'Cocoa is Ghana, Ghana is Cocoa' – Should Ghana Specialise in the Production and Export of Cocoa Beans?

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Potential of "Dutch Disease" in Ghana, the second largest producer of cocoa beans, has produced the unlikely question of whether to continue specialization toward cocoa. Based upon a balanced consideration of economic theory through the Heckscher-Ohlin Model and previously discounted flaws of this model, Dinnaga Padmaperuma recommends to not specialize further in cocoa production. He presents a series of arguments rooted in real wage dynamics, producer price developments and incentives for innovation to evaluate decisions, both theoretical and institutional, to specialize. In conclusion, he presents some possible improvements and extensions to his analysis.

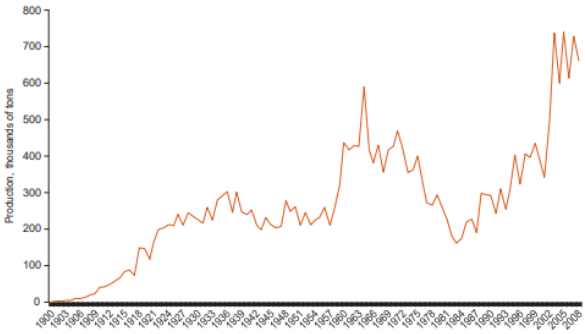
Introduction

The light-hearted phrase 'Cocoa is Ghana, Ghana is Cocoa' mentioned in everything from dessert recipes to peer-reviewed academic papers, provides an insightful glance at a wider issue in the sphere of international trade economics. Traditionally, West African agriculture has played a central role in the provision of sustenance, raw materials, employment and foreign earnings to secure adequate backing for development (Yahaya, et al., 2015). This

is evident in Ghana being the second largest producer of cocoa beans, with recent estimates indicating 900,000 tons in 2017/2018 second only to Côte d'Ivôire (ICCO, 2018). The magnitude of the subsector is witnessed through the 1 million households involved in cocoa production, whose output accounts for greater than one-fifth of Ghana's GDP, and 20–25% of export earnings – a primary source of foreign exchange (World Bank, 2018). However, recently Ghana has begun diverging from this trend, with economic growth being driven strongly by growth in oil production at 16% in 2016/2017 compared to 0.8% in agriculture. The World Bank (2018) specifies this consistent reduction in agricultural contribution to GDP alongside the rapid rise in extractive industry as a nascent sign of the Dutch Disease, i.e., focusing on one sector at the expense of the economic activity of another. A clear method to alleviate this expected decline in medium term oil production is development of non-natural resource sectors. Given the structural importance of the agricultural sector and the heavy reliance on cocoa beans, this essay seeks to determine if Ghana should continue to specialize in the production and export of cocoa beans in a longer term sustainability context. This paper will begin with a historical overview, then determine what trade economic theory proposes through the Heckscher-Ohlin framework. Subsequently we argue on the bases of real wages dynamics, producer prices and productivity/innovation as to why Ghana should not specialize in cocoa production, whilst drawing on any relevant theoretical predictions and or shortcomings.

Historical Background

Figure 12.1 Ghana's Cocoa Production, 1900–2008



Source: Gill & Duffus Group, various issues; Ghana Cocoa Marketing Board, various issues.

- 1888 – 1937: Cocoa introduced in mid-19th century by commercial farmers seeking different export agriculture opportunities and establishment of European companies. This was aided by expansion

of the road/rail system from 1920 onwards and the association of export marketing by middlemen, allowing cocoa earnings to account for 84% of total exports by 1927 (Kolavalli & Vigneri, 2011);

