

Policy Shift and the Lack of Industrialization in Africa

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Empirical analysis indicates that a policy shift occurred in Sub-Saharan Africa that involved the political elite redirecting their attention to agriculture, resulting in policies that reduced the indirect taxation of this sector. It is hypothesized that this has had two effects: a productivity effect that stimulated the expansion of manufacturing and a reallocation effect that reduced manufacturing. It is hypothesized that initially, the productivity effect was stronger than the reallocation effect, and thus manufacturing expanded as a share of GDP. However, as indirect taxes continue to be reduced the reallocation effect comes to offset the productivity effect and the share of manufacturing in GDP begins to fall. A panel data set for a sample of Sub-Saharan African countries is created and analysis of this data indicates that indeed the hypotheses are supported.

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INTRODUCTION

Historically, rapid economic development has always involved industrialization or the rapid growth of manufacturing. Thus structural change has played a critical role whereby the share of agriculture in both GDP and total employment declined while the share of manufacturing in GDP and employment dramatically increased. As rapid economic growth continues, eventually services begin to displace manufacturing in terms of both GDP and employment.

This process of structural change is thought to lead to a comparative static rise in labor productivity. This is due to the fact that most poor countries are initially dualistic in nature (Lewis, 1954). That is, initially the economy is made up of a traditional sector, usually identified with agriculture and agriculturally related activities, and a modern sector, usually identified with manufacturing. Labor productivity is low in the former and high in the latter. Thus the shift in labor from agriculture to manufacturing results in a rise in overall productivity for the economy.

However, long-run development requires technical change which in the case of a developing country involves learning and applying technologies already developed in high income countries, catching up. This is a dynamic, long-run process that allows for rapid productivity growth. In fact, Rodrik (2013) finds that the manufacturing sector in developing regions is characterized by unconditional convergence. Thus once such a sector is firmly established, the productivity of firms in this sector tends to rapidly converge to that found in firms in already developed countries. This occurs even after accounting for initial conditions. Thus manufacturing serves as an escalator by which poorer countries can rapidly move up in terms of labor productivity. Thus countries in which labor rapidly shifts out of agriculture and traditional services and into manufacturing gain in two ways: a

comparative static productivity gain and a dynamic productivity gain.

This traditional mechanism for economic development, structural change, has recently seemed to lose some of its punch. In fact, some have argued that recently structural change has been characterized by a structural shift in which labor has moved to sectors with lower labor productivity (traditional services) (McMillan and Rodrik, 2011). More importantly, from the standpoint of this paper, it has been argued that many developing countries, in particular in Sub-Saharan Africa, have been undergoing premature deindustrialization. That is, as economic growth has occurred, the share of manufacturing in GDP and employment has actually declined (Felipe et al., 2014). This is indeed distressing since it implies that rapid productivity growth via structural change is not likely to occur. While deindustrialization has occurred in some places in Sub-Saharan Africa, it is also obvious that in those areas where deindustrialization has been avoided, the expansion of manufacturing has still been very slow. Thus perhaps a better description of the Sub-Saharan African experience is that structural change via the expansion of manufacturing has been very slow. Thus this region seems to be missing out on the opportunity for rapid industrialization (Mensah, 2020).

Explanations for this missed opportunity for industrialization are numerous. Most of them involve a combination of the globalization process and technical innovation and will be discussed in a later section of this paper. These explanations are certainly relevant and useful. However, this paper will put forward a somewhat different and unique explanation. Beginning in the late 1980s and early 1990s liberalization of economic policy began as structural adjustment policies were adopted in many countries. At the same time, democracy, in terms of competitive multi-party elections, became increasingly pervasive in many developing countries. Empirical evidence strongly supports the idea that structural adjustment policies liberalizing the economy and also the institution of democracy in the form of multiparty elections significantly changed policy towards agriculture in developing nations. In particular, policy changes have significantly reduced the indirect taxation of agriculture and increased the provision of subsidies to agriculture (Olper et al., 2014). Moreover, empirical evidence from Sub-Saharan Africa indicates that the same sort of process has occurred there (Bates and Block, 2008).

