Essay on Development Policy

Cocoa Prices and Development:
A Closer Look at Time Trends and Fluctuations

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1 Introduction

There are two stylized facts about commodity prices:

i. A long-term declining trend relative to the prices of manufactured goods that the exporting countries must import. This characteristic is generally referred to as the Prebisch-Singer hypothesis (Prebisch 1950, Singer 1950). They argue that the income elasticity of demand for manufactured goods is greater than for primary products. Therefore, as incomes rise in the long-term, the demand for manufactured goods is supposed to increase more rapidly than the demand for primary products.

ii. Disproportionately high fluctuations compared to those of manufactured goods. These are frequently attributed to supply shocks in combination with inelastic demand and the behavior of speculators (Deaton and Laroque 1992).

These characteristics cause complex problems for commodity-dependent countries and households alike. The long-term declining price trend in commodities leads to decreasing terms of trade. This results in trade deficits and increasing public debts on a macroeconomic level and implies declining real incomes on a microeconomic level. The high price fluctuations in contrast, have a more short-term impact, inducing erratic incomes from export taxes on commodities, which entail difficulties in national budget planning. For commodity-dependent households, price fluctuations make it nearly impossible to rely on a steady income, which in many cases results in insufficient investments in future revenue generation and therefore in unsustainable financial behavior.

Cocoa is, next to crude petroleum and coffee, one of the most important commodities that is exported by developing countries and mostly processed and consumed in developed countries. Internationally, it is therefore heavily traded, mainly at global commodity exchanges. The key trading places for cocoa are the New York Board of Trade and the London based NYSE Liffe Futures and Options.

In major exporting countries, cocoa has a crucial economic importance both on a microeconomic and a macroeconomic level. Therefore this essay aims to analyze critical aspects of cocoa prices and their implications for producing countries and farmers, respectively. The time period of 1960 to 2008 is studied.

The organization of this essay is as follows: Firstly, cocoa production and demand are studied, and the impact they have on prices is investigated. Secondly, cocoa prices are discussed and a

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1 Cocoa stands for dried cocoa beans referring to the general trading standard.
regression model that simulates real cocoa prices and evaluates the long-term time trend is presented. Thirdly, the problem of high price fluctuations is reinterpreted and put into relation to long-term price evolution. Finally, possible solutions to mitigate the effects of high price fluctuations are highlighted, followed by concluding remarks.

2 Cocoa market and price formation

2.1 Cocoa producing countries

Being a tropical crop, cocoa can be grown only in a limited geographical area, approximately 20 degrees north and south of the Equator. In addition, the cocoa tree needs specific climatic conditions, which are sufficient rainfall, high humidity and year-round stable temperatures. These circumstances implicate that the majority of the world’s cocoa crops are produced by few, mainly poor developing countries (figure 1).

![Pie chart showing the distribution of cocoa production among countries.](image)

**Figure 1**: Major producers of cocoa 2008/2009; shares of world production.
Data form ICCO (2009a)

When analyzing figure 1, it is evident that the importance of the different producing countries varies widely. The four West African countries accounted for 67% of worldwide cocoa production in 2008/2009, whereas Côte d’Ivoire alone contributed 35%. Adding the output of Indonesia to the output of Côte d’Ivoire, Ghana, Cameroon and Nigeria, these five countries reach a market share of 81%, which can be considered fairly dominant. Latin America, where the cocoa plant is originally from, nowadays only accounts for 13% of worldwide cocoa production.
With the exception of Brazil, cocoa production is mainly concentrated in small-scale farms regarding the listed countries in figure 1. Cocoa production is therefore highly important for many households, as it is a key source of income and, in cases like Ghana, contributes significantly to rural development and poverty reduction (Breisinger et al. 2007).

In Côte d'Ivoire and Ghana, the two major producing countries, approximately 25% and 10% of the total population depend on cocoa production for a considerable part of their income (Sarris 2002, Talbot 2002, CIA 2009). In 2002 cocoa accounted for 44% and 34% of total export value in Côte d'Ivoire and Ghana, respectively, reflecting its substantial economic importance for those two countries (Busch 2005). However, in highly populous countries such as Nigeria, Brazil and Indonesia, cocoa only amounts to less than 1% of total export value (Ul Haque 2004).