- 1938 – Early 1964: Interwar periods witnessed volatility in cocoa production fueled by reduced global demand alongside transport complications. Subsequently, epidemics of pests/diseases reduced Eastern regional production in the 1940s, building cocoa cultivation in Western frontiers (Amanor, 2010). From 1947, the Cocoa Marketing Board (CMB) was established, with a monopoly over the purchase of cocoa beans. The CMB became a tool for public finance and maintained steady profitability through manipulation of government policy[1] (Brooks, et al., 2007). The 1960s saw a series of restrictive measures (i.e. increased taxation, import licensing) to combat forex reserve declines and budget deficits due to world cocoa prices falling (Kolavalli & Vigneri, 2011).
- 1967 – 1982: The global reductions in cocoa prices from 1965 ensured another downturn (Stryker, 1990); this was exacerbated by real producer prices dropping due to inflation caused by extensive money creation to counteract loss of cocoa revenue and overvaluations of the cedi. Further, aging tree stocks and repeated spread of disease reduced capital investment into cocoa. Poor confidence and low margins in the industry forced farmers to move toward food production (Amanor, 2005). Ghana's cocoa production fell to its lowest point in 1982/1983 at 159,000 tons (Kolavalli & Vigneri, 2011).
- 1983 – Present: Ghana's cocoa sector rebounded with the Economic Recovery Program of 1983. Notable policy changes include higher prices to Ghanaian farmers and devaluing the cedi. Output reached 400,000 tons by 1995/1996 whilst productivity rose from 210 – 404 kilograms per hectare (Kolavalli & Vigneri, 2011). From 1992 onward, Cocobod[2] awarded six private licensed buying companies responsibility for cocoa procurement, to reduce inefficiency and improve competitiveness. The 2000s saw production continue growing, driven by high world prices, increased farming incomes, improved

1 In real terms, total consolidated public expenditures increased approx. six-fold during the 1950s. Whilst share of expenditure in GDP grew from 7% to 18%, and the share of extraordinary/development expenditure grew from 27% to 36% (Kolavalli & Vigneri, 2011).

2 Rebranded CMB.

farming practices (e.g. mass spraying programs); subsidy packages and 'frequent applications of fertilizer' (Vigneri & Santos, 2008).

Theoretical Intuition & Recommendation

The Heckscher-Ohlin Theorem (H-O model) built upon the Ricardian model of comparative advantage (Heckscher, 1919) (Ohlin, 1933). Here, comparative advantage remains when a country's 'opportunity cost of producing the good is lower than the opportunity cost of producing the good in another country' (Feenstra & Taylor, 2017). The model states that trade takes place due to differing costs of factors of production between nations. Therein, countries will export products that intensively use the factor they are abundant in, and import products that are produced by domestically scarce factors (Feenstra & Taylor, 2017) (Blaug, 1992). The model specifically maintains that 'factor endowments are immobile between nations' (Verter, 2016) alongside several assumptions. We maintain the H-O model superior to the Ricardian model as it (is): comprehensively more versatile by implementing more variables (two countries; two commodities; two factors); includes the use of money as opposed to Ricardo's 'wage good' allowing for more seamless analysis; proposes the main cause of international trade is the difference in abundance of factors as opposed to variances in the technological abilities of countries (Heckscher, 1919) (Ohlin, 1933). This latter point is crucial as the model allows for the free dissemination of knowledge between nations and that best techniques will eventually be adopted in both countries.

In constructing the model, we keep that cocoa production is labor-intensive, though seasonal (Boas & Huser, 2006), reinforced by the 1 million households involved in cocoa production (World Bank, 2018). This is in contrast to capital-intensive surface mining operations, that require less but very skilled labor for the complex operation of equipment (Amponsah-Tawiah & Dartey-Baah, 2011). Alternatively, some academics propose Ghana has a factor endowment of favorable tropical climate(s) (e.g. 6 million hectares of arable land in the Northern Savannah Ecological Zone (NSEZ) (World Bank, 2018)), which in the H-O model may be a cause for specialization in cocoa production as agriculture demands arable land. We do not consider a land endowment in the model due to Breisinger et al. (2008)'s research into average yield in relation to harvested land that indicates cocoa production is exhausting suitable land rapidly (Breisinger, et al., 2008).

