Thinking about Financialization and Industrialization in Ghana: Is there Evidence of Long-run Equilibrium?

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Ghana recently decided to embark on a massive industrialization agenda, because the decision makers in the country believe that industrialization is the way to create sustainable employment and achieve sustained long run economic growth. However, there are threats to this agenda that need to be examined. In this paper, we show that financing industrialization via typical domestic sources or foreign aid do not support the growth of manufacturing in Ghana. We argue that financialization threatens the success of industrialization in Ghana, because typical domestic finance and foreign aid focus on short-term returns. Using time series data from 1980 - 2019, we model the relationship between domestic finance, foreign aid and manufacturing growth in Ghana. The results support our concerns about threats of financialization. We recommend that Ghanaian policy makers consider using industrial finance as was done in Japan in the 1950s and 1960s to achieve long-term sustainability for industrialization in Ghana instead of using typical market-based credit or debt.

1. INTRODUCTION

Industrialization is known to be a growth-enhancing path for developing economies, because of its stronger linkages or multiplier and employment creation effects, especially manufacturing, in the economy (Szirmai 2012) [1]. In light of this, there has been a renewed

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interest in the pursuit of industrialization across the African continent in which industrial policies seek to enhance inclusive and broad-based sustainable development that creates much needed jobs, especially for the youth (Weiss 2015). In the past, African countries experienced modest industrialization after their independence. However, due to economic and governance problems faced in the 1970s, most of them abandoned their industrialization trajectory and followed the Bretton Woods institutions to implement a raft of "structural adjustment" and "economic reform" programs that returned them to their colonial economic outlook and orientation leading to the destruction of their infant industries. The renewed interest in industrialization is therefore aimed at finding ways of reviving their industries after decades of neoliberal policies that destroyed them.

In the case of Ghana, the renewed interest in industrialization came to light during the campaigns that led to the elections in 2016. Having successfully won the bid of the people on the back of an industrialization agenda, the government then proceeded with fulfilling some of the promises it had made in the campaign era. The main promise was a massive industrialization program that would create jobs. This program was dubbed 'One district, One factory' and meant to improve the productive capacity of the country, through the establishment of factories in different parts of the country. These factories, to be privately owned and managed, would source their inputs locally and produce to meet domestic demand, whiles creating employment for the youth, who are highly unemployed. With the support of a dedicated secretariat created for the program at the presidency, 106 factories had been established and operational by end of 2021 with 148 under construction while 24 projects are at a mobilization stage.

For a domestic industrialization agenda, the approach has been to seek foreign investments which can provide the funding to support the set-up of factories across the four main development zones that have been outlined, while focusing on creating an enabling environment that provides the right conditions for investment and growth. This approach by the government is commendable but can be critiqued on the basis of long-term sustainability, in that market-based finance always seeks higher return. In addition, this approach of the government takes out the critical role of the 'developmental' state, which

would implement industrialization, because of the initial costs involved in the learning phase. In addition, countries who have industrialized have done so on the premise of a strong influence of the state [2].

Indeed various Ghanaian governments over the past few decades have made efforts at improving the productive base of the economy, through manufacturing growth. From 2000 to 2008, for example, the government of President John Kuffour initiated the Presidential Special Initiatives that targeted salt, cassava, oil palm and textiles sectors with support to enhance industrialization. Data from the World Bank however shows that despite the generally decreasing trend, Ghana's manufacturing share of total output sharply rose after 2012, reaching a maximum of 11.74%. However, it declined in 2013, raising questions about the sustainability of the industrialization agenda that the government wanted to implement. Sustainability in industrialization is important because manufacturing is associated with increase returns to scale. This means that, even with fully committed resources, one cannot expect industrialization to happen in the short-run because of the initial period of learning and skills development.