### 2.2 Cocoa production

A remarkable feature of global cocoa production, considered as gross cocoa supply in this essay, is its considerable and constant growth over the last 70 years. Since the 1960s global cocoa production has shown an annual growth rate of 2.49%, even though there were considerable ups and downs between some years, due to climatic, economic, political and crop related impacts, like the emergence and dispersion of new cocoa pests (figure 2).

**Figure 2**: Global cocoa production and annual growth rates 1960-2008. Data from ICCO (2009a)
During the 1970s, cocoa production was more or less constant at around 1.5 million tons, followed by a steep growth in the 1980s with a boost of one million tons. However, since 2003, a form of growth stagnation can be observed. Problems like the black pod disease in West African countries, old cocoa plantations, particularly in Ghana, continuing political instability in Côte d’Ivoire and a sagging exploitation of new cocoa farmland in Indonesia are fundamental reasons for this phenomenon.

2.3 Cocoa demand

To make cocoa beans consumable or to further transform or mix them with other substances, they have to be ground first. Grinding results in a semi-finished product called cocoa liquor, which can be considered the basis for all further processing. Chocolate is by far the most important end-product, accounting for almost 90% of global cocoa demand (ITC 2001). Because of its crucial importance in processing, the total amount of cocoa grindings is usually considered a good indicator for the gross demand of cocoa, despite the emergence of significant stocks of semi-finished cocoa products in the last years (figure 3).

Figure 3: Global cocoa production, cocoa grindings and annual surplus/deficit. Annual surplus/deficit corresponds to the difference between cocoa production and cocoa grindings. Data from ICCO (2009a)

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2 Black pod is a fungal disease affecting cocoa.
Since 1960, cocoa grindings show a steady growth from one million tons to three and a half million tons corresponding to worldwide cocoa production. This stands for an annual growth rate of 2.53%. When comparing the relation of gross cocoa supply and gross cocoa demand, the massive surplus of supply during the 1980s is particularly striking. Côte d’Ivoire alone nearly doubled its output from 417’000 to 780’000 tonnes between 1980 and 1989. Furthermore, the seven-fold increase in production in Malaysia that boosted its cocoa output from 35’000 to 243’000 tonnes during this decade was significant for the surplus.

2.4 Cocoa prices

Global cocoa prices, as shown in figure 4, are listed in current USD, which means that they are not inflation-adjusted, therefore representing the prices in absolute USD at the time of trading.

![Figure 4: Global cocoa production, cocoa grindings, total end-of-season stocks and nominal cocoa prices. Data from ICCO (2009a)](Image)

When analyzing the trend in nominal cocoa prices, it becomes evident that there was an extraordinary boom in the 1970s. Between 1970 and 1976 nominal cocoa prices virtually exploded, showing a sixfold increase. Since cocoa is mostly traded in USD, the 1970s cocoa price boom can be partly explained by the significant devaluation of the USD during this decade. However, the 1970s were followed by a considerable bust in the 1980s. Later on prices then remained constantly low in the 1990s, before they began to recover between 2002
and 2008. The development of end-of-season stocks is eye-catching. From 1960 to 1980 they remained more or less constant at around 500,000 tonnes. In the 1980s, a dramatic increase from about 500 to 1,500 tonnes can be observed. This increase of end-of-season stocks is certainly caused by the constant production surplus during this decade (figure 3) and reflects a high global availability. Commonly, the trend in global availability seems to be a suitable negatively correlated indicator for price development. It is therefore generally assumed that the massive increase in end-of-season stocks in the 1980s significantly contributed to the substantial bust in cocoa prices.

