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The Impact of Commodity Price Changes on Rural Households: The Case of Coffee in Uganda♦

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Abstract: Policies and external shocks affecting agriculture, the main source of income for rural households, can be expected to have a significant impact on poverty. This paper studies the case of Uganda. Throughout the 1990s, more than 90 percent of its poor lived in rural areas and, during the same period, large international price fluctuations as well as an extensive domestic deregulation affected the coffee sector, its main source of export revenues. Using data from three household surveys covering the 1990s, this paper confirms a strong correlation between changes in coffee prices (in a liberalized market) and poverty reduction. This is clearly highlighted by comparing the performance of different households grouped according to their dependence on coffee farming. Regression analysis (based on pooled data from the three surveys) of consumption expenditure on coffee-related variables, other controls and time fixed effects, corroborates that the mentioned correlation is not spurious. We also find that while both poor and rich farmers enter the coffee sector, the price boom benefits relatively more the poorer households, whereas the liberalization seems to create more opportunities for richer farmers. Finally, notwithstanding the importance of the coffee price boom, the agricultural policy framework and the thorough structural reforms in which the coffee market liberalization was embedded have certainly played a role in triggering overall agricultural growth. These factors appear to matter especially in the second half of the 1990s when prices went down but poverty reduction continued.

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Table of Contents

Introduction

In Uganda, as in much of Sub-Saharan Africa, poverty is predominantly a rural phenomenon. Throughout the 1990s, more than 90 percent of the country's poor lived in rural areas (Appleton 2001b). Since agriculture accounts for a large share of income for most rural households, policies and external shocks that affect agriculture can be expected to have a significant impact on poverty. This is particularly true for the Ugandan economy, whose coffee sector in the 1990s faced both large international price fluctuations – world prices rose by more than 100 percent in the first half of the 1990s and then, by 2001, fell back to levels below those of the early 1990s – and an extensive domestic deregulation. The existing empirical evidence suggests that both the domestic liberalization and a temporary coffee price boom have been main factors behind Uganda's remarkable growth performance and its related reduction in poverty (Appleton 2001a).

How exactly these factors worked out is less known. Dijkstra and van Donge (2001) as well as Deininger and Okidi (2003) contend that a significant supply response, particularly in the coffee sector, as well as diversification into new crops has resulted from liberalization. Yet, Belshaw et al. (1999) conclude that coffee and cotton production have failed to recover over the 1990s mainly because of institutional resistance to reform. In the same vein, it is not clear how producers have responded to temporary coffee price shocks. Evidence for Sub-Saharan Africa accumulated by Dehn (2000) points to a possible asymmetry: price booms are less likely to have a lasting effect on output than price slumps because the windfall profits associated with booms tend to be consumed rather than invested, whereas slumps may force farmers to disinvest. Collier and Gunning (1998), however, find marked increases in farmers' savings in response to the 1976/77 coffee price boom in three Sub-Saharan African countries. Regarding indirect effects of temporary coffee price shocks, most studies stress the importance of Dutch disease effects, which result from spending the windfalls on domestic non tradables (e.g. Dorosh et al. 2003). They also account for multiplier effects via forward and backward linkages, but typically neglect that these effects may be confined to specific regions due to limited spatial integration.

This paper provides new evidence on the sign and the strength of some of these linkages between poverty reduction (or growth) and changes in export crop prices for Uganda. Overall, our analysis points to a sustained and positive poverty impact of the coffee price boom in a liberalized coffee market. We find a significant positive supply response of the coffee sector with a large number of farmers moving into coffee production. We cannot corroborate the

pessimistic view that coffee farmers use windfall profits entirely for consumption. The evidence rather suggests that coffee farmers invest into alternative crops and non-agricultural activities. In addition, the price boom appears to have strong multiplier effects that tend to be concentrated in coffee-growing regions.

These results are obtained by analyzing three household surveys for the years 1992/93, 1995/96 and 1999/00. The empirical strategy adopted to identify the effects of coffee price changes on households' welfare consists of comparing the performance of different groups. The most basic null hypothesis tested here is that, controlling for other factors, households more dependent on coffee farming should be more intensively affected by changes of coffee prices. Due to data quality limitations, going beyond measuring this correlation and towards proving causation has been difficult. In particular, since we rely on an ex-post assessment of changes in household welfare based on the surveys, we cannot isolate the impact of changes of coffee world prices from that due to the domestic coffee market liberalization; we can only capture their combined effect. And given that we do not use panel data, changes shown for particular household groups may reflect both inter-group movements and changes for initial group members.[1]

The remainder of the paper is structured as follows. After discussing briefly how important coffee price shocks were in relation to other factors, we deal with the transmission of international price changes to Ugandan coffee farmers. We then move on to examine the changes in the performance of different households and the possible factors behind them. The final section puts the findings of the paper into a broader policy context.

The Impact of Coffee Price Changes on Incomes and Poverty: Existing Evidence

Most analyses of the links between movements of export crops prices and poverty have to deal with two sets of problems. First, it is usually very difficult to isolate price changes from other shocks and, second, changes in international prices are seldom fully transmitted to farmers and this partial pass-through can vary by region, crop, market structure, size of the farm, etc. These two sets of issues are also relevant for the case of coffee in Uganda. This

[1] There is a panel of 1200 households for the years 1992/93 and 1999/2000 – a sub-sample of the sample used in our analysis. Yet, we prefer to work with the cross-sections, as (a) the panel does not cover the boom year 1995/96, and (b) the panel would yield too small sub-groups that are of interest to our analysis.

section briefly illustrates the various shocks that affected Uganda during the 1990s and summarizes the main findings of previous studies. It then briefly discusses the issue of pass-through.

Coffee price changes: What is their role in explaining Uganda's performance during the 1990s?

Towards the end of the 1980s, the government of Uganda embarked on a series of reforms commonly regarded as necessary for sustained economic growth (Okidi et al. 2004): in 1987 it launched the Economic Recovery Program (ERP), which was later supported by a sequence of additional structural adjustment programs. Inflation decreased to single-digit levels in 1993 and remained stable thereafter. Policy changes in the coffee sector are particularly relevant because they have almost certainly intensified the degree of interdependency between international and domestic coffee prices. The domestic market for coffee was liberalized in the early 1990s. This liberalization entailed the complete withdrawal of the state from marketing, the abolishment of minimum prices, and the removal of the export tax.[2] Not all government interventions in the coffee market ceased completely after the liberalization. To preserve macroeconomic stability during the boom phase, the Ugandan government introduced a coffee stabilization tax, which came into force in late 1994 (Henstridge and Kasakende 2001).[3]

Besides liberalizing the domestic coffee market, the government implemented a thorough trade liberalization, which included an extensive reduction of non-tariff barriers, competitive tendering for government purchases, and a switch from export taxation to import taxation. Finally, the government reversed the investment incentive system that was biased in favor of domestic firms so as to attract foreign direct investment.