In this paper, we seek to investigate the scope and extent of support that growing traditional finance and thus financialization offer to industrialization historically. Thus, we explore the presence of 'financialization effect' of domestic and foreign capital. Our hypothesis is does finance such as domestic credit, given to the private sector from banks, or that provided by the financial sector, and foreign aid, adversely influences the growth of manufacturing in Ghana? In addition, we also explore if this negative effect persists in the long-run. Such investigations, novel for Ghana, seek to enhance our understanding about financialization and industrialization to provide the basis for policy makers to look beyond "creating the environment" and focus on developing special industrial finance to support the development of manufacturing in order to ensure that the industrialization agenda is achieved in the long-run.

To make our case, we follow the theoretical literature which has argued that manufacturing is critical for inclusive and sustained economic development (Szirmai & Verspagen 2015, Su & Yao 2017) as well the literature on

financialization [3]. As a contribution to the literature, this paper shows that because of financialization, manufacturing growth is hampered even in the long-run by interest-seeking finance such as domestic credit given to private sector by banks and financial institutions. Earlier studies on the determinants of manufacturing growth in African countries do not consider the role of finance and studies those on financialization in African countries do not consider the long-run effect of manufacturing [3-5].

The remaining sections of the paper are organized as follows: Section two reviews trends in manufacturing growth and domestic finance in Ghana. Section three reviews the theoretical literature that supports the arguments in this paper and discusses the empirical literature, whiles section four presents the empirical strategy adopted in this paper. In section five, the results obtained are presented and discussed whiles section six presents the concluding remarks and recommendations for policy and future research.

2. LITERATURE REVIEW

The paper situates this empirical investigation into two main theories. The first relates to the manufacturing and economic development while the other explains the theoretical effect of financialization on manufacturing growth. The first important aspect of this theoretical review is to discuss the theory that manufacturing contributes significantly to economic development. A British economist developed three laws which explained the relationship between manufacturing and economic growth [6]. These laws are explained in detail by Thirlwall (1983). The first law is that manufacturing positively and directly influences economic growth. This relationship is brought to life because manufacturing offers some dynamic properties that can induce growth in the economy and contribute significantly to economic growth.

In Szirmai (2012), the arguments that support the empirical relationship of manufac- turing on economic growth are discussed. Manufacturing has higher productivity relative to other sectors and is amenable to capital accumulation and can build stronger linkage and spillover effects. Finally, increases in per capita income are associated with increased expenditure on manufactured goods. All of these arguments are based on empirical tests and offer an insight into

the experience of the East Asian economies during their periods of industrialization. These countries pursued industrial policies and promoted manufacturing of goods and services in their economies to serve their domestic markets and meet global demand. After more than two decades of reforms and practice of industrial policy, they became leading economies at a global level and were informally recognized as the "East Asian giants" [7,8]. Basically, countries which have been successful at developing rapidly used the path of industrialization. However, some developing countries, especially those in Africa, are pursuing other growth paths aside industrialization [9].

Next, another theory which is relevant to this study is that of finance-induced Dutch- Disease. The theoretical argument here has been applied to the analysis of the influence of foreign aid on manufacturing development in the literature. Through the real exchange rate, foreign aid can have a negative effect on growth through because it causes manufacturing to lose competitiveness [10][1]. The real exchange rate can be defined as the relative prices of tradables versus the price of non-tradables. In that sense, an increase in demand for non-tradables will contribute to a real exchange rate appreciation, assuming that the price of tradables is fixed for a small open economy like Ghana and that the nominal exchange rate adjusts to meet demand for non-tradables [11].