Nevertheless, as cocoa grindings show a constant growth over time, the impact of end-of-season stocks on cocoa prices is more easily interpreted when put into relation with the absolute volume of cocoa grindings. The so-called stocks-to-grindings ratio is often used in models to simulate cocoa price development. Yet, it is pointless to simulate cocoa prices in current USD, because of inflation-related effects and variation in exchange rates that affect nominal cocoa prices. Ul Haque (2004) for instance developed an OLS (Ordinary Least Squares) linear regression model to predict cocoa prices in constant 2002 SDRs using following variables: 1. A time trend and 2. The stocks-to-grindings ratio. Taking into account the time period of 1961 to 2001 he estimated a 2% annual declining rate of inflation-adjusted cocoa prices per year and the following correlation regarding the stocks-to-grindings: A 1% increase in the stocks-to-grindings ratio resulted in a price decline of 3%. By means of this model he could explain approximately 75% of the variation in price. Within the scope of this essay the model of Ul Haque (2004) was reproduced and the results could be confirmed.

Considering the recent boom in cocoa prices a similar regression model, using the same two variables was adopted, in order to verify or disprove the findings of Ul Haque (2004). Following equation was applied:

\[ \ln P = \alpha + \beta_{\text{time}} \cdot \text{time} + \beta_{\text{stocks-to-grindings}} \cdot \text{stocks-to-grindings} \]

where \( \ln P \) is the logarithm of the cocoa price, \( \alpha \) is a constant and \( \beta \) stands for the regression parameters.

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3 End-of-season stocks are calculated as follows: end-of-season stocks \((t) = \) end-of-season stocks \((t-1) + \) production \((t) - \) grindings \((t)\), where \(t\) stands for years.

4 SDR (Special Drawing Right) is an international reserve asset, created by the IMF in 1969 to supplement the existing official reserves of member countries. Its value is based on a basket of key international currencies.

5 OLS is a technique for estimating the unknown parameters in a linear regression model. Applying OLS linear regression models it has to be assumed that observations are independently distributed. In the case of observations over time, for instance measured cocoa prices, this is not truly the case, as prices are influenced by price levels in previous years. A proper statistical analysis hence would require a time series model that takes into account the natural ordering of cocoa prices over the studied time period and the interdependence of prices across several years. Nevertheless, OLS was applied in order to compare results with the regression model of Ul Haque (2004).
The main differences in the dataset were the following: 1. Nominal cocoa prices in USD and not SDRs were used as the basis for further calculations; 2. Deflation of nominal cocoa prices was performed with the MUV\(^6\) index. According to Radetzki (2006), it resolves the problem of exchange rate changes that are not immediately reflected in the export prices. In addition, the MUV index relates to manufactured goods only, which provides a better counterpoint than SDRs for measuring the price changes of commodities such as cocoa; 3. The time period of 1960 to 2008 was studied (figure 5).

![Figure 5: Real cocoa prices deflated with the MUV index and stocks-to-grinding ratio. Data calculated from ICCO (2009a), UNCTAD (2008) and World Bank (2009)](image-url)

With the applied regression model 74% of the variation in MUV deflated cocoa prices over the entire time period could be explained. Regression coefficients of the variables; time trend and stocks-to-grindings ratio were all significant. Subsequent listed relationships could be found: 1. Cocoa prices declined by an annual rate of 0.008% 2. An increase of 1% in the stocks-to-grindings ratio led to a decline of 3% of the cocoa price. The correlation between the stocks-to-grindings ratio and the cocoa prices obtained through the model presented in this essay is similar to the correlation presented by Ul Haque (2004). However, it is striking that the model presented in this essay shows an estimated annual declining rate of only 0.008% for MUV deflated cocoa prices. In contrast, Ul Haque (2004) calculated an annual declining rate of 2% for cocoa prices in constant 2002 SDRs. Obviously, other currencies were used and cocoa prices were deflated differently, which makes it difficult to compare findings of Ul

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\(^6\) MUV (Manufactures Unit Value) is an index generally accepted as a proxy for the price of developing country imports of manufactured goods in USD terms.
Haque and findings presented in this essay. Nevertheless, the obtained result in this essay implies that a high long-term declining trend of MUV deflated cocoa prices between 1960 and 2008 does appear to be existent. In other words, the annual decline of terms of trade for cocoa is statistically significant but negligibly small. Yet, this finding very much depends on the observed time period.