Two different approaches have been used to assess the relative importance of coffee price shocks and other shocks on poverty and growth in Uganda. The first relies on ex-post econometric analysis. Household surveys are available before and after the change in coffee prices (while other shocks were also operating) and researchers attempt to measure their

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[2] For the institutional details of the coffee market liberalization, see Akiyama (2001). Prior to market liberalization, the coffee sector had been taxed both explicitly and implicitly. Explicitly, the government levied an export tax at a rate ranging between 40 and 100 percent. An additional implicit tax burden resulted from fixing producer prices at 20 percent of the export price (Fafchamps et al. 2003).

[3] The tax was set at 20 percent on coffee export earnings above a threshold of U Sh 1100 per kilogram, and 40 percent on receipts above U Sh 2200 per kilogram.

contribution to the final outcomes. The second approach relies on simulation analysis. A general equilibrium model is calibrated on some initial data and the change in coffee prices is 'simulated' on the model and the effects on relevant household groups are then traced. The main advantage of this simulation approach is its 'experimental setting': the coffee price shock effects can be studied in isolation from the other shocks. However, the simulation model has to simplify the functioning of the economy it represents in many restricting ways, and some of the key structural form parameters needed for its calibration are usually not available.

Deininger and Okidi (2003) investigate the impact of coffee price changes on per capita incomes and poverty for a panel of about 1200 households that spans the 1992-2000 period. Their regression analysis reveals that the elasticity of both income growth and poverty reduction is high with respect to coffee prices. This general conclusion is corroborated in a descriptive analysis by Kappel et al. (2005) who find that coffee districts contributed more than non-coffee districts to the overall poverty reduction between 1992/93 and 1999/2000.

Several numerical simulation studies have been conducted for the Ugandan case. Employing a static version of the standard IFPRI CGE model that accounts for limited transmission of prices from world markets to domestic producers, Dorosh et al. (2003) simulate the effects of a 60 percent decline in the world price of coffee along with a 20 percent decline in coffee production, thereby approximating the actual price and quantity changes over the period 1998/99 to 2000/01. They find that in response to this large negative external shock Uganda's real exchange rate depreciates by more than 10 percent, that farmers in all six agro-climatic zones incur real income losses, and that even rural non-farm households and the urban poor, who earn their living mainly from occupations with low trade orientation, suffer from this shock. By contrast, real incomes of the urban non-poor increase as the real exchange rate depreciation tends to raise the producer prices and output of textiles and other manufactured goods, leading to higher returns to capital and skilled labor.

Chant et al. (2004) examine the short and medium-run impact of the 1994-95 coffee boom on different household groups with a recursive-dynamic CGE model. Their most striking result is that less than half of the simulated short-run welfare gains accrue to farm households. This is explained by the fact that urban households benefit strongly from the initial large real appreciation accompanying the coffee price boom. In later periods, welfare gains drop and shift back in favor of rural households.

Blake et al. (2002) conduct a static CGE analysis to assess the welfare effects of agricultural trade liberalization in Uganda and find a very moderate overall welfare effect which is slightly biased in favor of the urban and rural non-farm self-employed. However, the liberalization of coffee markets, which arguably has been Uganda's most far-reaching agricultural trade reform, is captured by these authors' model only very indirectly by assuming export price increases of up to 10 percent.

Coffee price changes and their transmission to local markets

During the 1990s, Ugandan farmers were confronted with simultaneous major domestic market liberalization and pronounced fluctuations in coffee prices. World prices went up dramatically in the first half of the 1990s, more than doubling between 1992/93 and 1994/95. The coffee price boom began its reversal in 1996/97. Coffee prices reached a trough in 2001, when they fell below the levels of the early 1990s. At the same time, due to the liberalization, intermediation margins were reduced and domestic and international coffee prices begun to move more synchronously.

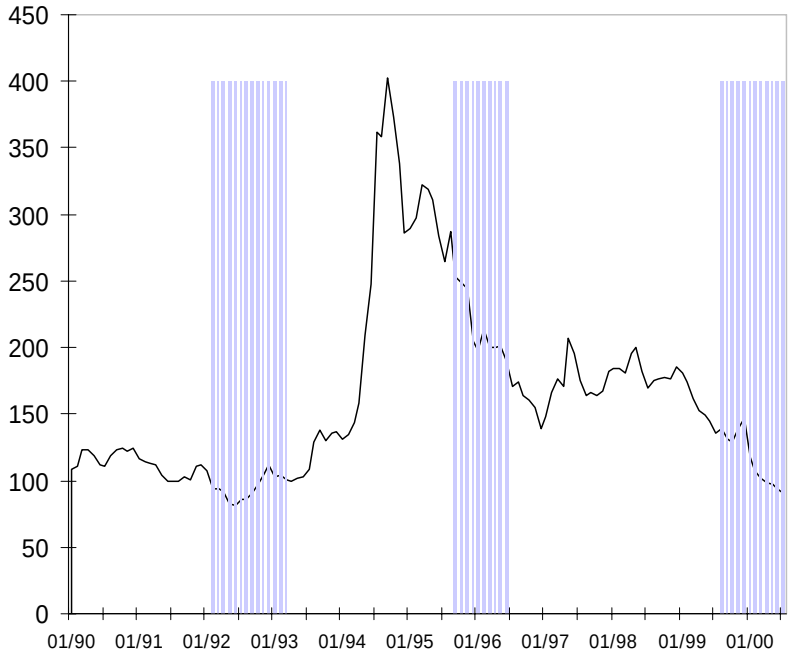
Krivonos (2004) confirms this by showing that coffee market liberalization induced a closer relationship between producer prices and world market prices, not only in Uganda, but also in other major coffee-producing countries. For the Ugandan case, 96 percent of the adjustment is realized after 6 months as compared to 30 percent in the pre-reform period. Fafchamps et al. (2003) – by examining the transmission of international coffee prices through the domestic value chain, with coffee growers, traders and exporters as the main market participants – find that fluctuations in international prices are not fully reflected in the prices received by coffee farmers. In a companion paper (Fafchamps and Hill 2005), this is mainly attributed to the fact that producers are more likely to sell at the farm gate rather than at the nearest market when prices go up, thereby lowering the price they actually receive. More frequent selling at the farm gate is consistent with a higher presence of itinerant traders purchasing coffee from farmers when prices increase. In contrast to producer prices, prices paid by large coffee traders and exporters track the international price relatively closely, which suggests a fairly smooth and competitive operation of the liberalized coffee value chain from large traders to exporters.

The notion of a competitive coffee sector is supported by Ponte (2001), who finds that coffee market liberalization stimulated entry of buyers, processors and exporters. When international

prices started to fall in 1996/97, the number of market participants almost instantaneously decreased.

What evidence of pass-through do we get from our household survey data during the 1990s? As shown in Figure 1, the three surveys used in our analysis cover one period preceding the coffee boom (1992/93), one period right after the boom (1995/96), when world market prices for Robusta coffee had already considerably dropped, and a later period (1999/00) that follows a further significant decline in world market prices. Thus, two low-price periods and a relatively high-price period can be compared.

