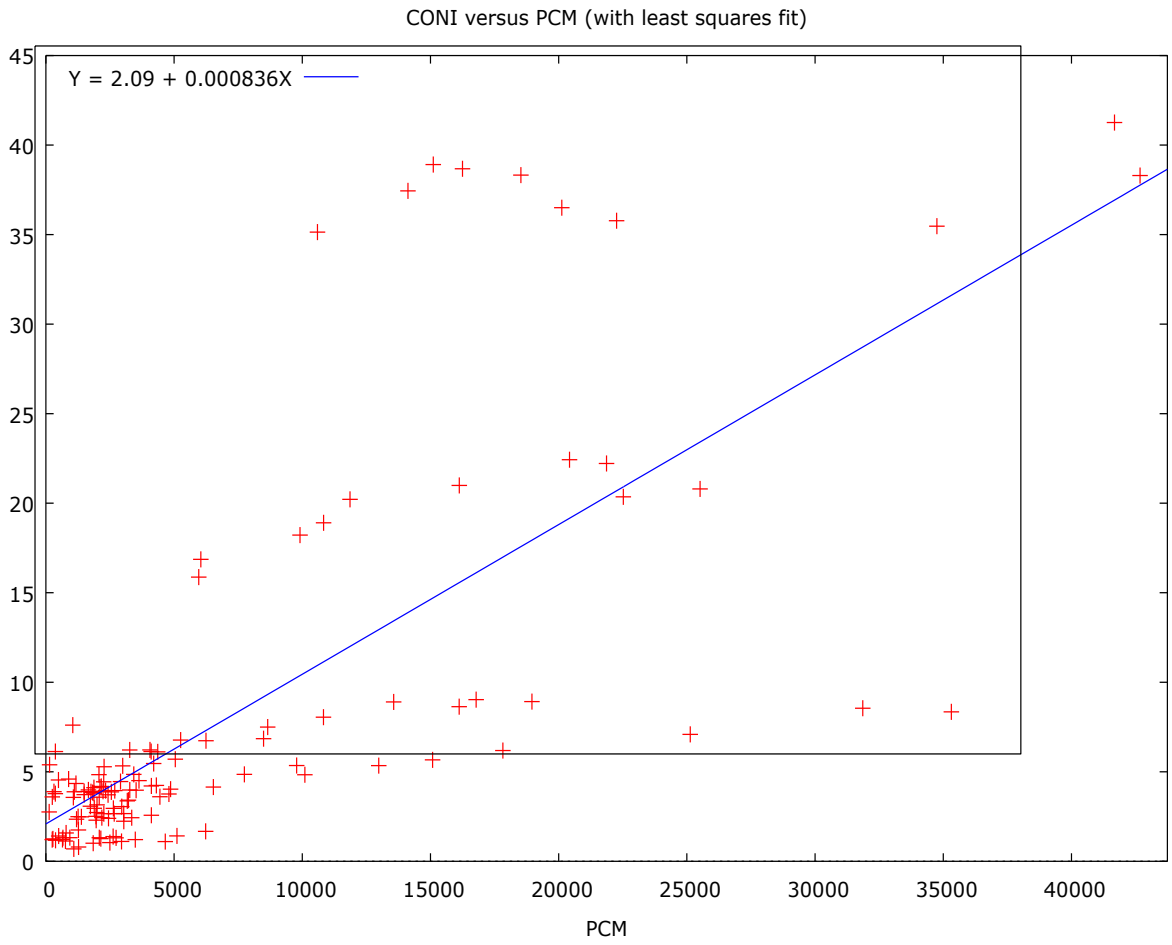

Figure 5: Concentration index versus price-cost margin

As industries become more concentrated they tend towards imperfect competition, gaining market power and influence on price. Industries with such structures tend to price their produce highly resulting in a loss of allocative efficiency. A graphical comparison between the effects of IPR and CONI on PCM by the gradient of their slopes shows that PCM has strong and sensitive relationships with the degree of concentration than it has with import penetration. This is evident from the coefficient of correlation between these variables.

Figure 6 illustrates the relationship between the capital-output ratio (K_Q) and price-cost margin. The capital-output ratio measures the overall capital intensity which represents the impact of adopting new technology, expected to have a positive effect on productivity and profit markups.