Given labor abundance, we would witness Ghana choosing to export cocoa. Engaging in trade will see the relative price of cocoa rise, whilst its imports can be purchased at the lower world market price (Feenstra & Taylor,

2017). Historically, Ghana's export profile does not diverge significantly from the model (see Figure 2), indicating heavy production and export between 1961 and 2016. The subsequent diagram confirms that Ghana gradually experienced an increase in the price per ton of cocoa beans (see Figure 3). Despite similarities between the model and reality, it is important to outline the clear shortcomings of the model, namely: that econometric testing of the standard H-O model and Vanek's (1968) extension convey factor endowment has poor predictive power of international trade patterns (Vanek, 1968) (Trefler & Zhu, 2000); that the H-O model in contrast to New Trade Theory assumes firms are homogenous with identical production functions (Greenaway & Kneller, 2007); homogeneity and complete transferability of capital (Edwards, 1985)[3].

REAL WAGES DYNAMICS

Real wage remains a wide-ranging measure of the outcome of trade but further a key mechanism by which the disadvantaged may obtain wealth and reduce economic vulnerability. The theoretical intuition underlying long term changes in real variables under H-O specialization remains the Stolper-Samuelson (SS) theory; which posits an increase in the relative price of the associated labor-intensive good will generate associated increases in the relative price of labor/real wage (Stolper & Samuelson, 1941) (Feenstra & Taylor, 2017). Unfortunately, the literature corroborating such is both scarce and ambiguous in relation to cocoa – warranting evaluation. The 1990s, a period of macroeconomic liberalization replicates the theoretical movement toward greater free-trade, where Teal & Vigneri's (2004) paper estimates an econometric production function for cocoa production, drawing on two household surveys covering the period from 1991 to 1998 (Teal & Vigneri, 2004). Overall this period experienced an increase in total cocoa output of 37% (Teal, 2000) alongside improved prices – highlighting the tangible export benefits of liberalization. Nevertheless, the Ghana Living Standards Survey suggested that during this period, there is no evidence for a rise in real cedi agricultural wage, with a change from GH₵565.97 in 1990 to GH₵564.40 in 1997 (indexed to 1990 GH₵) (Teal & Vigneri, 2004). This ambiguity is deepened given the associated rise in labor productivity from GH₵141.00 in 1990 to GH₵297.00 in 1997, due to the growth of non-labor inputs through the Cocoa Rehabilitation Project in 1983 for example fertilizers, hybrid cocoa varieties and better disease management (Boahene, et al., 1999) (Teal, et al., 2006). According to the equation from Feenstra & Taylor (2017) real wages should in fact have risen:

3 Note, this model has various other shortcomings primarily rooted in the strong assumptions.

$$MPL_c = \frac{W}{P_C}$$

We attribute this to the inability to adjust for cocoa farmers varying their use of land and labor in response to the dynamism of the cocoa market. Fundamentally, real wage effects should have improved however in practice when labor costs rose significantly, cheaper forms of labor were sought primarily sharecropping arrangements or informal labor groups (Berry, 1993) (Amanor, 2010). Hence real wages never improved drastically rose for farmers as they were undercut by seasonal workers. For perspective, the World Bank (2018) claims 55% of workers in agriculture and fisheries are informal. Construction of specialization policies that disregard this large proportion of informal workers, will inherently provide unrealistic predictions on the real effect of trade.

Beyond this, pretenses to specialize may instigate internal policy that promotes unsustainable practices. This is witnessed in the 'switching' factor endowments related to the above example that saw an increase in the land-to-labor ratio (Teal & Vigneri, 2004). This occurred as farmers were promised property rights by developing and clearing uncultivated land for cocoa production (Amanor, 2010) (Berry, 2009) (Takane, 2002). This micro level rent-seeking has contributed to widespread surges in land cultivations, with no changes in land productivity. This is observed as the drop in labor per unit of land offsets the rise in non-labor inputs to land (Teal, 2000). Interestingly the final effect on the real rental on land remains variable with the price of cocoa. It is true that optimum use of arable land has previously aided the cocoa sector however the present scenario remains unsustainable as the NSEZ, the land gradually being reclaimed/cultivated, has been explicitly stated to not hold potential for cocoa but rather production of cereals, sugar cane, cotton, and livestock (World Bank, 2018).