In this paper, it will be accepted that policy liberalization associated with structural adjustment programs and the institution of multi-party competition has indeed altered policy so as to dramatically reduce the indirect taxation of agriculture. This paper will focus on the implications of this policy change on manufacturing. It will be argued that this policy shift has had two effects. The first effect is that productivity in agriculture grows as a result of improvements in the overall efficiency with which resources are allocated and, as a result of several factors related to this, the share of manufacturing increases (manufacturing becomes relatively more important) as labor is pushed out of agriculture. The second effect is a reallocation effect. The reduction in indirect taxation (raising the profitability of investment there) attracts resources into agriculture which would tend to reduce the share of manufacturing in GDP. It is hypothesized that initially as indirect taxation of agriculture is reduced and efficiency improves, the productivity effect outweighs the reallocation effect and manufacturing becomes relatively more important. However, as indirect taxation continues to fall the reallocation effect begins to outweigh the productivity effect and the share of manufacturing in GDP will decline. Empirical analysis using panel data drawn from Sub-Saharan Africa supports this hypothesis.

The paper will unfold as follows. Section two will provide evidence for the lack of industrialization in Sub-Saharan Africa. Section three will survey some explanations of this phenomenon in the existing literature and present a simple additional explanation that is the focus of this paper: changes in policies towards agriculture. In section four, statistical analysis of a panel data set drawn from a number of countries in Sub-Saharan Africa will be presented and discussed. Finally, section five will summarize the paper and provide a conclusion.

AFRICA'S DIFFICULTIES WITH INDUSTRIALIZATION

Data on the extent of industrialization in Sub-Saharan Africa, measured by the share of manufacturing in GDP and total employment are difficult to find. However, recently de Vries et al. (2013) have developed a useful data set for examining this issue. The data set covers eleven Sub-Saharan African nations for the period 1960 to 2010. It includes data on gross value added at nominal, real, and international prices as well as information on employment by sector of the economy.

In Table 1, summary data is presented on value added, employment, and relative labor productivity by sector of the economy. The data for value added and employment represents each sector's proportion of the economy's total. With respect to relative productivity levels, this represents the ratio of a particular sector's productivity level to the total economy's productivity level. Thus a 0.5 for agriculture implies that the sector's labor productivity was half that for the entire economy. Examining the data one can see that agriculture certainly followed the typical pattern of structural change. Agriculture's share in value added and employment has significantly declined over time. However, labor productivity in agriculture has lagged behind that of the rest of the economy.

When the focus shifts to the industrial sector, several interesting things emerge. Looking at the industrial sector as a whole, the share of value added rises from 1960 to 1990. However, after that, there is a decline. Examining the subcategory for manufacturing one can see that the share of this sector fell dramatically, especially after the 1990s. In terms of employment, it too declines after the 1990s.

Examining relative productivity, a similar story emerges. Overall productivity in industry is significantly greater than that for the overall economy, but this advantage begins to decline dramatically in the 1990s. The same holds for the manufacturing sector.

Finally, the sector which has expanded most rapidly has been the service sector. It has grown both in terms of value added and employment shares. Looking at relative productivity, one can see that this sector is more productive than the average for the entire economy, but not to the same extent as manufacturing. Also, relative productivity has fallen through time. Finally, while the service sector has grown, much of this has involved the expansion of traditional sector services where labor productivity is low. Modern sector services, characterized by higher labor productivity, also require very high levels of human capital, a characteristic which is scarce in Sub-Saharan Africa (Rodrik, 2015).

Thus while there appears to be some empirical evidence to support the idea of premature deindustrialization during the period utilized above, more recent data indicates that on average the share of workers in manufacturing in Sub-Saharan Africa has actually increased from 7.2% to 8.4% for the period 2010 to 2018 (Kruse et al., 2021). This seems to

Table 1. Summary data

Sector	Sectoral shares								Relative productivity levels			
	Value added				Employment							
	1960	1975	1990	2010	1960	1975	1990	2010	1960	1975	1990	2010
Agriculture	37.6	29.2	24.9	22.4	72.7	66.0	61.6	49.8	0.5	0.4	0.4	0.4
Industry	24.3	30.0	32.6	27.8	9.3	13.1	14.3	13.4	4.4	3.7	3.5	2.6
Mining	8.1	6.2	11.2	8.9	1.7	1.5	1.5	0.9	15.7	22.4	23.3	19.5
Manufacturing	9.2	14.7	14.0	10.1	4.7	7.8	8.9	8.3	2.5	2.8	2.4	1.6
Other industry	7.1	9.2	7.3	8.9	3.0	3.8	3.9	4.2	8.5	5.8	5.3	2.9
Services	38.1	40.7	42.6	49.8	19.0	20.9	24.1	36.8	2.7	2.5	2.4	1.6
Total economy	100	100	100	100	100	100	100	100	1.0	1.0	1.0	1.0