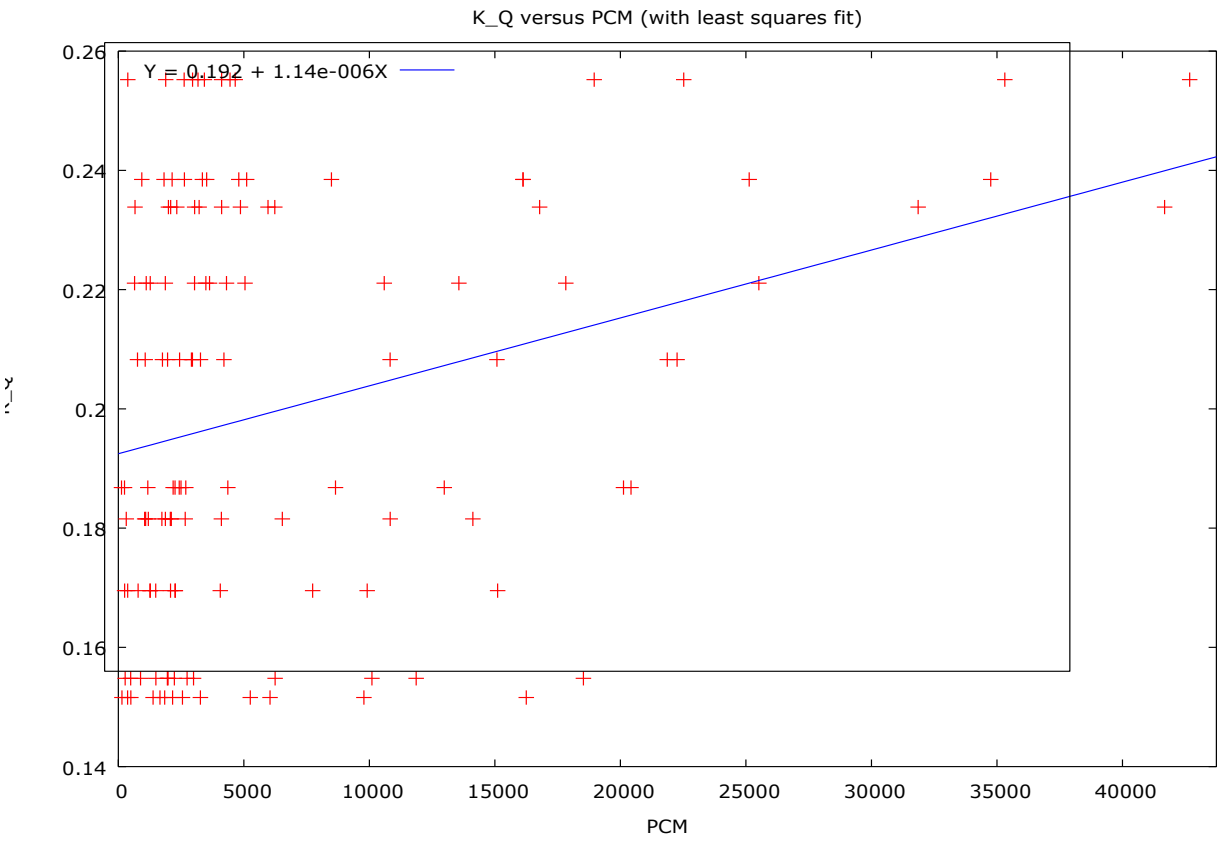

Figure 6: Capital output ratio against price-cost margin

From the graph, the capital-output ratio varies positively with price cost margin indicating that growth in capital formation in an economy enhances the sectors profit markups mainly by inducing enhanced productivity and saving on costs of production. This positive relationship, therefore, may not necessarily be viewed as negative with respect to allocative efficiency as defined by prices paid by consumers.

Estimation Results

Pooled OLS Results

The results in table 3 based on simple pooled OLS model show that 52.5335% of the variation in PCM is jointly explained by the regressors in the model. The F statistic which measures the global significance of the variables model is significant at 1% implying that all coefficients in the model are significantly different from zero and hence confirms the fitness of the model. The estimates indicate a clear positive relationship of PCM with IPR. The coefficient of IPR is positive and statistically significant at 5% level. The coefficient of concentration index (CONI) which represents the output share of industries is also positive and statistically significant at 1%.