Due to the relatively higher price of non-tradables, manufacturing loses its competitiveness as producers and consumers are enticed to move in to partake in the market for non-tradables [2]. In addition, aid inflows support imports of capital goods into non-tradable sectors of the economy such as education and health. Aid inflows can also trigger purchases of non-tradables good or services within the economy which can influence the price of non-tradable [3]. In this sense, the theory suggests that when a country receives, they cause Dutch disease symptoms

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[1] *The Dutch disease is traced back to the seminal work of Corden [12] and basically refers to the adverse growth effects an economy faces due to its reliance on revenues from particular resource.*
[2] *With increased spending of aid in non-tradable sectors, labour from other sectors will be drawn into the non-tradable sector in order to earn higher wages. Hence, in an import dependent country, higher wages of labour will mostly be spent on imported goods and services. This is the income spending effect.*
[3] *This is usually referred to as the resource movement effect.*

However, in a much broader sense, it is not only foreign aid that can cause the Dutch disease. Capital flows from the global economy can also appreciate the real exchange rate, through its influence on the nominal exchange rate. Hence, capital flows can contribute to the financialization effect as capital speculates for higher interest, to the detriment of manufacturing in developing countries like Ghana. Financialization here refers to the increasing and relative importance of finance, its motives, institutions that control them as well as the markets in which they function [13]. This suggests that in addition to the direct negative influence of capital flows on manufacturing, there would be additional negative influence of capital flows on manufacturing when capital flows are interacted with the real exchange rates.

As a result of applying liberalization policies of the Washington Consensus in African countries, African countries have become highly financialized [3]. What this means is that financial resources can earn a greater reward in any market at all, whether foreign or domestic. And with domestic credit, capital is focused mainly on productive activity that will yield significant returns in the shortest possible time. This trend of thought can also be applied to foreign aid, given that such finance comes with strict conditions on which markets to import from. Hence, this paper argues that such market-based capital resources are not focused on manufacturing growth because manufacturing takes some time to generate increasing returns to scale, despite the growth-enhancing properties indicated earlier on. Therefore, due to the short-term interests of capital providers, manufacturing growth may not be positively influenced by typical finance.

2.1 Empirical Review

We find that not many studies exist that have looked at the relationships between manufacturing value added and finance in African countries. At best, most studies have examined macroeconomic determinants and estimated the influence of policies for the manufacturing sector in Ghana and other countries. For example, Enu & Havi [5] examined the manufacturing sector in Ghana to see whether there were any macroeconomic disturbances. Using cointegration and error correction models, the paper showed that some macroeconomic factors influences the manufacturing sector of Ghana negatively. The

results showed that in the long-run, private sector credit, labour and the real ex- change rate negatively influenced manufacturing share of GDP. The study also found that in the short-run, inflation and the real exchange rate adversely influenced manufacturing share of GDP.

Secondly, Anaman & Osei-Amponsah [14] analyzed the determinants of manufacturing industry output in Ghana from 1974 - 2006. The study also used cointegration and error correction modelling.

The study found that in the long-run, the share of manufacturing value added in total output was influenced by per capita income, the export-import ratio and the level of political stability in the country. These findings are quite similar to the findings of Enu & Havi [5]. The study further recommended that export promotion in the manufacturing industry would have to be strengthened given that the results showed a significant influence of the export-import ratio on manufacturing share of GDP in Ghana.

Several other studies have also analyzed the manufacturing industry in developing countries and have found that macroeconomic factors such as interest rate, exchange rate, capital and population influence manufacturing output [15-20]. For instance, Imoughele & Ismaila [18] determine the impact of monetary policy instruments on the performance of the manufacturing sector in Nigeria from 1986 - 2012. Their study used vector autoregression and error correction modelling, in addition to Granger causality tests and unit root tests. The results showed that interest rate, exchange rate and external reserves had a negative influence on manufacturing sector output whereas broad money and inflation influenced manufacturing sector output positively.

Furthermore, research on financialization is still developing and has so far focused on developing countries in Asia, Latin America and South Africa. However, there is still more that can be done to show the influences of financialization in African developing countries [21]. According to Bonizzi [3], the key empirical facts about the influence of financialization are best seen in the real economy and the expansion of financial services in developing countries. The main key empirical fact of financialization in developing countries is how it has contributed to increase in financial investment instead of productive investment, thus contributing more to the

problems of deindustrialization [22-24]. This suggests that financialization has contributed to increasing investments away from manufacturing, by promoting the use of hedge funds, derivatives and securities [25]. As a result, the financial sector in developing countries has mainly supported the purchase and sale of short-term financial instruments, which do not involve any form of productive enterprise that may be deemed to be risky or possess a long lead time. The obvious influence of this approach is the reduction in the share of productive investments and the share manufacturing in total output [26] (Tan 2013).