Adapted from: de Vries, Timmer, and de Vries (2013).

indicate that recently the extent of deindustrialization has declined and that a more accurate description of the situation is that growth in manufacturing production and employment while positive, has been slow. The focus in this paper will be on the missed opportunity for industrialization. This concept includes the notion of premature deindustrialization. However, it also includes those situations in which the share of manufacturing in total GDP and in total employment may increase slowly through time. This will be referred to as the missed opportunity for industrialization.

SOME EXPLANATIONS

Many of the explanations offered to explain the lack of industrialization are technology based. For example, Baldwin (2011) has argued that dramatic changes in technology have led to an unbundling of the manufacturing process. Throughout much of recent history, development involved a country going through the difficult process of constructing a manufacturing supply chain eventually resulting in the production of a finished manufactured good. Thus the share of manufacturing in terms of both GDP and employment would rise dramatically over time. However, developments in technology have allowed the production process to become unbundled into different parts or elements. These different parts of the supply chain can now be located in different parts of the world where costs are relatively the lowest. Thus a less developed country can be home to only a particular part of the supply chain and thus the extent of manufacturing in GDP and employment will be much less. Although in this paper it is acknowledged that globalization and the changing nature of technical innovation are likely to be part of the explanation for a lack of development of manufacturing, this paper will focus on another factor, the change in the policy stance taken by the state with respect to agriculture.

Agriculture has always been an important sector economically and sometimes politically to the extent that neither developed nor less developed countries allowed markets alone to determine the outcome of economic activities in this sector. Most developed countries seek to protect their agricultural sectors from international competition (Elliott, 2004). In addition, as the East Asian economies achieved rapid development and higher standards of living, they too engaged in significant protection of their agricultural sectors (Anderson et al., 1986).

Less developed countries have also been reluctant to allow the market alone to guide economic activities in the agricultural sector. They have, however, sought to indirectly tax the agricultural sector (Schiff and Valdés, 1992). This has generally been associated with an import substitution strategy of economic development. The point of this strategy was to promote the expansion of manufacturing by using policy to transfer resources from the agricultural sector (Anderson, 2009). Recently, a liberalization process has been occurring which has reduced the extent of import substitution and the indirect taxation of agriculture.

This brief discussion indicates that indeed governments have generally been deeply involved in policymaking with respect to agriculture. In a general sense, one can think of policy with respect to agriculture as coming in two varieties. Policy can be aimed at lowering the domestic prices of outputs (below international levels) and/or raising the domestic prices of inputs (above international levels) thus resulting in the indirect taxation of the agricultural sector. Alternatively, policy can be aimed at raising the price of outputs (above international levels) and/or lowering the prices of inputs (below international levels) thus resulting in the protection of the agricultural sector.

One can measure a country's policy stance by calculating the relative rate of assistance for the agricultural sector (RRA). This measures the incentive provided to agriculture relative to non-agriculture as a result of government policy. Policies that lower the price of agricultural outputs below international prices and/or raise the price of inputs to this sector above international levels represent an indirect tax on agriculture and the RRA for agriculture will be negative. By the same token, government policies that raise the prices of non-agricultural goods above international levels and/or lower input prices for this sector below international levels are also indirectly taxing the agricultural sector and the RRA will be negative. Alternatively, policies that favor the agricultural sector at the expense of

the non-agricultural sector will have an RRA that is positive. They tend to raise the price of agricultural goods above international levels and/or lower the prices of agricultural inputs below international levels. Details of the calculation method for RRA can be found in the work of Anderson and Valenzuela (2008).