Table 3.Model 1: Pooled OLS, using 130 observations

Included 13 cross-sectional units; Time-series length = 10

Dependent variable: l_PCM; Robust (HAC) standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	2.59608	1.38412	1.8756	0.06304	*
IPR	4.40588	2.12161	2.0767	0.03988	**
CONI	7.78257	1.38196	5.6315	<0.00001	***
IGR	1.50919	0.316754	4.7646	<0.00001	***
K_Q	8.59865	2.30508	3.7303	0.00029	***

Mean dependent variable	8.109253	S.D. dependent var	1.240796
Sum squared resid	91.34783	S.E. of regression	0.854858
R-squared	0.540053	Adjusted R-squared	0.525335
F(4, 125)	36.69263	P-value(F)	2.89e-20
Log-likelihood	-161.5261	Akaike criterion	333.0522
Schwarz criterion	347.3899	Hannan-Quinn	338.8781
Rho	0.887490	Durbin-Watson	0.209294

** Significant at 10%, ** Significant at 5%, *** Significant at 1%*

The inference that may be drawn from these results is that measures taken to open up Kenya's economy to imports have not had a competitive effect on the manufacturing sector. This contradicts the earlier conceptual expectations of a pro-competitive effect of imports. This trend could, however, be attributed to the structure of Kenya's economy which relies heavily on primary production and minimum value addition efforts such that most of its manufactured demand must be met by imports. The sector also relies heavily on imported inputs which are vital for profits. However, these should be interpreted cautiously since the import penetration measure is not industry specific. As expected though, the greater the output share of the industries the higher the PCM, proving a negative relationship between the degree of concentration and allocative efficiency. The coefficient of industry growth rate (IGR) is positive and statistically significant at 1% level. A rise in industry growth rates by 1.51% increases PCM by 1%. Levels in the capital-output ratio (K_Q) have a positive coefficient and significant at 1%. The coefficient of the capital-output ratio is positive and largest of all at 8.59865 suggesting a strong influence of capital formation on profit markups through the adoption of new technology. Based on the results produced by pooled OLS model, a panel diagnosis was run in Gretl. The diagnosis performed various tests to determine the suitability of pooled OLS model for the analysis of the subject of this study. For this model, the joint significance of different group means is given by F(12, 113) = 30.2543 with a p-value of 8.46594e-030 hence rejecting the null

hypothesis that the pooled OLS model is adequate, in favor of fixed effects model. Similarly, the Breusch-Pagan LM test is given by LM = 304.408 with a p-value of 3.61031e-068, rejecting the null hypothesis for the test that pooled OLS model is adequate, in favor of RE model. These results reduce the reliability of the estimates by Pooled OLS method. Both fixed effects and random effects models were therefore run.

Fixed Effects Model Results

Estimation by fixed effects method was done by invoking robust standard error command in Gretl software to account for heteroscedasticity and possible autocorrelation. The result from this model yield an adjusted R squared of 0.87536422 suggesting that approximately 87.5364% variations in the dependent variable PCM are explained jointly by the independent variables. The F statistic which measures the joint significance of all parameters in the model is well above zero and significant at 1% level of significance with a p-value of 1.73e-79 implying that the model is well specified. The test for differing group intercepts which tests the null hypothesis that the cross-sectional units have a common intercept has a p-value of 3.46163e-026 implying that the null hypothesis is not accepted and therefore the groups have differing intercepts. This is consistent with the precepts of the fixed effects method of panel regression analysis.

From the results contained in table 4, IPR has a positive coefficient of 4.3516. This implies that a 4.35 percent rise in import penetration increases price-cost margin by 1 percent. This result suggests that openness to imports enhances profit markup of the manufacturing sector in general. This could be attributed to the fact that the sector relies on imports for important ingredients in the production process. An alternative explanation is that huge percentage of Kenya's import bill comes from high-value goods not produced in the country and hence such imports have no competitive effect on locally manufactured goods.

Table 4. Model 2: Fixed-effects, using 130 observations

Included 13 cross-sectional units; Time-series length = 10

Dependent variable: l_PCM; Robust (HAC) standard errors

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	2.12311	1.14616	1.8524	0.06658	*
IPR	4.35158	1.61731	2.6906	0.00821	***
CONI	14.5382	6.07268	2.3940	0.01831	**
IGR	0.968965	0.271117	3.5740	0.00052	***
K_Q	8.80202	2.05322	4.2869	0.00004	***

Table 4...