Furthermore, several studies on financialization have looked at the reduction in pro- ductive investments in Asia, Latin America and even South Africa, where firms are argued to be overcapitalised and solely focus on short-term investments, at the expense of the productive section of the economy [4].

There is a fundamental gap in the literature which we attempt to fill in this paper. So far, earlier studies have not considered the long-run influences of financialization on the growth of the manufacturing, which represents the productive sector of most economies. For a small open economy such as Ghana, such evidence is still lacking and leaves the opportunity for studies such as this to fill the gap.

3. EMPIRICAL STRATEGY

We follow the empirical strategy of Anaman & Osei-Amponsah [14], who investigated the macroeconomic determinants of manufacturing output in Ghana. Following this ap- proach, we contribute to the literature by accounting for the role of finance as a determinant of manufacturing output in Ghana. We measure the level of industrializa tion by using the share of manufacturing value added in total output, in line with studies such as Tregenna (2016) and Szirmai & Verspagen (2015). In addition, we measure financialization with three financial variables: domestic credit to the private sector by banks, domestic credit provided by the financial sector and net official development assistance and foreign aid. These variables are different forms of capital and can have similar in-fluences on the productive sector, as argued by

Karwowski et al. [21] and Addison & Baliamoune-Lutz [11]. We argue due to financialization, domestic credit and foreign aid have a negative influence on manufacturing share of total output in Ghana.

The paper employs the Autoregressive Distributed Lag (ARDL) technique to analyse the relationship between the share of manufacturing value added and other theoretically related variables. This approach is quite robust and is not influenced by correlations between the variables considered in the estimation procedure [27]. Other approaches such as the Vector Autoregressive approach (VAR) have been used in the literature to analyse the macroeconomic factors that affect manufacturing growth in Ghana and Nigeria [5,18]. However, these studies do not consider the role of finance, which is really important in determining manufacturing output in a developing country like Ghana.

Indeed, past studies have considered broadly connected macroeconomic factors and policy variables that are related to the manufacturing sector such as real per capita income, labour, monetary policy, fiscal policy and private sector credit. Such factors, although important, may not be strongly correlated with manufacturing sector output.

Based on the theories reviewed in this paper, we argue that in the case in Ghana, there are also important variables that have not been accounted for. These include the level of imports, the real exchange rate, the share of hydroelectric energy produced as well as financial variables such as domestic credit to the private sector from the financial sector, domestic credit from banks and the official development assistance and aid received. Hence, we specify a generic ARDL equation in this paper which captures these financial variables and also controls for the inputs such as the level of imports and energy used in the manufacturing process. In addition, we also control for interactions between financial variables and the exchange rate, because these interactions influence the competitiveness of the domestic manufacturing sector. This adds on the financialization effect and further worsens the impact of the capital flows considered in this paper. The regression is specified as follows:

$$\Delta lnMV\ A_t = \alpha_0 + \beta_1 \sum_{t=0}^{n} \Delta lnER_{t-i} + \beta_2 \sum_{t=0}^{n} \Delta lnIMP_{t-i} + \beta_3 \sum_{t=0}^{n} \Delta lnEN_{t-i}$$
$$+ \beta_4 \sum_{t=0} \Delta lnX_{t-i} + \beta_5 \sum_{t=0} \Delta(lnX_{t-i} \times lnER_{t-i}) + \beta_6 \sum_{t=1} \Delta lnMV\ A_{t-i}$$
$$+ \gamma_1 lnER_{t-1} + \gamma_2 lnIMP_{t-1} + \gamma_3 lnEN_{t-1} + \gamma_4 lnX_{t-1}$$
$$+ \gamma_5(lnX_{t-1} \times lnER_{t-1}) + \gamma_6 lnMV\ A_{t-1} + \epsilon_t \qquad (3.1)$$