Figure 1: ICO robusta international price in US cents per kg and survey coverage, 1990-2001



Source: International coffee organization (www.ico.org), September 2005.

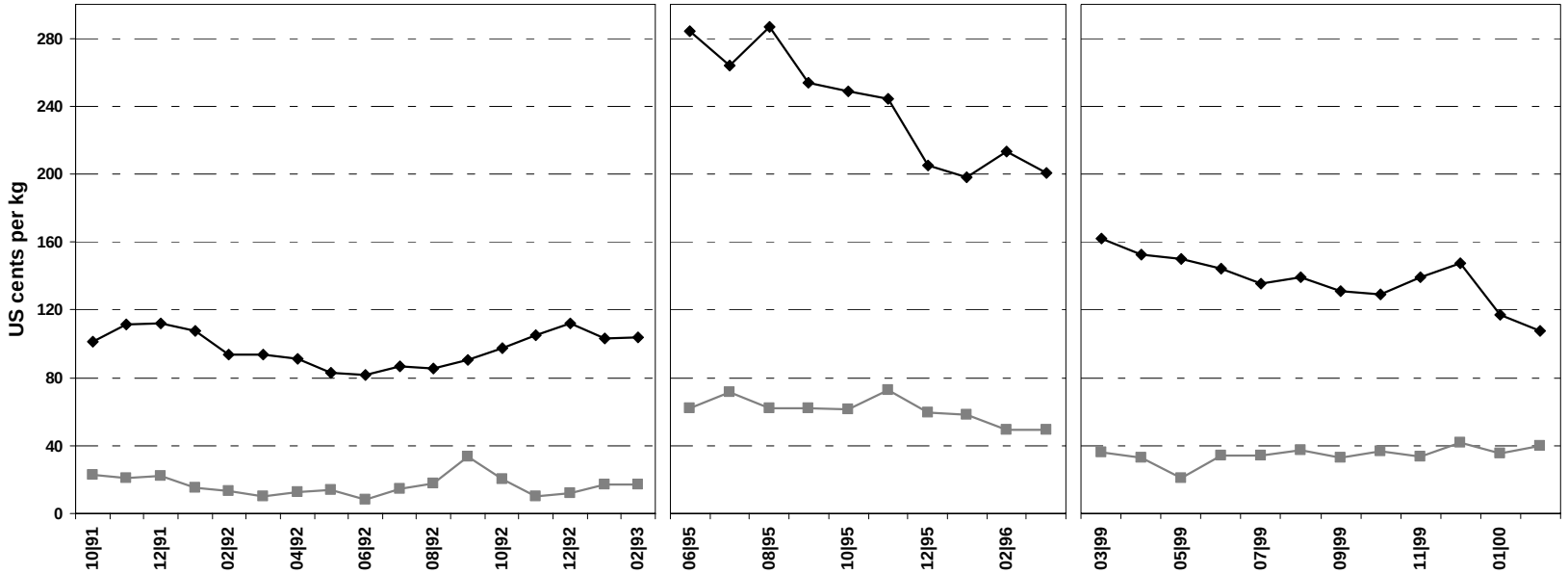
Figure 2 shows, for each survey period, how world market price fluctuations relate to the prices received by coffee producers. It turns out that mean prices paid to growers (converted to current US cents and averaged over each survey period) increased more than fourfold between the first and second survey and were almost halved between 1995/96 and 1999/2000. In 1992 Ugandan Shillings, these prices fluctuated around 200 USh per kg in 1992/93, then rose to around 500 USh in 1995/96, and fell again to around 330 USh in 1999/00. This

implies that prices received by coffee growers in 1999/2000 were 65 percent higher than in 1992/93 when world market prices were at roughly the same level.[4]

The data hence show clear evidence that the share of the world price received by Ugandan coffee farmers has increased significantly in the course of the 1990s. When prices are measured in current US cents (as in Figure 2), our data suggest that this share increased from approximately 15 to about 25 percent between 1992/93 and 1995/96 possibly reflecting the transition away from "guaranteed" prices and the successful adjustment to liberalization. It appears that the share has stabilized, as it remains constant in the period of falling world prices, thus confirming the symmetries in the way positive and negative international price changes are transmitted to the domestic market after liberalization (Krivonos 2004).

[4] These findings are largely consistent with those in Fafchamps et al. (2003). In fact, the prices reported by Fafchamps et al. (2003) are estimated from a survey explicitly designed for tracking coffee prices and thus their estimations are more accurate than those computed from household surveys. However, Fafchamps et al. (2003) only consider a single year period.

Figure 2: Robusta prices on international reference markets and producer selling prices during the three surveys



Sources: International Coffee Organization (www.ico.org), September 2005, IHS 1992/93, UNHS 95/96, UNHS 99/00

Note: The upper line is the international price in US cents per kg for Robusta coffee provided by International Coffee Organisation (ICO). The lower line is the median price of bulk Kiboko per kilogram converted to US cents. Kiboko is the green coffee bean specific to Uganda and the bulk price of Kiboko a good proxy for the prices farmers receive. Monthly average exchange rates from the International Financial Statistics are used to convert the prices into US cents. We compute the Kiboko prices from the crop and community sections of the household surveys.

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Coffee Prices, Growth and Poverty: How Different Household Groups Fared

At the aggregate level, Uganda's performance over the period under consideration has been remarkable: yearly growth rates of per capita consumption (estimated from the household surveys) were 4.4 percent between 1992 and 1995, and 8.7 percent between 1995 and 1999. These growth rates were accompanied by a substantial poverty reduction during the 1990s, which accelerated in the second half of the decade. The poverty headcount decreased from 56 to 49 percent during the first period, and from 49 to 34 percent in the second period.

To assess how these aggregate gains were distributed across households and whether their pattern was correlated with coffee price fluctuations, we disaggregate households in five separate groups according to their degree of dependency on coffee farming. The five groups are: coffee farmers, other rural as well as other urban households in coffee regions and non-coffee regions. Coffee farmers are defined as those who report some coffee production[5], and coffee regions are those districts with actual *per capita* production of coffee of more than 20 bags (of 60kg each) or production potential of more than 100,000 bags.[6] To improve comparability across these five groups and among different time periods, we constructed a more homogenous sub-sample by dropping some districts that were not covered in all the surveys and some specific non-coffee districts, in particular from the North.[7] The latter region has been shown to suffer from adverse agricultural conditions and to be largely de-linked from the rest of the economy.

Based on this sub-sample and for each of the five household groups, Table 1 shows their respective sizes in terms of shares of total population and per capita consumption values. The population share of coffee farmers increased considerably in the first period, starting from just 22 percent in 1992 and reaching 38 percent by 1995. Not much change is recorded in the

[5] Later, we will analyse coffee farmer performance based on different degrees of dependency/specialization in coffee production.

[6] Coffee districts by this definition are (according to 1992 district definition): Kalangala, Kapchorwa, Kiboga, Luwero, Masaka, Mpigi, Mubende, Mukono, Rakai, Mbale, Kamuli, Iganga, Bushenyi, and Jinja.