Inefficiency of Producer Prices

Producer price of cocoa remains a different strata from real wage, as producers are paid a proportion (approx. 70%) of the 'net free-on-board (FOB) price,' a producer price generated (incl. costs, storage etc.) by Cocobod at the start of a season (World Bank, 2018). Further, the FOB price often differs from world market price but may also differ from the sale price as cocoa is primarily comprised of forward sales. This highlights the inherent pricing distortions of the cocoa trade. In relation to the SS theory Ghanaian producer prices present a mixed image, and it is difficult to decipher if specialization has improved producer prices. Figure 4 details that cocoa production has risen since the reforms

of the 1990s, alongside a partially lagged increase in real producer price.

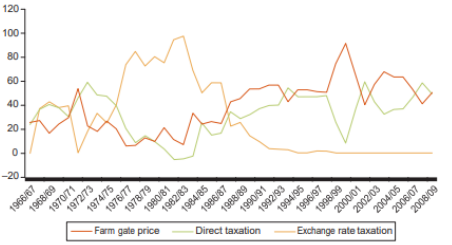
Discounting the abrupt drop in price from 2002 to mid-2006 with only minor fluctuations in output, we experience a general upward trend in the absolute amount received by farmers. However, Figure 5 crucially conveys that despite absolute increases in prices the share of has remained approximately constant if not declined moderately. This is corroborated by Barrientos and Asenso-Okyere (2008) in 1996 and 2006 who observe 'cocoa production has not improved in profitability for farmers, with net profits 7% lower in 2005 than 1996; signaling whilst real price of cocoa increase by 47% between this period, cost of inputs has increased by more (Kolavalli & Vigneri, 2011).

This pricing inefficiency has arisen as the Ghanaian government has become overly reliant upon cocoa revenue. Leading it to leverage its factor endowment in labor to serve as a fixed tool for revenue collection through both extensive implicit taxation of the producer price (World Bank, 2018), and a lesser extent the difference between the producer price and final sale price. This systemic inefficiency not only reduces the real income share of producers, but contributes to a variety of derivative inefficiencies that harm the supply chain. In Adarkwa [village], lower producer prices result in farmers being incapable of investing their incomes into their farms as they cannot afford necessities. Indirect lowering of small-scale investments leave small-producers unable to purchase required inputs worsening crop management and subsequently yields (Dormon, et al., 2004). The government has enacted measures to alleviate such problems (see Fertilizer Subsidy Program), however such programs often crowd out investment into long-term productivity in exchange for shorter term gains. Dormon et al (2004) indicate despite reforms of the cocoa industry in the 1990s, mechanization remained minimal. From 2007 onward the Ghanaian government has been subsidizing agricultural-specific machines to scale up hire services to smallholder farmers. Heavy subsidies on capital-intensive equipment distort development of the input supply chain, and bar lower-cost machines entering the market. Moreover, foreign manufacturers lack local market knowledge to cater suitable products to the region. Enhanced specialization proves distressing as the obscure endogenous relationship between the cocoa industry and the government generates a scenario, wherein the latter has no reason to improve efficiency as the flourishing cocoa industry continues to inflates the FOB price contributing to export margins approx. double that of Côte d'Ivoire (World Bank, 2018). Similar to lacking informal agents, a key factor is the role of institutions during and/or after specialization. This is understandable given that we cannot deny the literature is scattered with examples of such, however, it is difficult to model

Figure 12.5 Ghana Cocoa Production and Real Producer Price, 1990–2008

Source: Cocobod and ICCO.

Figure 12.4 Farm Gate Prices, Direct Taxation, and Exchange Rate Taxation for Ghanaian Cocoa, 1966–2008
Percent



Source: Vigneri 2005.