where $MV\ A_t$ represents Manufacturing share of GDP, ER_t represents the exchange rate, IMP_t represents the current dollar value of merchandise imports and X_t represents three financial variables: domestic credit to the private sector from banks (as a share of total output) [DFB_t], domestic credit provided by the financial sector (as a share of total output) [DFS_t] as well as the net official development assistance and aid received in current dollar value (AID_t). Also, EN_t represents the share of total electricity produced that comes from hydroelectric sources, whiles Δ is the difference operator. Furthermore, alphas, betas and gammas are coefficients to be estimated and the epsilon is representative of a white noise process. Table A of the Appendix section presents the full definition of all variables used in the estimation. This suggests that three models are estimated using each of the finance variables specified and the results are presented in the next section.

To execute the methodology, we first begin by determining stationary properties of showing evidence of cointegration of the selected variables. Most studies in the literature usually use the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller 1981). We complement the findings of the ADF test also with the Phillips Perron (PP) test (Phillips & Perron 1988). Both methods have the null hypothesis of unit roots in the series. This suggests that where the test statistic has a significant probability value (p-value), the null hypothesis can be rejected because there is enough evidence to suggest that the series has no unit roots in them.

After this, we test for cointegration using the Bounds Testing Approach [28]. The Bounds testing approach is useful in this case because it helps determine cointegration in the case of variables that are either at levels or first differences, i.e. I(0) and I(1) variables. This method has an advantage over the Johansen approach because it allows the researcher to combine variables with different orders of integration. Earlier studies such as Anaman & Osei-Amponsah [14] used both the ARDL approach and the Bounds test for cointegration to analyze the determinants of manufacturing industry output in Ghana.

Another important element of the model to be addressed is lag selection. In this case, we use the Akaike Information Criterion (AIC) for lag selection before estimating the model. The maximum number of lags set for the models in this paper was two. The automatic lag length of the first model using AID_t was (200000) whiles that of the second model using DFB_t was (220010). Also, the automatic lag length of the third model using DFS_t was (200000).

Finally, the last step of the methodology involved estimating an error correction model which, provided the cointegrated estimations of the model. The error correction model included an adjustment term of the model shown in Equation 4.1 above, which must be negative and significant at the 1% level of significance. Studies such as Anaman & Osei-Amponsah [14] and Enu & Havi [5] also used the error correction model to estimate the determinants of manufacturing output in Ghana.

3.1 Data and Sampling

We used annual data from two main sources. The effective sample used in the analysis covers the period from 1980 - 2020, after controlling for the lags and data gaps on two of the regressors (the exchange rate and the hydroelectric share of total energy produced). The World Development Indicators (WDI) database, published by the World Bank, was the source of data of all variables except the manufacturing value added share of output. For manufacturing share of GDP, alternative sources such as United Nations Industrial Development Organization (UNIDO) were consulted.

4. RESULTS AND DISCUSSION

4.1 Unit Root Analysis & The Bounds Test

The first part of this section focuses on the results from unit roots tests and the Bounds test of cointegration. The unit root test results obtained showed that most of the variables considered had the first order of integration except the interactive term of foreign aid and exchange rates, which was integrated at levels (refer to Equation 4.1 to see interactive term). This meant that most of the variables were I(1) variables. Both the ADF and PP unit root tests were conducted and the results were similar. The results from the unit root tests are shown in Table 1.

Therefore, we employed the Bounds Test in this situation because the test was able to handle variables that have different levels of integration. The Bound Test estimates an F-statistic that is compared to an upper bound and a lower bound, which are two critical values that follow an F-distribution. It can be concluded that cointegration exists when the calculated static is higher than the upper and lower critical values[4]. In this paper, the results of the Bounds Test showed or confirmed evidence of cointegration between the variables in the paper (see Table 2).