[7] The sub-sample includes observations from the following districts: Kalangala, Kiboga, Luwero, Masaka Mpigi, Mubende, Mukono, Rakai, Iganga, Jinja, Kamuli, Tororo, Bushenyi, Kabarole, Kibaale, and Mbarara. The sub-sample sizes are 4994 households in 1992/93, 2241 in 1995/96, and 5637 in 1999/2000.

second period: by 1999 coffee farmers represent 39 percent of the population in our sample. [8] The significant increase in the size of this group is the result of many farmers deciding to start growing coffee and will be discussed in more detail below.

With regard to welfare levels, coffee farmers initially exhibited lower mean per capita consumption levels than other rural households in coffee regions. Only rural households in non-coffee regions consumed almost as little. With its large rural-urban income gap, Uganda fits well into the pattern prevailing in much of Sub-Saharan Africa.

Table 1: Per capita consumption levels by household type, 1992-1999

Household type	*1992*		*1995*		*1999*	
	Mean pc cons	*Pop. Share (%)*	*Mean pc cons*	*Pop. Share (%)*	*Mean pc cons*	*Pop. Share (%)*
Coffee farmers	4908 *4592 5224*	22.3	6101 *5713 6489*	37.8	7330 *6939 7721*	39.0
Rural in coffee regions	5233 *4879 5586*	46.1	6444 *5751 7137*	33.9	7859 *7152 8565*	30.6
Rural in non-coffee regions	4913 *4540 5286*	23.0	4746 *4171 5322*	21.9	7017 *6631 7403*	21.4
Urban in coffee regions	8408 *6399 10417*	6.5	10163 *8211 12115*	5.2	15583 *13300 17866*	7.0
Urban in non-coffee regions	7590 *6744 8437*	2.1	11131 *9323 12938*	1.3	16122 *12953 19291*	2.0
Total	*5344* *5057 5631*	100.0	6198 *5821 6575*	100.0	8175 *7709 8641*	100.0

Source: Authors' calculations.
Note: In all our calculations, we use the official consumption aggregate provided by the Uganda Bureau of Statistics (UBOS) based on the work by Simon Appleton. Values are in constant 1989 shillings. For details, see the technical appendix in Appleton (2001a). We also use official poverty lines as documented in Appleton (2003). 95 % confidence intervals in italics (standard errors corrected for survey design).

Not surprisingly, coffee farmers experienced the highest welfare gains during the coffee price boom, but they were closely followed by the other household groups residing in coffee regions (Table 2). Overall, growth in per capita consumption was markedly higher in coffee regions than in non-coffee regions where rural households even experienced negative growth rates. In the first half of the 1990s, the most significant difference in consumption growth occurred between the rural households of the two regions, which points to substantial but

[8] It should be noted that the sub-sample is not representative for the regions covered, as only the full national sample is constructed to be representative and district samples are so only to a limited degree. In addition, we have received comments from several observers of Ugandan agriculture that this increase may be exaggerated. An analysis of the primary sampling units however does not hint at any major differences in the sampling procedure between the three surveys, and in particular between the first and the two more recent surveys. We therefore consider the design of the Integrated Household Survey (IHS) from 1992/93 that includes questions on agricultural production in a separate "agricultural enterprise" questionnaire as a possible source of the underestimation of the share of coffee farming households for this period.

regionally concentrated multiplier effects of the price boom. As a consequence, rural households in coffee regions were significantly better off in 1995 than those in non-coffee regions.

In the second period, coffee farmers continued to perform well despite falling coffee prices, and other rural households in coffee regions grew at similar rates. However, non-coffee regions outperformed coffee regions, which brought rural consumption levels closer together again, rendering the regional differences insignificant. The very high growth rates in urban coffee regions as well as in both rural and urban non-coffee regions point to a strong autonomous growth process unrelated to the coffee sector.

Table 2: Per capita consumption growth by household type, 1992-99

Household type	Growth in mean per capita consumption (%)	
	1992-95	*1995-99*
Coffee farmers	7.53	6.31
Rural in coffee regions	7.19	6.84
Rural in non-coffee regions	-1.15	13.92
Urban in coffee regions	6.52	15.31
Urban in non-coffee regions	13.61	13.14
Total	5.07	9.66

Source: Authors' calculations.

The basic thrust of the descriptive analysis is corroborated by a multivariate regression analysis that pools the observations from the three surveys. Per adult equivalent consumption expenditures are regressed against several variables including dummies for being coffee farmer and residing in coffee regions, which we interact with time dummies for each year, and time dummies for 1995/96 and 1999/2000. Additional right-hand-side variables comprise a standard set of controls, including education and land endowments, an urban dummy, as well as variables related to non-farm income. Some of these controls are also interacted with time dummies.

The results (ordinary least squares estimates are reported in Appendix A) correspond to expectations: controlling for other income determinants, in 1992/93 and in 1999/2000, neither coffee farmers nor people residing in coffee regions were better off than their counterparts in non-coffee regions. Yet, both the 1995/96 coffee region and the 1995/96 coffee farmer dummy are significantly related to higher expenditure levels. These effects are quantitatively

very important: households in coffee regions consumed approximately 10 percent more, coffee farmers an additional 10 percent. The time dummy for 1995/96 is not significant, which underlines the importance of the price boom and regional multiplier effects in explaining overall growth. These coffee-related expenditure differentials disappear between 1995/96 and 1999/2000, a period during which overall expenditure levels increased by more than 20 percent, as indicated by the coefficient of the 1999/2000 time dummy.

Consumption growth also led to poverty reduction (Table 3). Between 1992 and 1995, poverty among coffee farmers and other rural households in coffee regions was reduced considerably while rural poverty in non-coffee regions increased slightly. During the first half of the 1990s, if not causation, one certainly observes a strong correlation between poverty reduction and booming coffee prices. Between 1995 and 1999, poverty reduction slowed down but continued for coffee farmers and other rural households in coffee regions despite falling coffee prices. Enjoying remarkable growth rate in its consumption levels, the group of rural households in non-coffee regions experienced a concomitant drop of more than 50 percent in its poverty headcount. Urban poverty decreased at a relatively stable pace throughout the entire period.

Table 3: Poverty reduction by household type, 1992-1999

Household type	*P0 (Headcount index)*		
	1992	*1995*	*1999*
Coffee farmers	56.4	42.3	27.0
	51.0 61.7	*36.4 48.2*	*24.5 29.6*
Rural in coffee regions	52.6	37.1	28.7
	48.4 56.8	*31.1 43.0*	*25.5 31.8*
Rural in non-coffee regions	52.0	54.9	26.5
	46.0 58.1	*47.6 62.2*	*22.6 30.4*
Urban in coffee regions	34.1	20.5	8.7
	20.1 48.1	*12.7 28.4*	*4.7 12.7*
Urban in non-coffee regions	31.1	17.9	10.2
	24.4 37.9	*7.4 28.5*	*3.7 16.7*
Total	51.7	41.8	25.8
	48.6 54.7	*38.1 45.6*	*24.0 27.6*

Source: Authors' calculations.