With the exception of the extraordinary boom in the 1970s, cocoa prices could be predicted reliably for the overall time period using the estimated coefficients of the regression model. Therefore it can be concluded that cocoa prices generally behave in line with basic market mechanisms. Abundant availability of cocoa leads to price busts, whereas scarce availability triggers price booms. In the 1970s, although the stocks-to-grindings ratio was considerably low, other factors seemed to have played an important role, too, in respect to the increasing cocoa prices. Cooper and Lawrence (1975) argue that the high inflation in the United States, movement to flexible exchange rates and their following high variability during this period also contributed significantly to the cocoa price boom. Namely, because the chaos in currency markets in the early 1970s led many investors to move out of bonds and shares and into commodities (Radetzki 2006).

Figure 6 shows the evolution of the MUV index and the cocoa price index, in order to get an idea of how the cocoa price has developed over time in comparison to the price of manufactured goods.

Figure 6: MUV index and cocoa price index (2000=100) from 1960-2008. Data calculated from ICCO (2009a), UNCTAD (2008) and World Bank (2009)
For the time period between 1960 and 2008 terms of trade of cocoa did not decline significantly. According to Dand (1999) cocoa has an income elasticity\(^7\) of 0.65 and therefore is considered a normal good, whereas manufactured goods like cars generally show income elasticity of demand >1 and are considered luxury goods. Consequently, the income elasticity can not explain, why terms of trade of cocoa are not declining. Apparently, other factors such as the political instability in Côte d’Ivoire, which led to uncertainty of future supply, might play a more important role to explain the positive evolution of terms of trade of cocoa in recent years.

Comparing the development of the two indexes showed in figure 6, striking above all is the huge discrepancy in the 1970s. During this decade the cocoa price index was up to the fourfold higher than the MUV index. Generally, it can be stated that the evolution of the cocoa price index is significantly more inconsistent than the evolution of the MUV index. Or in other words, there seems to be a huge difference in fluctuation when comparing the two indices.

### 3 Price fluctuations: a big problem

Regarding fluctuations, the behavior of cocoa prices has been similar to other commodities: very high fluctuations, not only on an annual but also on a monthly basis. Data shown in table 1 give an estimate of these of price fluctuations based on monthly data\(^8\) of cocoa and other selected commodities and indices.

| Table 1: Price fluctuation indices for cocoa, other selected commodities, commodity indices and the MUV index based on current USD. Data calculated from UNCTAD (2008, UNCTAD 2009) |
|---|---|---|---|---|
| Cocoa | 73% | 24% | 16% | 24% |
| Coffee | 81% | 19% | 38% | 32% |
| Bananas | 26% | 18% | 22% | 25% |
| Crude petroleum | 74% | 32% | 19% | 54% |
| Tropical beverages* | 74% | 16% | 28% | 22% |
| Agricultural raw materials** | 36% | 11% | 10% | 21% |
| MUV | 29% | 11% | 6% | 10% |

* Tropical beverages is an index composed of cocoa, coffee and tea
** Agricultural raw materials is an index mainly composed of linseed oil, tobacco, cotton, wool, jute, sisal, cattle hides, tropical logs and rubber

\(^7\) Income elasticity of demand measures the responsiveness of the demand of a good to the change in the income of the people demanding the good. It is calculated as the ratio of the percent change in demand to the percent change in income. Normal goods generally show income elasticity between 0 and 1, whereas luxury goods show income elasticity >1.