4.2 ARDL Estimations

The results obtained after estimating the ARDL model confirm the hypothesis in this paper. The results are shown in Table 3. For each model equation, there are three main columns that show the estimates: the Short-Run (SR), the Long-Run (LR) and the Error Correction (EC) term.

The results in Table 3 show that foreign aid, domestic credit to the private sector from banks and the domestic credit from the financial sector in Ghana along with their interactions with exchange rates that reflect financialization have negative influence on manufacturing share of total output which is also reflective of industrialization in Ghana. The sign on the coefficients of these variables across all three estimated models confirm this. In the first set of results, net official development assistance and foreign aid received as well as its interaction with

exchange rate have statistically significant negative influence on manufacturing share of total output in the short- run and not the long-run. The results show that a percent increase in foreign aid and official development assistance will reduce manufacturing share by 0.275%, holding all other influences constant. This effect is further enhanced when foreign aid interacts with the exchange rate. This interaction between foreign aid and the exchange rate is also shown to have a negative influence on manufacturing share in the long- run and not the short-run. This means that in addition to the short-run effect of an increase in foreign aid having negative effect on manufacturing share of output, its interaction with the exchange rates also reduces manufacturing share by 0.071% in the long-run. These coefficients are significant statistically at the 5% and 10% levels of significance.

In the second set of results, domestic credit to the private sector from banks, as a share of GDP, is shown to have a negative influence on manufacturing share of total output, only in the long-run.

The results show that a percentage increase in the domestic credit to the private sector from banks will reduce manufacturing share of total output by 0.697%, holding all other influences constant. This coefficient is significant statistically at the 1% level of significance. In addition to this influence is the influence from the exchange rate, based on the interaction of domestic credit to the private sector from banks and the exchange rate. The results also show that the exchange rate negatively influence manufacturing share by 0.137% in the long-run, when domestic credit to the private sector from banks is increased by one percent, holding all other influences constant.

Furthermore, in the third set of results, domestic credit provided by the financial sector as a share of GDP, is also shown to have a negative influence on manufacturing share of total output in Ghana only in the long-run. The results show that a one percent increase in the domestic credit provided by the financial sector will reduce manufacturing share by 0.795%, holding all other influences constant. This effect is also further enhanced by the exchange rate. The results show that interaction between the exchange rate and domestic credit by financial institutions also negatively influences manufacturing share by 0.254% in the long-run, when domestic credit provided by the financial sector is increased by one percent, holding all other influences constant.

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[4] *This paper uses the F-statistic. However, the Bounds test also produces a t-statistic which can be used to make a decision.*

Table 1. Unit root tests - ADF and PP

Variables	I(0)-ADF	I(1)-ADF	I(0)-PP	I(1)-PP
$MV\,A_t$	-3.652***	-5.734***	-2.718*	-5.106***
EX_t	-3.625***	-3.896***	-3.393**	-3.739***
IMP_t	-2.294	-5.349***	-1.291	-4.407***
EN_t	-1.265	-8.108***	1.438	-7.238***
AID_t	-1.750	-4.044***	-1.251	-7.599***
DFB_t	-1.933	-5.255***	-1.605	-7.513***
DFS_t	-2.170	-4.862***	-2.437	-7.277***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Bounds test for cointegration for all X_t variables

Equation	Test Statistic	90% Bounds	95% Bounds
	F-Statistic	I(0) I(1)	I(0) I(1)
1 – Aid and EX	4.077	2.26 3.35	2.62 3.79
2 – DFB_t and EX	4.205	2.26 3.35	2.62 3.79
3 – DFS_t and EX	3.931	2.26 3.35	2.62 3.79

Table 3. ARDL error correction model estimates using X variables - AID_t, DFB_t and DFS_t