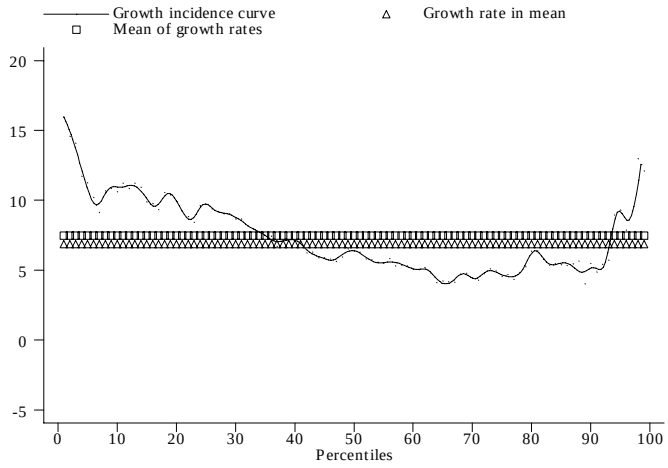
Note: 95 % confidence intervals in italics (standard errors corrected for survey design).

To complement the household-group-specific averages presented so far, growth incidence curves for coffee farmers and other rural households in coffee regions, the two groups most closely associated with the coffee price changes, are shown in Figures 3-6. The growth incidence curve plots average consumption growth by consumption percentiles and thus

indicates whether consumption growth was pro-poor or not. The curves suggest that coffee farmers experienced pro-poor growth over the period 1992-1995, with a mean of growth rates exceeding the mean growth rate, with very high consumption gains for the poorer farmers but also for the very rich. For other rural households, growth was also pro-poor during the first period. These growth incidence curves are not constructed from panel data, but from cross sections, therefore the large gains of rich coffee farmers may be due to (a) entry of even richer farmers and/or (b) gains experienced by rich farmers who had been coffee farmers before. A similar argument applies to the lower part of the income distribution. To positively conclude that growth has been pro-poor for coffee farmers during the boom period, more information on the characteristics of those who enter (or exit) the coffee sector is needed; a point to which we will return later.

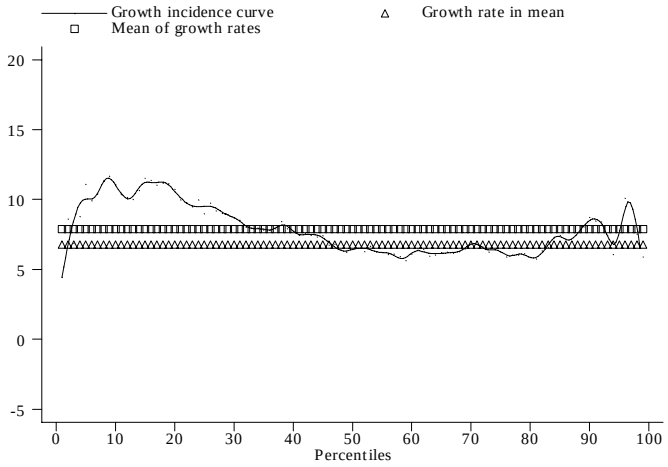
After 1995, poorer and richer coffee farmers benefited from growth in roughly equal terms and, during this second period, no major population shift is observed for this household group. This growth pattern implies that poorer coffee farmers were not hit disproportionately by the decrease in coffee prices. The growth incidence for other rural households in coffee regions was somewhat anti-poor during the second period, although very poor farmers saw their consumption level increase quite substantially.

Figure 3: Growth incidence among coffee farmers, 1992-1995



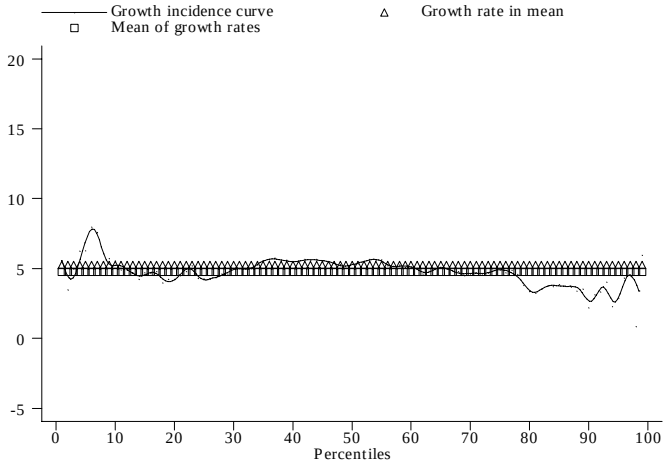
Source: Authors' calculations.

Figure 4: Growth incidence among rural households in coffee regions, 1992-1995



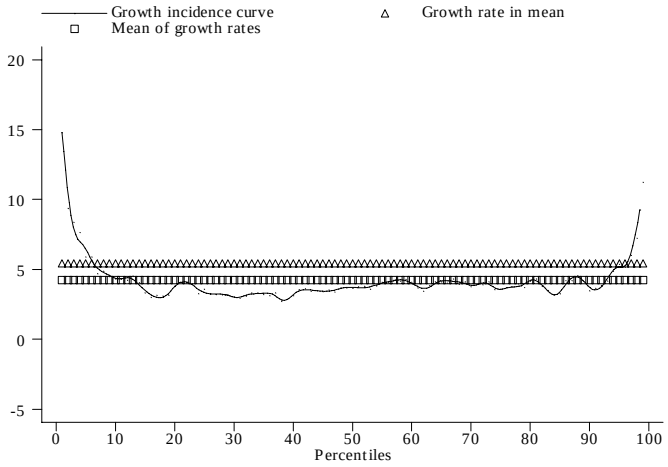
Source: Authors' calculations.

Figure 5: Growth incidence among coffee farmers, 1995-1999



Source: Authors' calculations.

Figure 6: Growth incidence among rural households in coffee regions, 1995-1999



Source: Authors' calculations.

Summing up, from the previous analysis three major observations emerge. First, coffee farmers markedly improve their welfare during the boom period, but other rural households in coffee regions do almost as well. During this same period, rural households' consumption in non-coffee regions stagnates, which suggests that there are strong indirect effects of the coffee price increase within coffee regions, but no or few links to non-coffee regions. Second, the most important supply response correlated to the coffee price boom (or liberalization) was the decision of many farmers to start growing coffee. Based on the available cross-sectional data, it is difficult to disentangle the poverty and distributional impact of this decision, on the one hand, and of the price boom, on the other. Third, coffee farmers' were able to sustain consumption growth and poverty reduction even during the second period of falling coffee prices.

Coffee Prices, Growth and Poverty: Can Transmission Channels Be Identified?

Up to this point, the descriptive analysis of the links between changes of coffee prices and poverty has highlighted strong correlation but has not established causation. This may be difficult to confirm given the limitations imposed by the generally poor quality of the data and by our choice of using cross section versus panel data. However, by further investigating a number of issues focusing on how price shocks may 'cause' changes in poverty ratios, we have been able to shed some light on certain relevant structural links.