\(^8\) Averages per 10 years were calculated. Then standard deviation of monthly data was determined for the same period of 10 years. Finally, ratio of standard deviation to 10 years average was calculated.
The data that stands out from the rest are the fluctuation indices between 1968 and 1977. For all listed commodities, commodity groups and the MUV, fluctuation indices are highest during this period. Mainly cocoa, coffee, crude petroleum and tropical beverages show very high fluctuation indices with values of over 70%. In the case of cocoa this high fluctuation index can be clearly related to the cocoa price boom during this period and is not caused by disproportionate monthly price fluctuations. Because fluctuation indices in table 1 are based on current USD, high inflation in the United States in the 1970s also contributed to their high level. Leaving aside the period of 1968 to 1977, a stabilizing trend can not be detected over time when comparing periods of 1978 to 2007. Interestingly however, is that the MUV shows a minimum value of price fluctuation for every analyzed time period. Naturally, the MUV is a composed index, containing lots of different manufactured goods but comparing it to agricultural raw materials, a likewise composed index, it can be concluded that prices for manufactured goods are by far not as volatile as prices for commodities. In the case of cocoa, coffee and crude petroleum this is especially striking but also bananas show high fluctuation indices between 1968 and 2007. Investigating cocoa in particular, the following reasons for the very high fluctuation indices could be detected:

i. Price elasticity of demand of cocoa has a coefficient of -0.091 and can therefore be considered extremely inelastic (Dand 1999). Consequently, cocoa demand does not increase or decrease significantly if supply and cocoa prices change. In addition the inelastic demand implies that variations in worldwide cocoa production result in massive changes in cocoa prices.

ii. Being a tree crop, the supply of cocoa can not be adjusted on a yearly basis. This means that a decrease in cocoa production in a major cocoa producing country can not be easily compensated by an increase in production elsewhere.

iii. Cocoa plants are heavily prone to diseases and sensitive to climatic incidences and since the majority of worldwide cocoa crops are produced by only a few countries, such factors can lead to significant supply shocks.

iv. Because cocoa is heavily traded at global commodity exchanges it is susceptible to speculations.

For countries such as Côte d’Ivoire and Ghana, where cocoa accounts for a huge share of total national exports, the above-mentioned high price fluctuations have erratic impacts on the national budgets because of heavy dependency on incomes from export taxes on commodities.

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9 Price elasticity of demand measures the percentage change in quantity demanded caused by a one percent change in the price variable.
sales. Assuming that cocoa outputs are stable, governments often tend to spend more when
cocoa prices are high and as a result, in years with low prices, are forced to indebt themselves,
in order to fulfill their public responsibilities. According to Bleaney and Greenaway (2001)
there is evidence that economic growth is negatively affected by high terms of trade
fluctuations.

For cocoa-dependent households, high volatility of cocoa prices makes it nearly impossible to
rely on a steady income. Obviously, the income of a cocoa farmer is not only influenced by
cocoa prices but also by the quantity sold. Nevertheless, the individual cocoa farmer can not
control cocoa prices in contrast to the yields. When comparing price fluctuations to
fluctuations in yield, the former is considered a more significant financial uncertainty
regarding farmer’s incomes. The financial uncertainty in many cases results in insufficient
investments in future revenues and therefore in unsustainable financial behavior. In fact the
high fluctuations of cocoa prices evoke the image of a lottery, with the stale aftertaste that this
lottery is not played voluntarily.

As highlighted above, sustainable economic development and rural development in cocoa
dependent countries can be greatly affected by the erratic instability of cocoa prices. It can be
concluded that the high price fluctuations and not the frequently mentioned long-term
declining trend in prices or terms of trade is considered the biggest problem concerning cocoa.
For this reason, some possibilities to mitigate the negative effects of high price fluctuations
shall be discussed in the next section.