As discussed above, for much of the post-World War II period governments in less developed countries have generally indirectly taxed agriculture ($RRA < 0$). This is a bit perplexing in that for most developing countries the bulk of the population earns its living in agricultural production and related activities. One would expect that the population in the rural sector would effectively oppose indirect taxation. However, rural populations have generally lacked the political power to prevent such policies. This has been attributed to a variety of reasons. Olson (1971) argued that large groups are likely to find it very difficult to organize politically given the fact that they are more subject to collective action problems relative to small groups. Bates and Rogerson (1980) argued that agriculture sector producers make poor candidates for incorporation into ruling coalitions because policies aimed at providing subsidies to this sector harm almost all other potential participants in a ruling coalition. Finally, Bates and Block (2013) argue that the population of the rural sector is geographically highly dispersed with each farm too small to impact prices or policy. The political power of the agricultural sector is relatively weak even though this sector generally includes a high share of the total population. Thus agriculture tends to be indirectly taxed for the benefit of the nonagricultural sector.

However, in the late 1980s and early 1990s, this situation began to change. Data for the RRA for Sub-Saharan Africa is provided in Table 2. As can be seen, beginning in the 1980s and early 1990s the extent of discrimination (indirect taxation) of agriculture declined dramatically. Some scholars have argued that the spread of multi-party elections had a significant effect on policy with respect to agriculture. The lack of political power for the rural agriculturally-based sector discussed above was reversed since multiparty competitive elections enhanced the influence of the agricultural sector which contained a large share of potential voters. The political governing coalition would now have an incentive to provide policies more favorable to agriculture. There is empirical evidence for developing countries in general to support this connection between multi-party democracy and the RRA provided to the agricultural sector (Olper et al., 2014).

There is also empirical evidence that the spread of multiparty democracy in Sub-Saharan Africa has had a similar effect. Prior to the late 1980s, there was very little political competition throughout Sub-Saharan Africa. However, beginning in the late 1980s and early 1990s significant political change began to occur. Multi-party elections involving competition for political power spread throughout the region. Bates and Block (2013) have quantified this

Table 2. RRA (1950-2010, five year average)

Year	RRA
1955-1960	-0.37
1960-1965	-0.16
1965-1970	-0.22
1970-1975	-0.27
1975-1980	-0.27
1980-1985	-0.15
1985-1990	-0.1
1990-1995	-0.18
1995-2000	-0.09
2000-2005	-0.13
2005-2010	-0.12

From: Anderson and Nelgen (2013).

political change and provide empirical evidence indicating that political change reduced the extent of the indirect taxation of agriculture in Sub-Saharan Africa.

Others have argued that other factors explain the policy change which involved a reduction in the extent of indirect taxation in agriculture (a rise in RRA). Specifically, this policy change with respect to agriculture was the result of efforts aimed at reducing the extent to which industrial production was protected. After independence, most of the countries in the region followed policies that aimed to protect and promote (subsidize) the expansion of industry which in turn discriminated against the agricultural sector. Economic difficulties arose in the late 1970s involving balance of payments problems, debt problems, and inflation. International organizations such as the World Bank and the International Monetary Fund promoted policies that sought to eliminate policies protecting industry, reducing tariffs and quotas, balancing budgets, privatization, etc. These have been labeled as structural adjustment programs (Heidhues and Obare, 2011). The impact of such policy reforms was a reduction in the indirect taxation of agriculture (increase in RRA).

Whatever the cause of such a policy change (spread of competitive elections or the application of structural adjustment programs), the indirect taxation of agriculture declined (RRA rose). What has not been studied is the impact that such a policy change had on manufacturing. Initially, agriculture was being indirectly taxed ($RRA < 0$). The reforms raising RRA raised the incentive for agricultural production relative to nonagricultural production, in particular manufacturing. As agricultural production expands it would draw resources away from manufacturing which would tend to cause a decline in production in the nonagricultural sector, in particular manufacturing. This is the reallocation effect. In addition, the shift of resources into agriculture would improve the overall efficiency of production (due to the reduction in indirect taxation) thus raising the overall productivity and income of the economy, which is labeled here as the productivity effect. The rise in income in agriculture would expand the demand for manufactured goods. It would also tend to free up agricultural labor (since less of it is needed in agriculture now that productivity has increased) which could then be moved into manufacturing. The increased productivity and income would also result in increased savings and investment in capital goods produced in the nonagricultural sector (Dennis and İşcan, 2011).