In more detail, three sets of issues have been considered: 1) What are the characteristics of the farmers who moved into coffee farming during the 1990s, and can the growth process of this

period be qualified as pro-poor, at least for the coffee farmers' group? 2) How have coffee farmers reacted to the price hike and, in particular, were they able to expand supply? In addition, was this positive supply response sufficient to enable coffee farmers to cushion the negative price effect of the second period? 3) Is it possible to clearly identify a coffee price effect by decomposing income growth into different income components for different household groups? More specifically, do changes in the composition of income sources in the second period of falling prices indicate a diversification towards alternative crops or non-farm employment and thus signal a 'coping' strategy?

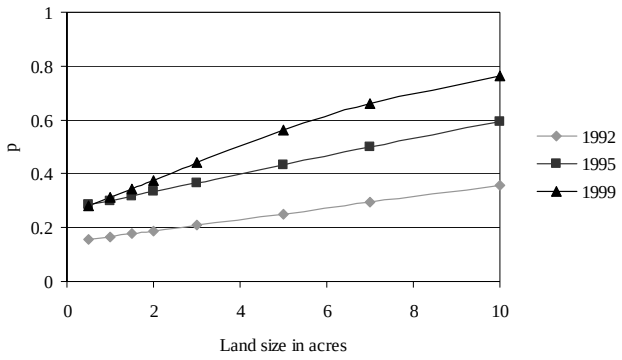
The coffee farmers' group: Who enters and who exits?

Had it been mainly poorer farmers (as proxied by the important poverty correlates land and education) moving into the coffee sector, then the pro-poor pattern of consumption growth found among coffee farmers could be attributed, at least partly, to the price boom.[9] To verify this hypothesis, we performed a logit analysis for each survey, in which the probability of being coffee farmer is related to household characteristics such as asset endowments. The regression results are presented in Appendix B. Figure 7 and Figure 8 show the predicted probabilities of these models conditional on land and education endowments. The vertical shifts of the predicted probability line simply reflect a larger number of coffee farmers and hence the interpretation of the graphs has to focus on the slope of the lines. If the slope remains unchanged, this implies that coffee farmers' characteristics as proxied by the explanatory variables are not altered relative to those of non-coffee farmers. Concerning land size, the increasing slope over time means that non-coffee farmers with relatively high land endowments move into coffee farming (Figure 7). This effect is particularly pronounced between 1995 and 1999, i.e. the few farmers who started to grow coffee despite falling prices tended to be large landowners. For education, the reverse pattern obtains, with relatively poorly educated households exhibiting a higher probability of moving into coffee farming (Figure 8). Again, the impact appears to be stronger in the second period. Taken together, it is therefore difficult to say whether entry has been biased towards poorer or richer farmers. This finding may allow for the conclusion that at least some of the pro-poor growth pattern observed between 1992/93 and 1995/96 for coffee farmers is due to the boom, i.e. poorer

[9] This argument rests on the following counterfactual reasoning: if poorer farmers entered the coffee sector in a world without a coffee price boom, the income distribution would have worsened. If the income distribution improves despite entry of poorer farmers in the real world, this can only be due to the boom.

coffee farmers have benefited (relatively) more from the boom than the rich. Yet, as land tends to be a more important determinant of income and hence poverty in the rural context, it is likely that the better-off farmers have been in a better position to grasp the opportunities of the liberalized coffee market through entry.

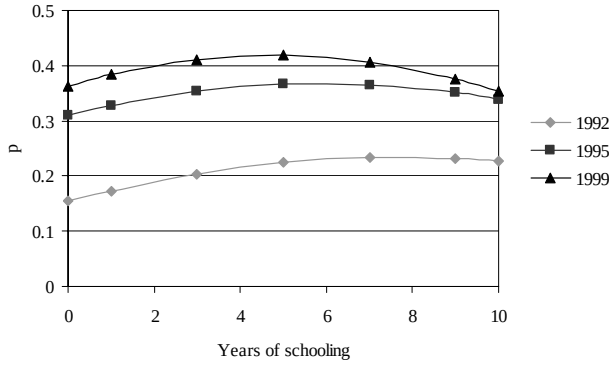
Figure 7: Land size and coffee farming, 1992-1999



Source: Authors' calculations.

Note: Predicted probabilities of being a coffee farmer conditional on land size (evaluated at the mean of all other right-hand-side variables).

Figure 8: Education and coffee farming, 1992-1999



Source: Authors' calculations.

Note: Predicted probabilities of being a coffee farmer conditional on educational level (evaluated at the mean of all other right-hand-side variables).

Supply responses of the coffee sector

Beside raising the number of coffee farmers, the coffee price boom and the concomitant coffee price liberalization could have provided an incentive to increase coffee production. A supply response to changes in prices can come about via changing yields for a given set of

inputs and/or via changes in input use. We are not able to draw any conclusions concerning possible yield improvements based on the information given in the surveys.[10] Among the inputs used the area planted with coffee is obviously a key determinant of production. Unfortunately, this variable is not available for 1992 so we start by looking at the overall land area under cultivation to obtain some indirect evidence.

It turns out that coffee farmers started with substantially higher land endowments than other farm households in 1992 (Table 4). The data confirm the commonly held view in Uganda (e.g. UBOS 2003) that farm size has further declined during the 1990s due to population pressure. This appears to be particularly pronounced for non-coffee farmers, whose land area declined significantly from 2.9 to 2.4 acres between 1992 and 1999. Yet, when looking at the figures for 1995, land size appears to have gone up slightly during the second half of the 1990s. Exploring this issue further would go beyond the scope of this study, but this observation could well stem from some farmers with very small landholdings having exited agricultural activities.

Table 4: Land under cultivation, by farm type, 1992-1999

Farmtype	*Land under cultivation in acres*					
	1992		*1995*		*1999*	
Coffeefarmer	3.6		3.7		3.3	
	3.3	*4.0*	*2.9*	*4.4*	*3.1*	*3.5*
Non-coffee farmer	2.9		2.2		2.4	
	2.7	*3.0*	*1.9*	*2.4*	*2.1*	*2.6*
all	3.0		2.7		2.8	
	2.9	*3.2*	*2.4*	*3.1*	*2.6*	*2.9*

Source: Authors' calculations.

Note: 95 % confidence intervals in italics (standard errors corrected for survey design).

The mean land size of coffee farmers also decreased between 1992 and 1999. In the early 1990s, however, their land size even increased slightly if not significantly. This is likely to be partly due to larger farmers moving into coffee, in line with the above findings. As shown in Table 5, the share of coffee farmers with landholdings of more than 10 acres in overall farm households increased steeply between 1992 and 1995. But the finding is of course also consistent with a rise in the area planted with coffee. The latter is all the more plausible given

[10] The data on agricultural production are too deficient to calculate yield changes that are comparable over time. But even if we could do so, the variations between the surveys could not necessarily be interpreted as a supply

that the land area under coffee even increased slightly in the second period (Table 6), which can be attributed to the further expansion of coffee farms that were already large in 1995.