Primary Commodity Specialization and Innovation

A large portion of economic development cannot be explained by the allocation of capital and labor nor the real changes in terms of trade. This unexplained part, multi-factor productivity, characterizes advances in the efficiency of production. Productivity is fueled by innovation in the strictest sense, and in neoclassical terms we see productivity when new capital resources are introduced into the firm or when market competition produce a greater incentive to innovate (Arrow, 1962). With respect to Ghana, agricultural productivity concerns are masked by overarching success of the sector growing 10% (Q3) (World Bank, 2018), founded upon stagnating productivity growth combined with extensive land expansion. It is important to note this matter does not only impact cocoa production but others too. For example, Ghanaian cereal yields estimated at 1.7t/ha remain lower than key competitors, Côte d'Ivôire (2.7t/ha), Madagascar (2.6t/ha), and Uganda (2t/ha). Regardless, all nations consistently remains below the potential yield estimated at over 5t/ha. For purposes here, Ghanaian cocoa yields average between 400–450 kg/ha amongst the lowest globally (World

Bank, 2018). Similar to the case of pricing inefficiencies, this concern is attributed to the fundamental reliance of the government to primary commodities.

Simply put, this reliance on primary goods has fostered a reduction in the entrepreneurial initiative of the populous (Singer, 1950), eroding the place for innovative capacity and micro-investment. This occurs as the cocoa industry remains a source of easily manipulated revenue the government will seek to provide all necessary support to maintain revenue. Two key examples being: the National Seed Council that is largely involved in regulatory and administrative holdups affecting liberalization of the seed sector (e.g. inspection, certification, subsidies etc.) (Tripp & Mensah-Bonsu, 2013); and prevalence of private licensed companies permitted to purchase and transport the cocoa crop from farms at specified prices set by Cocobod (Kolavalli & Vigneri, 2011). It is true, we cannot dispute these measures have resulted in positive spill-over effects for example Zeitlin (2006) indicates a positive correlation between the concentration of licensed buying companies at the village level and production[4] . However it is crucial to evaluate the inefficiency of policy. Direct agricultural supply chain intervention results in inefficient production as farmers grow dependent on public support, exacerbated by a pseudo-competitive cocoa market inhabited by an informal oligopoly. Such interventions fail to create a competitive environment that generates expected rents for farmers that exceed cost of innovation. Nor do they allow competitive pressures that push producers to endeavor for survival by instigating innovations. Therein on the macroeconomic scale, the government seeks no fundamental improvement in innovation as excess finance may be achieved via policy tuning.

Some consolation is provided through the recent Ghana Commercial Agriculture Project, which hopes to support 'commercialization of smallholder farming through Public-Private Partnership-type arrangements with large agricultural investors' (World Bank, 2018). This aims to enact structural change and improve productivity alongside market linkages through the out-grower model for agribusiness.

Conclusion

This paper has outlined how shortcomings traditionally discarded from or overlooked from the H-O model may suppress further specialization in cocoa production. To summarize, we initially consider the H-O model which maintains that countries must specialize and subsequently export products that intensively use factors they are endowed with. Given the scope of this paper, we have omitted

4 It is important to note outlines there may be a causality issue as buyers will likely locate themselves closest to large quantities of cocoa (Zeitlin, 2006)

the more trivial assumptions of this model and have rather focused upon more unorthodox shortcomings. We reasoned that Ghana possesses an abundance of labor and specialization has given way to increases in the producer price per ton of cocoa beans. Respectively, we establish that predictions lacking informal activity may poorly represent real effects of specialization resulting in unsustainable policy toward such; over-specialization upon singular commodities will induce inefficient pricing mechanism distorting the nominal benefits of trade; government reliance upon cocoa production inherently contributes to reduced innovative capacity of smaller-scale producers. Given the evidence and intuition of arguments we state that Ghana should not specialize further in cocoa production.

A clear improvement to this analysis remains to consider additional models of trade for example the Ricardian or Specific Factors that may more holistically represent the matter of specialization as per the academic perspective alongside associated shortcomings.

Building upon this, we recommend three clear extensions to this study: first, to determine the suitability and sustainability of alternative Ghanaian commodities to better inform policy recommendation considering the analysis to move away from cocoa; second, to evaluate other Sub-Saharan countries regarding primary commodity specialization to isolate similar trends in export policy for example the Côte d'Ivôire; and finally, to begin the process of econometrically testing if the aforementioned points hold statistically significant relationships in the data. To note this latter point will likely involve a data collection phase particularly regarding informal sector variables.

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