R-squared	0.890823	Adjusted R-squared	0.875364
F(16, 113)	57.62592	P-value(F)	1.20e-46

Test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: F(12, 113) = 30.2543
with p-value = P(F(12, 113) > 30.2543) = 8.46594e-030
** Significant at 10%, ** Significant at 5%, *** Significant at 1%*

The output share of industries (CONI) also has a positive coefficient of 14.5382 implying that a change in industry concentration ratio by 14.54% leads to a 1% change in Price-Cost Margin. Technically, this suggests that concentrated industries result in enhanced allocative inefficiency due to the concentration of market power which induces imperfect competition.

Random Effects Model Results

Table 5. Model 3: Random-effects (GLS), using 130 observations

Included 13 cross-sectional units; Time-series length = 10

Dependent variable: l_PCM

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	2.50402	2.23262	1.1216	0.26420	
IPR	4.36379	3.50163	1.2462	0.21502	
CONI	9.44973	1.94986	4.8464	<0.00001	***
IGR	1.09047	0.222485	4.9013	<0.00001	***
K_Q	8.75628	1.57612	5.5556	<0.00001	***

Mean dependent var	8.109253	S.D. dependent var	1.240796
Sum squared resid	95.38788	S.E. of regression	0.870084
Log-likelihood	-164.3391	Akaike criterion	338.6782
Schwarz criterion	353.0159	Hannan-Quinn	344.5041

'Within' variance = 0.191886
'Between' variance = 0.61958

Theta used for quasi-demeaning = 0.824016

Breusch-Pagan test -
Null hypothesis: Variance of the unit-specific error = 0
Asymptotic test statistic: Chi-square(1) = 304.408
with p-value = 3.61031e-068

Hausman test -
Null hypothesis: GLS estimates are consistent
Asymptotic test statistic: Chi-square(4) = 3.79038
with p-value = 0.435118
*** *Significant at 1%*

Table 5 presents result from random effect method based on Generalised Least Square (GLS). Results of this model yield an R squared of 0.824016 indicating that 82.40% of variations in the dependent variable PCM is jointly explained by the independent variables in the model. The Hausman test which tests the null hypothesis that GLS estimates are consistent has a p-value of 0.435118 and hence cannot be rejected, affirming the suitability of the random effects model estimates as compared to the fixed effects estimates. Results from this model indicate that Import Penetration Ratio (IPR) has a positive impact on Price Cost Margin of the manufacturing sector, but statistically insignificant. This result is however not consistent with those produced in both fixed and pooled OLS models. A comparison of the magnitude of the coefficient does not show many variations. The coefficient of Concentration index is also positive and significant at 1% level. This is consistent with results of both Pooled OLS and Fixed Effects Models. The coefficients of industry growth rate and capital-output ratio are all consistently positive and significant at 1% level.

In general, the inference to be drawn from these results is that import penetration does not have a competitive effect on domestic manufacturing output in Kenya and therefore may not yet be used as a substitute or complement for competition policy.

SUMMARY

The manufacturing sector in Kenya no doubt plays a significant role in providing jobs and accounts for approximately 10% of Kenya's Gross Domestic Product (GDP) (RoK, 2010). Trends over the years have shown that the sector performance and contribution to GDP have largely remained constant. Being one of the foundation blocks upon which the economic pillar of vision 2030 is anchored, it's imperative that the sector is made more robust. This involves identifying the variables driving growth and efficiency and understanding their dynamics.

Among important environments within which the sector operates is the dynamics of international trade. For the period following Kenya's independence to about 1985, the sector existed within a trade policy regime that was highly restrictive. The import substitution industrialization strategy was pursued with the aim of enhancing Kenya's manufacturing capacity and competitiveness. The objectives of the policy were however not achieved as it became evident that the strategy could not help alleviate the BOP crisis due to increased importation of capital goods for the production process.

Correction of the BOP status required donor support from the multilateral and international financial institutions which required rethinking trade policy to allow trade liberalization as a conditionality for the access of structural adjustment support. Yielding to this pressure meant that Kenya opens its market to import competition. With undeveloped local manufacturing sector, the policy shift depressed the sector. Advocates of the trade liberalization policy contend that allowing for import competition, in fact, enhances efficiency gains in form of reduced prices and expanded consumer surplus – enhanced allocative efficiency.