These two factors, reallocation and productivity effects, pull in opposite directions with respect to the share of manufacturing in GDP. The reallocation effect would tend to lower the share of manufacturing in GDP while the productivity effect would tend to raise the share of manufacturing in GDP. However, it will be hypothesized here that if the level of indirect taxation is very high, then the productivity gains effect is likely to be large relative to the reallocation effect and the share of manufacturing in GDP is likely to rise as the extent of indirect taxation of agriculture declines. This is due to the fact that the productivity gains are likely to be initially quite large if the distortions are initially quite large. Alternatively, as the indirect taxation of agriculture continues to decline, then the gains in productivity are likely to be smaller and the reallocation effect is likely to more than offset the productivity effect with the share of manufacturing in GDP declining. Thus one would expect that as the indirect taxation of agriculture is reduced from high levels that the share of manufacturing in GDP would increase. However, as indirect taxation of agriculture continues to be reduced the share of manufacturing will begin to decline. This hypothesis will be tested in the next section of the paper.

EMPIRICAL ANALYSIS

In order to test the above hypothesis, a panel data set was constructed. This data set included information on the RRA, the RRA squared, real GDP per capita, real GDP per capita squared, and the share of manufacturing in GDP for five countries in Sub-Saharan Africa (Cameroon, Ghana, Kenya, Sudan, Uganda) for the period 1965 to 2010. The countries included were those that had data available for this period. Additional countries could

be incorporated into the data set if the time period covered was significantly shortened. However, the factors hypothesized to be at work here and discussed in the previous section are only likely to unfold over a long period. Thus the sample was restricted in size creating a longer period for analysis. Obviously, the data covers a limited number of countries, but it is hoped that as additional data becomes available concerning the RRA then a more extensive analysis of this issue can be carried out. The period covered ends in 2010. This is due to the fact that data for RRA is not available beyond this time period.

The data on GDP per capita is taken from World Development Indicators. Data on the RRA is taken from Anderson and Nelgen (2013). Data on the share of manufacturing production in GDP is from the World Bank (2020). Five-year moving averages of this variable are presented in Table 3. As one can see the experience of these specific countries mimic that for Sub-Saharan Africa in general and discussed earlier. There is some evidence of deindustrialization as well as stagnation and very slow increases in the share of manufacturing.

Table 3. Manufacturing production as a share of GDP (five year moving average)

Year	Cameroon	Ghana	Kenya	Sudan	Uganda
1970	9.61	10.39	11.46	8.05	8.80
1975	10.21	12.95	12.12	6.93	7.42
1980	9.09	10.57	11.94	6.65	4.86
1985	11.57	7.70	11.98	7.82	5.37
1990	13.61	10.12	11.75	8.70	5.94
1995	18.84	9.91	10.69	5.62	6.26
2000	20.43	10.01	12.30	8.83	8.59
2005	19.95	9.81	11.21	7.59	7.41
2010	12.78	8.44	13.67	5.96	8.40

The empirical literature concerning the relationship between real GDP per capita and the share of manufacturing in GDP (Amirapu and Subramanian, 2015; Felipe et al., 2014) has generally used the following sort of equation to examine this relationship:

$$Manuf/GDP_{it} = a_0 + a_2 PerCapitaGDP_{it} + a_3 PerCapitaGDP_{it}^2 + a_4 T + e_{it}, \quad (1)$$

where $Manuf/GDP_{it}$ is manufacturing as a share of GDP, $PerCapitaGDP_{it}$ is real per capita GDP, $PerCapitaGDP_{it}^2$ is real GDP per capita squared, and T is a time trend. The empirical literature supports the idea that as real GDP per capita rises the share of manufacturing tends to rise (the sign of a_2 is positive), but as real GDP per capita continues to rise the increase in the share of manufacturing declines, and eventually, the share of manufacturing in GDP (while other sectors rise to importance) actually declines. Thus the sign of a_3 is negative. The inclusion of the time trend is to test the hypothesis as to whether the relationship between real GDP per capita and the share of manufacturing in GDP is weakening through time (a_4 is negative).

The empirical model being estimated in this paper can be written as

$$Manuf/GDP_{it} = a_0 + a_1 RRA_{it} + a_2 RRA_{it}^2 + a_3 PerCapitaGDP_{it} + a_4 PerCapitaGDP_{it}^2 + a_5 T + e_{it}, \quad (2)$$

where RRA_{it} and RRA_{it}^2 are the relative rate of assistance and the same variable squared. This will allow for the quadratic nature of the impact of RRA on the share of manufacturing in GDP to be tested.