4 Possibilities to mitigate effects of high price fluctuations

4.1 Public export monopolies

Before liberalization of the cocoa sector in the 1980s and 1990s, many major cocoa producing
countries had state authorities that controlled the cocoa trade. Economically it was considered
too important to be left to the private sector. The so-called Cocoa Boards were not directly
involved in the production and harvesting but mostly concentrated on purchasing domestic
cocoa at given prices and subsequently selling it to traders and processors. They therefore
appeared on the market as export monopolies. Consequently, they took over the whole
marketing process including quality control. In doing, so these Cocoa Boards guaranteed a
fixed cocoa price for at least a year for the cocoa farmers, therefore protecting them from
monthly price fluctuations. Generally, Cocoa Boards had the advantage of their negotiating power, which made it easier to sell cocoa through forward contracts\textsuperscript{10}, because cocoa can be sold in bulk quantities on the basis of production estimates of the respective country. Using forward contracts to sell cocoa provides greater flexibility, more stable and often higher prices and therefore facilitates national budget planning, because future incomes through export taxes can be more easily estimated (LMC 1996). However, Cocoa Boards were often criticized for their inefficient structures, mismanagement and high costs of operations. Without a doubt there were many problems in running these Cocoa Boards and the costs for their operations had to be borne by the cocoa farmers. According to Ruf and Milly (1990), the marketing costs and taxes were seen to be lower in countries relying on free markets than those with Cocoa Boards. Today only Ghana still runs its own Cocoa Board. This institution provides some advantages for the cocoa farmers. While fluctuations of cocoa producer prices in liberalized countries like Cameroon, Côte d’Ivoire and Nigeria rose sharply in the 1990s compared to those in the 1960s, 1970s and 1980s, they fell significantly in Ghana (Gilbert and Varangis 2003). Without a doubt the reduced exposure to price fluctuations only makes sense, if the cocoa farmer still gets a high share of the cocoa export value. In Ghana this is currently the case. Ghanaian cocoa farmers get a share of 70%, whereas in liberalized Côte d’Ivoire farmers only get a share of 41% of FOB\textsuperscript{11} export price (Williams 2009). In cases where the state-run Cocoa Board is run efficiently, without corruption, both the state and the cocoa farmers can economically benefit from such a centralised system.

4.2 Fair Trade price models

The fundamental idea of Fair Trade price models is that the producer gets a “fair” share of sales prices of final products. A major focus is put on exports from developing countries to developed countries. The FLO\textsuperscript{12} set a minimum price of 1600 USD/t and an additional Fair Trade premium of 150 USD/t for all standard grades of Fair Trade certified cocoa in 2004 (FLO 2009). Consequently, this results in a minimum FOB price of 1750 USD/t regardless of the current price at global commodity exchanges. If the exchange price rises above 1600 USD/t the Fair Trade price is defined as follows: the world market price plus the Fair Trade Premium of 150 USD/t. In figure 7 Fair Trade as well as current cocoa prices are shown for

\textsuperscript{10} A forward contract is an agreement between two parties to buy or sell an asset at a certain future time for a certain price agreed today. By contrast a spot contract is undertaken when making an agreement to buy or sell an asset at current market prices today.

\textsuperscript{11} FOB means Free On Board and refers to the shipping of goods. Generally it indicates that the seller pays for transportation of the goods to the port of shipment, plus loading costs. The buyer pays costs of marine freight transport, unloading, and transportation from the arrival port to the final destination.

\textsuperscript{12} FLO stands for Fair Trade Labelling Organizations International, an umbrella organization of Fair Trade that defines certification standards and minimum prices.
the period of January 2004 to December 2007. The vertically hatched area represents the difference between Fair Trade price and current world market prices. Cocoa farmers that sell their cocoa through the Fair Trade network are not affected by declining world market prices but can benefit from rising prices at the same time. This effect was most striking in 2000, when deflated cocoa prices reached a historical low. During that year, Fair Trade cocoa prices were partly twice as high as current cocoa prices.

![Figure 7: Free market cocoa prices and Fair Trade price model.](image)

By guaranteeing a minimum price, the Fair Trade price model directly addresses the problem of high price fluctuations, although unilaterally because only price busts are dealt with. The Fair Trade price difference can therefore also be considered a kind of subsidy, not directly reflecting market realities. This of course is known and also intended but could imply problems in mainstreaming the Fair Trade price model to a considerable share of worldwide cocoa producers. The higher Fair Trade price is an incentive to expand production, which could result in a substantial surplus of cocoa supply, leading to market distortion. However, in 2008, the total volume of Fair Trade cocoa sold through the Fair Trade network was 10’299 tonnes, which represents a very small share of 0.3% of global cocoa trade.