Variables	(1) $MV\,A_t$	(2) $MV\,A_t$	(3) $MV\,A_t$	(4) $MV\,A_t$	(5) $MV\,A_t$	(6) $MV\,A_t$	(7) $MV\,A_t$	(8) $MV\,A_t$	(9) $MV\,A_t$
Long-run									
Lenergy		-0.278			-1.256			0.265	
		(0.444)			(0.754)			(0.314)	
Limp		0.0209			-0.0676			-0.117	
		(0.135)			(0.111)			(0.119)	
Lex		1.461**			0.333***			0.934**	
		(0.549)			(0.0814)			(0.443)	
Laid		-0.275							
		(0.174)							
Aidex		-0.0710**							

Variables	(1) MV A_t	(2) MV A_t	(3) MV A_t	(4) MV A_t	(5) MV A_t	(6) MV A_t	(7) MV A_t	(8) MV A_t	(9) MV A_t
		(0.0283)							
Ldomcredbanks					-0.697***				
					(0.195)				
$DFB_t * EX_t$					e**				
					(0.0515)				
Ldomcredfs								-0.795**	
								(0.304)	
$DFS_t * EX_t$								-0.254*	
								(0.139)	
MV A_{t-1} (ECT)	-0.649***			-0.753***			-0.698***		
	(0.141)			(0.161)			(0.149)		
Short-run									
LD.mvas			0.371**			0.376**			0.454***
			(0.147)			(0.158)			(0.145)
D.lenergy						0.445			
						(0.419)			
LD.lenergy						0.434			
						(0.359)			
D.limp						0.00385			
						(0.108)			
LD.limp						0.0400			
						(0.138)			
D.ldomcredbanks						0.0379			
						(0.151)			
Constant			5.618*			8.224**			4.456
			(3.142)			(3.961)			(2.895)
N	39	39	39	39	39	39	39	39	39
R-squared	0.463	0.463	0.463	0.620	0.620	0.620	0.455	0.455	0.455

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

We argue that the negative influences of these financial variables are due to financialization, in which investors and creditors have the interest to finance projects that yield short-term results. The results provide enough empirical evidence to support this hypothesis and show that this financialization effect persists in the long-run. Karwowski et al. [21] has also argued on how financialization is promoting short-term investments instead of productive sectors such as manufacturing in developing countries. Our results seem to support this similar hypothesis.

Consider now the influence of control variables like the share of hydroelectric energy produced. The results show that although hydroelectric energy influences manufacturing share positively in the short-run, the long-run effect is negative. From Table 3, a percent increase in hydroelectric energy produced in the short-run will increase manufacturing share by 0.445%, holding all influences constant. However, we find that a percent increase in hydroelectric energy, in the long-run, will reduce manufacturing share by 1.256%, holding all influences constant. These results are shown in the second set of regression estimates. We find that this result is plausible because in the short-run, manufacturing thrives on available sources of energy which are affordable. Hydroelectric energy contributes significantly to total energy produced in Ghana and stable and affordable energy supply can support manufacturing. In the long-run however, other sources of energy may be available and may be cheaper than hydroelectric energy. In such an instance, increases in the share of hydroelectric energy supplied to manufacturing firms may add on to production costs and reduce manufacturing output.

The exchange rates are also seen to have an influence on the share of manufacturing value added in total output in Ghana. From the first set of regression results, the results show that the exchange rate has a positive influence on the share of manufacturing value added. Hence, a one percent increase in the exchange rate will decrease the share of manufacturing value added by 1.256% in the long-run, holding all other influences constant.. Across all three regression estimates, the exchange rates have a positive influence on the share of manufacturing value added in the long-run. We argue that this finding is plausible because increases in the exchange rates (depreciation) also cause the real exchange rate to depreciate, holing constant

global prices for tradables and the domestic price of non-tradables. When this happens, the domestic manufacturing sector becomes more competitive because tradables become relatively cheaper for the global market. Enu & Havi [5] find the effect of the exchange rates is negative and our results contradict their findings.