Unfortunately, there is very little information on other agricultural inputs in the 1995/96 survey. Actually, only hired farm labor turns out to be an agricultural input that is comparable across the three surveys, but the data appears to be severely contaminated by changes in survey design between 1992/93 and 1995/96. Yet, there is some evidence that in the second half of the 1990s more permanently hired labor was used in agriculture, and more so by coffee farmers.

Table 5: Distribution of coffee farmers by land size groups, 1992-1999

Landholdings in acres	*Distribution of farms by land size (%)*			*Share of coffeefarmers in each land size group (%)*		
	1992	*1995*	*1999*	*1992*	*1995*	*1999*
less than 1	25.5	29.5	22.7	18.5	24.6	27.6
1-2	28.7	32.0	31.4	24.9	39.1	42.7
2-3	19.1	17.1	19.6	23.8	49.2	49.6
3-5	16.9	12.4	15.6	27.6	43.5	50.7
5-10	7.8	5.9	8.1	39.0	56.9	64.7
more than 10	2.0	3.2	2.8	40.8	70.2	72.9
total	100.0	100.0	100.0	24.9	39.1	44.5

Source: Authors' calculations.

response because coffee yields tend to vary widely with weather conditions. This qualification also holds for the following assessment of changes in coffee production.

Table 6: Changes in farm distribution by production size and changes in planted coffee area, 1992-1999

Production size group	*Distribution of coffee farms by size of production (%)*			*Land under coffee in acres*			
	1992	*1995*	*1999*	*1995*		*1999*	
1	31.0	33.3	29.7	0.6		0.5	
				0.3	*0.9*	*0.4*	*0.5*
2	22.1	15.8	22.3	0.8		0.7	
				0.5	*1.2*	*0.6*	*0.8*
3	22.8	23.6	23.1	0.8		1.0	
				0.6	*1.1*	*0.9*	*1.1*
4	14.3	15.6	15.1	1.3		1.5	
				1.0	*1.7*	*1.2*	*1.8*
5	9.9	11.6	9.9	2.0		2.9	
				1.5	*2.6*	*2.5*	*3.3*
total	100.0	100.0	100.0	1.0		1.1	
				1.0	*1.2*	*1.0*	*1.2*

Source: Authors' calculations.

Note: 95 % confidence intervals in italics (standard errors corrected for survey design). Production size groups are defined according to coffee production quantity. Production size group 1 includes all coffee farms that produce less than 0.5 times median coffee production in the respective year. Production size group 2 (3, 4, 5) produces between 0.5. and 1 (1and 2, 2 and 4, more than 4) times median production in the respective year. This procedure helps to account for changes in survey design as well as external shocks (above all weather shocks) that affect overall production levels.

Regarding the evolution of coffee production, 1992 and 1995 should not be compared because of large differences in the survey design, while 1995 and 1999 are more readily comparable. The data show a large and significant expansion of coffee production across all farm sizes (Table 7), which may at least partly explain why coffee households could raise their living standards in a phase of falling prices. In combination with the rising share of coffee farmers, this dramatic production increase also provides an indication that farmers have indeed responded to the coffee price boom, with the delay in production reflecting the time that has to pass between planting and harvesting.

Table 7: Changes in coffee production, by coffee farm size, 1992-1999

Production size group	*Mean coffee production in kg per year*		
	1992	*1995*	*1999*
1	69 *65 72*	42 *38 45*	65 *62 69*
2	166 *161 171*	135 *129 141*	186 *182 189*
3	317 *309 326*	263 *254 273*	348 *341 355*
4	636 *606 667*	492 *475 509*	693 *676 709*
5	1443 *1248 1639*	1746 *1303 2189*	2362 *2014 2709*
total	364 *315 413*	377 *292 461*	479 *432 527*

Source: Authors' calculations.

Note: Coffee production is in kg (approximately per year). 95 % confidence intervals in italics (standard errors corrected for survey design). Production size groups are defined as in Table 6.

Decomposing income growth by source: Is a coffee price effect clearly discernable?

For coffee farmers, Table 8 illustrates the strong impact of the coffee price fluctuations on household welfare. Income growth between 1992 and 1995 is almost entirely due to increased income from coffee.[11] Yet, there is also a notable increase of income from non-agricultural activities, possibly indicating that the income earned from coffee is immediately invested in setting-up non-agricultural enterprises. This holds in particular for rich coffee farmers.

For other rural households in coffee regions, the income earned from non-agricultural activities increases markedly between 1992 and 1995, in particular for richer households. Income growth for poorer households however stems primarily from increased crop income. This suggests that repercussions of the coffee boom work through both stimulating non-agricultural activities and non-coffee crop agriculture. While multiplier effects in non-agriculture seem to favor richer households, the poor benefit from agricultural (possibly food-demand) linkages. As the growth incidence curves above have already demonstrated, the overall growth patterns due to these multiplier effects is biased in favor of the poor.

[11] As income data is notoriously deficient in the surveys, many observations for income from different sources had to be imputed using a simple methodology described in Appendix C. To keep the decomposition consistent with the preceding analyses we decompose per capita expenditure growth applying the derived income shares to this welfare measure.

For urban households in coffee regions, the growth decomposition points towards another multiplier channel of the coffee price boom. Remittances and transfers received by richer urban households increase substantially between 1992 and 1995, which is likely to be due to transfers from coffee farmers to urban areas. For the richest 30 percent, growth in remittances and transfers even constitutes the most important source of income growth.

After 1995, rural growth in coffee regions is driven by agricultural incomes, but the trend towards higher incomes from non-agricultural activities is not reversed with falling coffee prices. For coffee farmers, income earned from other crops than coffee compensates for the losses incurred from falling coffee prices.

Table 8: Growth decomposition by income sources for coffee farming households and households in coffee regions