Pay (2009) states that cocoa is extremely suitable for ethical trade, because chocolate is a luxury good, which implies a high willingness to pay more for it. In fact sales of Fair Trade cocoa rose massively over the last years, by an average annual growth rate of 19.2% between 1997 and 2003 (Petchers 2004). Nevertheless, the high growth rate of Fair Trade cocoa has to be put into perspective, as it still holds a very modest share of total cocoa sales. High growth rates are much easier to achieve if one starts from a low initial level. Countries with a long
tradition of Fair Trade, such as Germany and the Netherlands showed growth rates for Fair Trade cocoa products of only 3.7% and -17.1%, respectively between 1997 and 2003 (Busch 2005). It therefore seems that Fair Trade cocoa has a high growth potential to a certain point but will probably, also due to considerable higher prices of corresponding end-products, always remain a niche product. As a result, it can be concluded that the Fair Trade price model can definitely have a very positive impact in terms of income stabilization on a microeconomic level. However, with a share of only 0.3% of global cocoa trade its stabilizing impact is irrelevant on a macroeconomic level. Considering the inapplicability of the Fair Trade price model to a majority of cocoa producers because of the above-mentioned reasons, according to Ul Haque (2004) Fair Trade actually “has come to mean unfair trade for all but a few”.

4.3 Price insurance

There is nothing new about the idea of price insurance as traders have been hedging themselves against price fluctuations for a long time, by using the futures market, forward contracts and options. Cocoa farmers or small cooperatives in developing countries by contrast normally do not have sufficient expertise and liquid assets to directly access these market-based risk management tools. Because of that it is generally recommended that private organisations or public institutions should offer price insurances to cocoa farmers and cooperatives. Basically, price insurances guarantee a minimum price for a specific quantity over a predetermined period of time (Sarris 2002), for which the policy holder has to pay a premium upfront. This fixed quantity-based approach of price insurances differs considerably from the approach national Cocoa Boards used to apply, which guaranteed a minimal cocoa price for any amount of produced output. Companies that offer price insurances generally use put options to hedge against declining prices. Since they can pool all policy holders, it is possible to diminish occurring transaction costs for hedging significantly, which means that individual insurance premiums can be offered at cheaper prices than the emerging costs of individual hedging. Furthermore price insurances are an attractive business area to invest in, as cocoa prices in contrast to cocoa yields, can not be influenced and misreported by the individual cocoa farmer, which minimizes cases of fraud and moral hazard. It is therefore assumed, that private insurance companies could easily be convinced to offer this service, which should lead to market competition and finally to cheaper insurance premiums for the cocoa farmers.

Sarris (2002) estimated a model to determine premiums and willingness to pay for price insurance by cocoa farmers in Ghana. The premiums he calculated are substantial, ranging from 3.3% of the expected future price if the strike price is 10% below the expected future price, to 13% if the minimum price is 10% above the expected price at maturity for a defined
insurance period of 6 months. For a 12 month insurance period he calculated 5.4% and 14.9% for the same type of contracts. However, he discovered that households with a large cocoa dependency, which are generally also poor households, show a high willingness to pay such a premium in order to receive some form of income stability. Therefore it can be concluded that especially poor rural households would greatly benefit from cocoa price insurances. Nevertheless, good access to such risk smoothing mechanisms would be essential, in order to reach households that most urgently need it.

Yet there are some constraints when using cocoa price insurances. There have been some incidences where private organizations and public institutions engaged in options trading have been rendered bankrupt or made enormous losses, because of traders that turned into speculators. Therefore, high personal integrity of engaged professionals as well as adequate regulation would be absolutely crucial. However, if these framework conditions are created, then price insurances are indeed a promising tool to reduce fluctuations on a yearly basis and ensure income stability for cocoa farmers. In addition, assuming that a major share of cocoa farmers took out price insurances, a positive stabilizing effect on the macroeconomic level might also be assumed.