Finally, the error correction terms in all three regression estimates are negatively signed and significant at the 1% level, as expected. The value of the coefficients represent the speed at which the systems adjust to equilibrium in the event of any shocks. The three models are also able to explain between 45% and 62% of the variations in the share of manufacturing value added in total output. In addition, from the third set of regression estimates, the previous shares of manufacturing value added influences current shares of manufacturing value added, which is indicative of an increasing time trend in the share of manufacturing value added between time periods.

5. CONCLUSION

In this paper, we have examined the influence of domestic credit and foreign aid on the share of manufacturing value added in Ghana. We have shown that these variables have a negative influence on the share of manufacturing value added in Ghana. In addition, we have shown evidence that this influence persist in the long-run. We argue that the negative influence of these variables is due to the financialization effect, which has been shown to persist in the long run. These findings raise implications that mainly reflect on the economic sustainability of growth and development in Ghana, which is something that policy makers should be concerned with.

Our key conclusion is that industrialization is adversely influenced by financialization. In other words, financialization threatens the success of industrialization by promoting in- vestments away from the productive sector and into short-term investments. This implies that the manufacturing sector in Ghana may not contribute much to total output due to the lack of financial investments. Earlier studies by Tregenna (2016) and Palma [29] have highlighted the risks that are associated with a reducing share of manufacturing value added. We argue that where there is the lack of stable and permanent industrial finance to support industrialization in Ghana, economic growth

cannot be sustained and will be left to contributions from services and the natural resources sector, which are fragile because the stock of natural resources can be depleted [30-32].

We recommend that policy makers should set up a special purpose vehicle solely for industrial finance in Ghana in order to ensure that producers are adequately supported. This involves demonstrating the political will to go beyond making promises of stimulus packages for industry and actually establishing the industrial finance support scheme for industry in Ghana. This is because manufacturing and industrialization take time to yield increasing returns to scale. Initial stages of manufacturing and industrialization involve learning, either by doing or through skills transfer, which also require financial support. This means that although the industrialization agenda of the government of Ghana is ideal, manufacturing firms will need stable and permanent financial support in order to ensure that they reach a stage where they are making significant returns. By so doing, the growth of the Ghanaian economy can be set on a sustainable path and economic development will be achieved over time.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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APPENDIX

Table A. Definition of variables

Variable	Definition	Source
MVA_t	The variable measures manufacturing share in total output or GDP. It is defined to capture final goods captured in the ISIC revison 3 range, with specific focus to goods in divisions 15-37.	UNIDO & WDI
AID_t	This vairable captures the current dollar value of Net official development assistance (ODA) and official aid given by developing countries. In either case, this aid is decided by the Development Assistant committee (DAC) and comes with specific conditions of repayment or use.	WDI
ER_t	This variable captures the official rate at which goods and services are exchanged. It is calculated the quantum of local currency units relative to the U.S. dollar.	WDI
EN_t	This variable measures the share of total electricity produced from hydroelectric sources. It is included to proxy the generational capacity for manufacturing in Ghana.	WDI
IMP_t	This variable measures the total value of imports of goods and services, in current US dollars. It is included to capture the aspects of manufacturing inputs which come from foreign sources.	WDI
DFB_t	This variable measures the share of domestic credit that is given by banks to the private sector, in total output. It may include loans, securities and trade credits and is included to capture the specific role of banks in financing industrial development.	WDI
DFS_t	This variable measures the share of domestic credit given to firms and industries from the financial sector, as a share of total output. It is used as a proxy for the workings of financial markets and credit provision.	WDI

Table B. Variable summary statistics

Variable	N	Mean	Std. dev.	Min	Max
MVA_t	41	8.832287	1.903286	3.605511	11.58855
AID_t	41	8.89E+08	5.33E+08	1.08E+08	2.20E+09
EX_t	41	1.156065	1.593821	0.000275	5.595708
EN_t	41	82.62898	17.24357	50.86589	100
IMP_t	41	7.93E+09	8.37E+09	1.20E+08	2.69E+10
DFB_t	41	9.617323	5.45858	1.542268	17.62266
DFS_t	41	25.15769	5.241264	16.38271	39.29761

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