This study, therefore, attempted to determine the effect of trade liberalization as defined by import penetration, on allocative efficiency of the manufacturing sector in Kenya. Given that achieving allocative efficiency is one of the key objectives of competition policy, the study makes a contribution to policy debate as to whether imports can have a competitive effect on the manufacturing sector and therefore whether they can be used as one of the complementary tools to enhance allocative efficiency.

Different studies reviewed for various economic jurisdictions have found increased exposure to import competition often results in reduced prices and by extension reduced profit markups both of which represent proxies for enhanced allocative efficiency. These studies include those that were carried out in Turkey, Korea, Cote d'Ivoire Chile and India and employed either domestic producer prices or price cost margin to measure allocative efficiency and tariff rates or import penetration index as measures of liberal trade policies. This paper measures allocative efficiency using price-cost margin and employs import penetration ratio as an adequate proxy for trade liberalization.

To achieve its set objectives, panel data of thirteen industries is used for panel data regression analysis. Three methods of estimation – pooled OLS, Fixed Effects and Random Effects –are used and compared. Estimated results are subsequent subjected Bausch Pagan LM tests and Hausman diagnostic tests which confirm the suitability of the Random Effects Model.

Following earlier assertions, various studies in other economic jurisdictions have found import liberalization leads to enhanced allocative efficiency for the benefit of consumers by way

of reduced domestic manufactured prices and reduced Price Cost Margin, in highly concentrated industries. Most of these studies use an industry-specific measure of import liberalization. A study on Indian manufacturing industries (Krishna and Mitra, 1998) and another on Korea manufacturing sector (Yang,1999) establish a pro-competitive effect of import liberalization. Some, however, have produced dissenting results. A firm-level panel data analysis based research on trade liberalization and productivity in Indian manufacturing firm, (Balakrishnan et. al, 2000) did not find declining profit margins in post-liberalization period. Similarly, using a panel data regression analysis technique, this paper has not also found a pro-competitive effect of import penetration on the manufacturing sector.

CONCLUSION

The results clearly indicate a positive relationship between import penetration ratio with price-cost margin. Contrary to various other related studies, the measure for import liberalization is not industry specific. The degree of concentration computed as output share of the industry also varies positively implying a negative relationship between the degree of concentration and allocative efficiency. This is consistent with general expectations as outlined in Motta (2005). Both capital-output ratio and industry growth rates relate positively with PCM as well, with consistent statistically significant influence in the equation. Results of the analysis, therefore, suggest that overall, imports do not have a competitive effect in the manufacturing sector in Kenya. This could be attributed to the fact that Kenya's manufacturing sector is not competitive, and has a low degree of heterogeneity such that, vast of the manufactured imports do not face competition locally. The fact that Kenya also depends on imports for its key industrial inputs which account for a sizeable portion of the import bill, such imports facilitate production and are therefore essential for profits. Enhancing allocative efficiency through trade will require significant improvement in domestic manufacturing production in terms of diversity and competitiveness. These, however, will be difficult to achieve within the existing liberal trade policy regime. Rethinking import substitution industrialization strategy with better-specified objectives could be an option. Encouraging competitiveness in the sector will reduce industry concentration and increase allocative efficiency by lowering prices and price-cost margins.

RECOMMENDATIONS AND WAY FORWARD

The main objective of this study was to determine the effect of trade liberalization on allocative efficiency of the manufacturing sector in Kenya. This was achieved by observing the pro-competitive effect (or lack of it) of import penetration through fall in domestic prices and sliming price-cost margins of industries in the sector. Results from the analysis clearly indicate a

positive relationship between import penetration ratio and price-cost margins implying that overall, imports in Kenya do not have a pro-competitive effect in the manufacturing sector in Kenya. Based on this result, therefore, the prevailing trade policy regime may not be considered as the best strategy for enhancing competition policy and improving allocative efficiency in the manufacturing sector in Kenya.

Given that the paper is based on a general proxy for trade liberalization policy and not industry specific index, it is recommended that similar studies should be carried out employing purely industry-specific variables to capture the dynamics of the sector with respect to these variables. One of the key challenges encountered during the period was the unavailability of data in a form consistent with the methodology employed. The study also recommends that more efforts be put to classify data published by various public sector agencies in consistent formats.

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