5 Concluding remarks

The regression model to predict cocoa prices presented in this essay reveals that there was no noticeable long-term declining trend in MUV deflated cocoa prices and therefore no significant decline in terms of trade of cocoa between 1960 and 2008. Eye-catching by contrast is the extremely high price volatility that affects cocoa prices. Critical problems for cocoa producing countries and farmers consequently, at least to date, do not emerge from decreasing terms of trade, but from the massive short-term as well as long-term price fluctuations.

However, there are several possible strategies to cope with these price fluctuations:

i. Implementation of state authorities. The so called Cocoa Boards appear on the market like export monopolies. Due to their negotiating power, Cocoa Boards can sell cocoa through forward contracts, which has advantages on a macroeconomic as well as on a microeconomic level. Regarding the former, forward contracts facilitate national budget planning, because future incomes through export taxes can be more easily estimated. Regarding the latter, forward contracts allow the Cocoa Boards to guarantee a minimum annual price for cocoa farmers. However, Cocoa Boards were often criticized for their inefficient structures, mismanagement and high costs of operations, which consequently had to be borne by the cocoa farmers.
ii. Adaption of Fair Trade price models. Cocoa farmers that sell their cocoa through Fair Trade networks benefit from a minimum Fair Trade price and a Fair Trade price premium. Consequently, they are not exposed to declining global cocoa prices. On a macroeconomic level the stabilizing impact of Fair Trade price models is negligible because Fair Trade cocoa still has a very small share of only 0.3% of global cocoa trade. Furthermore, serious market distortions could appear when mainstreaming Fair Trade price models due to the subsidy characteristic of the Fair Trade price difference.

iii. Promotion of cocoa price insurances. Price insurances are a completely market-based approach and generally offered by private or public insurance companies. Cocoa farmers pay a premium in order to receive a minimum price for a specific quantity over a defined time period. On a microeconomic level cocoa farmers can greatly benefit from price insurances, reducing their exposure to price fluctuations, therefore improving their income stability. Assuming that a major share of cocoa farmers take out price insurances, there should be a significant stabilizing effect on a macroeconomic level as well. Nevertheless, as price insurances are based on option trading, in order to hedge risks, there have been incidences where insurance companies have been rendered bankrupt because of speculation activities.

Due to the substantial impact price fluctuations have on producing countries both on microeconomic and macroeconomic level alike, they should be addressed at least nationally. However, not every above-listed coping strategy is equally suited for this purpose. It is impossible for instance to mainstream Fair Trade price models to a majority of cocoa farmers in key producing countries, like Côte d’Ivoire and Ghana. Simply because demand of Fair Trade cocoa is still very limited and, despite high growth rates, not expected to reach a major share of worldwide cocoa demand in the future.

The promotion of price insurances seems to be more promising. As a market-based approach, it should be fairly easy to be made accessible on a national or even worldwide level. A combination of a state authority and price insurances is considered particularly favorable to mitigate negative effects of high price fluctuations, because of resulting synergies. In the case of Ghana for example, the still existing Cocoa Board could offer price insurances to cocoa farmers and cooperatives. However, in countries that liberalized their cocoa sector, it is questionable if they will reintroduce Cocoa Boards. Nevertheless, in these countries cocoa price insurances could be provided by private insurance companies.

It can be concluded that despite the heavy negative impacts price fluctuations have, the situation is far from hopeless. There are promising coping strategies to mitigate these negative impacts. However, based on personal experience in Côte d’Ivoire and Honduras it can be stated that there is still a considerable lack of access to risk smoothing instruments. In the case
of Côte d’Ivoire as the biggest cocoa producing country this is particularly problematic. Considerable efforts are needed to improve the situation on a microeconomic as well as on a macroeconomic level. Nevertheless, high cocoa price fluctuations do not seem to be prominently listed on development agendas nowadays. Because of its crucial importance for economic development it is advocated to change this within the next years.
6 References