In this paper, the empirical analysis is carried out utilizing fixed effect estimations. The key advantage of the fixed effects model is that it allows for the control of all time invariant omitted variables. The fixed effects regression model is commonly used to reduce selection bias in the estimation by eliminating large portions of variation that might consist of confounding factors. Thus, fixed effects are often used because they eliminate all between-unit variations. In this case, where we are working with different countries that can be assumed to differ systematically from one another in unobserved ways which may have an impact on the outcome of interest, utilizing fixed effects regressions makes logical sense since they produce an estimate of a variable's average effect within units over time (Allison, 2009; Wooldridge, 2011). One can utilize the Hausman test to identify whether or not to utilize fixed effects, but one must also have a logical explanation for doing so. The results of the country fixed effects model are presented in Table 4. The last column does not include a time trend because it is a country as well as time fixed effects estimation.

Table 4. Fixed effects panel estimations

Variables	(1)	(2)	(3)	(4)
	Country fixed effects	Country fixed effects	Country fixed effects	Country & time fixed effects
RRA	-3.095** (1.33)	-3.034** (1.292)	-2.803** (1.383)	-3.432* -1.985
RRA ²	-8.973*** (1.766)	-8.781*** (1.743)	-8.505*** (1.819)	-7.808*** -2.445
GDP_POP		0.001 (0.001)	-0.008 (0.004)	0.001 -0.006
(GDP_POP) ²			-0.00000007 (0.011)	-0.00000002 (0.000)
Time trend	0.033*** (0.007)	0.029** (0.01)	0.03** (0.011)	
Cross-section fixed effects:				
Cameroon	4.024	3.925	4.095	3.847
Ghana	-0.017	0.253	0.022	0.473
Kenya	1.477	1.613	1.558	1.824
Sudan	-2.693	-2.501	-2.633	-2.401
Uganda	-2.791	-3.292	-3.041	-3.744
Observations	230	230	230	230

Note: White Heteroscedasticity Consistent Standard Errors (in parenthesis); *, **, *** indicate statistical significance at 90%, 95%, and 99% respectively; all estimations have white cross-section (period cluster) standard errors and covariances (d.f corrected); time fixed effects coefficients not presented for column (4).

As can be seen, the signs on *RRA* and *RRA*² are both negative and statistically significant. This indicates that as the *RRA* to agriculture increases manufacturing as a share of GDP first rises, but eventually it falls. Thus the shape is of an inverted U. The level of *RRA* at which the share of manufacturing ceases to rise and begins to fall can be calculated. Using the coefficients from estimation three in the above table, the apex of the inverted U is achieved at a level of *RRA* that is -0.17. Thus for higher levels of indirect taxation, reducing that taxation is associated with a rise in manufacturing as a share of GDP. For lower levels of indirect taxation, further reductions in the level of indirect taxation on agriculture are associated with a fall in the share of manufacturing as a share of GDP. Thus reducing the indirect taxation of agriculture has the unexpected consequence of eventually reducing the share of manufacturing in GDP. Thus the comparative static and dynamic gains following from structural change would be lost. The last set of results in column (4) does not include a time trend but instead controls for country and time fixed effects. The results remain essentially unchanged. As a test of robustness, these same estimations were carried out using a random effects estimation technique. The results, in terms of signs and statistical significance of variables, remained unchanged thereby providing evidence of the robustness of the results presented above.

It should be pointed out that the implication is not that reductions in the indirect tax on agriculture should be stopped. One must remember why it is that as the indirect tax on agriculture is reduced eventually the share of manufacturing in GDP declines. This happens because eventually, the reallocation effect of such changes outweighs the productivity effect. However, if technical innovation increases in agriculture, increasing agricultural productivity will tend to offset the reallocation effect and the share of manufacturing in GDP will increase with further reductions in the indirect tax on agriculture. It is the slowness of productivity increases in agriculture that is the real problem. This is particularly important for Sub-Saharan Africa. Table 5 presents estimates of total factor productivity growth in agriculture for the region of Sub-Saharan Africa and decomposes the productivity growth into that due to efficiency improvement and that due to technical change. The efficiency gains in total factor productivity are mainly the result of reducing the indirect tax on agriculture. As one can see, until the 1980s the indirect taxation of agriculture hampered economic efficiency while technical change in agriculture remained low. However, as the indirect taxation of agriculture began declining improvements in efficiency rose dramatically and dominated the impact of technical change. However, technical change has become increasingly important in the growth of productivity in agriculture. It is the slowness of technical change in agriculture which is the worrisome thing (although there has been an improvement since the mid-1980s). Again, the negative effect of reducing the indirect tax on agriculture on the share of manufacturing is due to the reallocation effect being stronger than the productivity effect. Increasing productivity via technical innovation will offset this result.

Table 5. TFP growth rate and decomposition

Period	TFP	Efficiency	Technical change
1961-2006	0.02	-0.24	0.32
1961-1983	1.33	-1.32	0.2
1984-1995	0.37	0.9	0.45
1996-2006	0.43	0.77	0.65

Source: Yu and Nin-Pratt (2011).

SUMMARY AND CONCLUSION

In this paper, it has been argued that policy towards agriculture in Sub-Saharan Africa changed dramatically in the 1980s. This shift in agricultural policy was reflected in the changes in the RRA for agriculture. Data concerning these measures of agricultural policy were presented for Sub-Saharan Africa. This data indicated that government policy became increasingly favorable towards agriculture. Relative to non-agriculture, the extent of discrimination against agriculture has declined dramatically (RRA has risen).

It was hypothesized in this paper that such a reduction in indirect taxation of agriculture would have two effects: reallocation of resources to agriculture and productivity increases which stimulate the expansion of manufacturing. The reduction in indirect tax increases the incentive for agricultural production and thus resources would reallocate to that sector and away from manufacturing. This would tend to reduce the share of manufacturing in GDP. At the same time, the improvement in efficiency would result in productivity growth for the entire economy. With rising income in agriculture, the demand for manufactured goods would rise while labor would be freed up for use in the manufacturing sector. Also saving and investment would increase the demand for capital goods produced in the industrial sector. This would cause the share of manufacturing to increase. Which effect dominates depends on the level of indirect tax. Beginning from a situation in which indirect taxation of agriculture is very high, there are likely to be great gains from productivity growth stemming from improvements in efficiency. This is likely to outweigh the

reallocation effects and thus the share of manufacturing in GDP would rise. However, as these productivity gains are reduced eventually the reallocation effect becomes predominant and thus the share of manufacturing in GDP will decline. This is the hypothesis that was tested. The empirical analysis provided support for this hypothesis. The relationship between the RRA and the share of manufacturing in GDP is an inverted U shape implying that increases in RRA (reductions in indirect taxation) eventually are associated with a fall in the share of manufacturing in GDP.

The conclusion is not that policies improving the efficiency of agricultural production should be done away with due to this unexpected consequence. Instead, emphasis should be placed on the creation of institutional infrastructure that promotes rapid productivity growth in agriculture. Specifically, the ability to develop, adapt, and apply technological improvements to agriculture would allow countries to reap the gains in productivity by eliminating distortions while at the same time minimizing the extent to which agricultural prices rise. This would limit or eliminate the negative impact on non-agriculture production, in particular manufacturing. In this context, the need to incorporate the agricultural sector into the governing coalition (as the result of multiparty competitive elections) could be met by providing new technologies that raise productivity growth in agriculture.

The experience of parts of East Asia (Taiwan, South Korea, and China) and Southeast Asia (Indonesia) would seem to be relevant here. The economic success of these countries seems to have been linked with policies that sought to initially increase the productivity of the agricultural sector. In fact, it seems difficult to imagine that rapid economic growth would have occurred there without rapid growth in agricultural productivity. The results of this paper also point to the conclusion that agricultural productivity growth is important for the shift from agriculture to manufacturing in Sub-Saharan Africa.

REFERENCES

- Allison, P. D. (2009). *Fixed effects regression models*. Thousand Oaks, Calif.: Sage Publications.
- Amirapu, A., and Subramanian, A. (2015). *Manufacturing or services? An Indian illustration of a development dilemma* (Working Paper 409). Center for Global Development. <https://www.cgdev.org/publication/manufacturing-or-services-indian-illustration-development-dilemma-working-paper-409>
- Anderson, K. (2009). Five decades of distortions to agricultural incentives. In K. Anderson (Ed.), *Distortions to agricultural incentives: A global perspective, 1955-2007* (pp. 3-64). Washington, DC: World Bank.
- Anderson, K., Hayami, Y. George, A., Honma, M., Otsuka, K., Saxon, E., Shei, S. Y., and Tyers, R. (1986). *The political economy of agricultural protection: East Asia in relative perspective*. USA: World Scientific Publishing.
- Anderson, K., and Nelgen, S. (2013). *Updated national and global estimates of distortions to agricultural incentives, 1955-2011, regional aggregates*. Washington, DC: World Bank.
- Anderson, K., and Valenzuela, E. (2008). *Estimates of distortions to agricultural incentives, 1955 to 2007*. Washington, DC: World Bank.
- Baldwin, R. (2011). Trade and industrialization after globalization's 2nd unbundling: how building and joining a supply chain are different and why it matters. *NBER Working Paper*, No. 17716, National Bureau of Economic Research. <https://www.nber.org/papers/w17716>
- Bates, R. H., and Block, S. (2008). The political economy of agricultural trade interventions in Africa. *Agricultural Distortions Working Paper*, 86, Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/28166>
- Bates, R. H., and Block, S. (2013). Revisiting African agriculture: institutional change and productivity growth. *Journal of Politics*, 75(2), 372-384.
- Bates, R. H., and Rogerson, W. P. (1980). Agriculture in development: a coalitional analysis. *Public Choice*, 35, 513-527.
- de Vries, G., Timmer, M., and de Vries, K. (2013). Structural transformation in Africa: static gains, dynamic losses, *GGDC Research Memorandum*, 136, University of Groningen Growth and Development Center. <https://research.rug.nl/en/publications/structural-transformation-in-africa-static-gains-dynamic-losses-2>
- Dennis, B. N., and İşcan, T. B. (2011). Agricultural distortions, structural change, and economic growth: A cross-country analysis. *American Journal of Agricultural Economics*, 93(3), 885-905.

- Elliott, K. (2004). Agricultural protectionism in rich countries: How did we get here? *Working Paper*, 47, Center for Global Development. <https://www.cgdev.org/publication/agricultural-protection-rich-countries-how-did-we-get-here-working-paper-number-47>
- Felipe, J., Mehta, A., and Rhee, C. (2014). Manufacturing matters ... but it's the jobs that count, *Working Paper*, No. 420, Asian Development Bank. <https://www.adb.org/sites/default/files/publication/149984/ewp-420.pdf>
- Heidhues, F., and Obare, G. (2011). Lessons from structural adjustment programmes and their effects in Africa. *Quarterly Journal of Agricultural Economics*, 50(1), 55-64.
- Kruse, H., Mensah, E., Sen, K., and de Vries, G. (2021). A manufacturing renaissance? Industrialization trends in the developing world, *Working Paper*, 2021/28, WIDER. <https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2021-28-manufacturing-renaissance-industrialization-trends-developing-world.pdf>
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22, 139-191.
- McMillan, M. S., and Rodrik, D. (2011). Globalization, structural change, and productivity growth, *NBER Working Paper*, 17143, National Bureau of Economic Research. <https://www.nber.org/papers/w17143>
- Mensah, E. (2020). Is Sub-Saharan Africa deindustrializing? *GGDC Research Memorandum*, 186, University of Groningen. https://www.rug.nl/ggdc/html_publications/memorandum/gd186.pdf
- Olper, A., Falkowski, J., and Swinnen, J. (2014). Political reforms and public policy: evidence from agricultural and food prices. *The World Bank Economic Review*, 28(1), 21-47.
- Olson, M. (1971). *The logic of collective action: public goods and the theory of groups*. Cambridge, Mass: Harvard University Press.
- Rodrik, D. (2013). Unconditional convergence in manufacturing. *Quarterly Journal of Economics*, 128(1), 165-204.
- Rodrik, D. (2015). Premature deindustrialization, *NBER Working Paper*, 20935, National Bureau of Economic Research. <https://www.nber.org/papers/w20935>
- Schiff, M., and Valdés, A. (1992). *The plundering of agriculture in developing countries*. Washington, DC: World Bank.
- Wooldridge, J. M. (2011). *Econometric analysis of cross section and panel data*. Cambridge, Mass: MIT Press.
- World Bank (2020). *World development indicators* [Data]. <https://databank.worldbank.org/source/world-development-indicators>
- Yu, B., and Nin-Pratt, A. (2011). Agricultural productivity and policies in Sub-Saharan Africa, *IFPRI Discussion Paper*, 01150, International Food Policy Research Institute. <https://www.ifpri.org/publication/agricultural-productivity-and-policies-sub-saharan-africa>