Expenditure decile	*Growth in income from*					*Total growth*	*Per capita expenditure level, initial year*
	coffee	*other crops*	*other agriculture*	*non-agricultural act.*	*remitt., transfers, other*		
Coffeefarmer, 1992-95							
bottom 30%	35.1	6.6	-5.4	11.0	-2.6	44.6	16173
middle 40%	30.7	1.8	-5.3	7.6	-0.9	33.8	26027
top 30%	23.1	-6.3	-1.9	23.8	5.2	43.9	40745
Total	27.8	-1.2	-3.7	16.2	1.7	40.9	27648
Coffeefarmer, 1995-99							
bottom 30%	-22.0	30.3	1.1	-1.7	2.6	10.4	23394
middle 40%	-18.8	32.5	1.3	-0.2	1.3	16.1	34837
top 30%	-7.2	30.0	3.1	-7.0	-2.7	16.2	58630
Total	-13.6	30.8	2.2	-3.9	-0.5	15.0	38953
Rural households in coffee regions, 1992-95							
bottom 30%		23.8	-8.1	9.0	1.7	26.4	13493
middle 40%		15.5	-3.3	13.9	4.3	30.4	21854
top 30%		-8.1	-3.7	25.0	0.9	14.1	34417
Total		5.4	-4.4	18.4	2.1	21.6	23254
Rural households in coffee regions, 1995-99							
bottom 30%		20.9	1.0	4.7	0.6	27.1	17059
middle 40%		13.3	0.9	5.6	-2.1	17.8	28497
top 30%		28.2	3.3	4.5	1.3	37.2	39269
Total		21.7	2.0	4.9	0.0	28.7	28275
Urban households in coffee regions, 1992-95							
bottom 30%		24.6	-1.6	15.3	1.4	39.7	17507
middle 40%		9.6	3.4	35.8	14.0	62.8	29096
top 30%		0.8	-3.2	7.3	16.3	21.2	60084
Total		7.1	-1.1	16.4	13.2	35.6	35562
Urban households in coffee regions, 1995-99							
bottom 30%		-3.6	1.4	29.4	2.6	29.8	24449
middle 40%		-3.0	-0.9	14.8	-2.9	8.1	47365
top 30%		1.8	1.6	69.7	-1.3	71.7	72813
Total		-0.7	0.7	44.9	-1.2	43.8	48209

Source: Authors' calculations.

To put the above findings into perspective, income growth decompositions are also reported for non-coffee regions (Appendix D). The sluggish growth performance of rural households in these regions in the early 1990s highlights the importance of the coffee price boom for rural areas in coffee regions. In contrast, urban growth performance is very similar in coffee and non-coffee regions in both periods except for the increase in remittances and transfers in coffee regions during the price boom. The decomposition shows that income growth of rural households in non-coffee regions in the second period was mainly driven by agricultural growth, although income from non-agricultural activities also became somewhat more

important. The general strong performance of agriculture, and not specific circumstances in coffee regions, seem to have helped coffee farmers to compensate the losses from falling coffee prices.

Such an interpretation is substantiated by a closer look at the agricultural sector. Table 9 shows the market integration of non-coffee farmers in both coffee and non-coffee regions as well as the number of crops planted by different farm types including coffee farmers. We interpret the number of planted crops as a proxy of more productive and more diversified farming systems. The figures for both market integration and diversification illustrate the strong growth dynamics between 1995 and 1999. Maybe somewhat surprisingly at first sight, market participation of non-coffee farmers in coffee regions as well as the number of crops planted drops significantly during the boom phase. Given the purchasing power generated by the rise in coffee prices one might have expected the reverse, but two factors help explain this phenomenon: first, it is likely that the more market-integrated farmers moved into the coffee sector (which also explains the drop in the number of crops planted by coffee farmers); second, the increased specialization into non-agricultural activities was possibly associated with a retreat from agricultural markets.

Table 9: Participation in agricultural markets and number of crops planted, by farm type, 1992-1999

Farmtype	*Share of farmers participating in product markets (%)*			*Number of crops*		
	1992	*1995*	*1999*	*1992*	*1995*	*1999*
Coffee farmers				6.0	5.3	6.8
				5.8 6.3	*4.9 5.8*	*6.7 6.9*
Non-coffee farmers in coffee regions	54	39	63	4.5	3.1	4.2
	50 57	*32 46*	*58 67*	*4.3 4.7*	*2.7 3.5*	*4.0 4.4*
Non-coffee farmers in non-coffee regions	63	68	79	4.8	5.6	5.7
	58 68	*59 77*	*75 83*	*4.5 5.1*	*5.1 6.2*	*5.4 5.9*

Source: Authors' calculations.

Note: Market participation is defined as the share of farmers with positive sales; 95 % confidence intervals in italics (standard errors corrected for survey design).

Finally, there is also some evidence that coffee farmers responded to falling coffee prices by selling assets as a means of smoothing consumption. The share of farmers owning cattle, arguably the asset that can most readily be sold, increased over the period 1995-1999 for coffee and non-coffee farmers alike, but the mean value of cattle in constant prices went down for coffee farmers, while it went up quite dramatically for non-coffee farmers (Table 10). Looking at which coffee farmers might have sold cattle does not produce very clear-cut results, but two tentative conclusions can be drawn: first, poorer coffee farmers do not

experience losses in cattle value (which can also be inferred from the median value of cattle even rising for coffee farmers), i.e. there is no indication of desperation-led selling of cattle; and second, the value of cattle appears to fall significantly for the most specialized coffee farmers.

Table 10: Changes in cattle endowments by farm type, 1995-1999

Household Type	*Share of farmers with cattle (%)*				*Value of cattle (in 1989 prices)*			
	1995		*1999*		*1995*		*1999*	
Non-coffee farmers	16		21		196328		297653	
	12	*19*	*12*	*23*	*146024*	*246632*	*249418*	*345887*
Coffee farmers	21		28		258471		221835	
	17	*25*	*17*	*31*	*101795*	*415148*	*180119*	*263551*

Source: Authors' calculations.

Note: 95 % confidence intervals in italics (standard errors corrected for survey design).

This evidence is supported by qualitative questions in the 1999/2000 survey, in which households are asked to assess the availability of different types of assets at the date of interview compared to 1992. Table 11 shows that farmers who grow coffee on more than 60 percent of their cultivated land report declining livestock assets. Under the plausible assumption that the evaluations of farmers mainly refer to recent changes in asset availability, this fits well with the quantitative evidence.

Table 11: Coffee farmers' assessment of change in livestock assets between 1992 and 1999

Degree of specialization, coffee area as share of cultivated land	*Evaluation of change in livestock assets, 1992-99*
no coffee	2.84
< 0.2	3.29
< 0.4	3.35
< 0.6	3.05
< 0.8	2.89
> 0.8	1.89

Source: Authors' calculations. Note: 3 equal, > 3 more, < 3 less in 1999 than in 1992.

Concluding Remarks

This paper has shown for Uganda that a coffee market liberalization followed by a price boom was associated with substantial reductions in poverty. The correlation between changes of coffee prices and poverty reduction was clearly highlighted by comparing the performance of different households grouped according to their dependence on coffee farming. Coffee growers, and especially the poorer among them, seem to have benefited from the price hike. Other rural households in coffee regions fared almost as well as coffee farmers during the first half of the 1990s. By contrast, during this same period, rural households' consumption in non-coffee regions stagnated (and, for this group, poverty did not change much), which suggests that the indirect effects of the coffee boom were confined to coffee producing regions.

This study could not disentangle the specific contribution to poverty reduction of changes in international prices of coffee from those of the domestic market liberalization or of other concomitant factors. However, we provide some strong indirect evidence that the relationship between poverty reduction and coffee price changes is not spurious.

In particular, by pooling data from the three periods and running a multivariate regression of consumption expenditure on coffee-related variables, other controls and time fixed effects, we show that the time dummy for 1995-96 is not significant thus corroborating the importance of coffee price changes for poverty reduction. Secondly, we find that while both poor and rich farmers enter the coffee sector, the price boom benefits relatively more the poorer households, whereas the liberalization seems to create more opportunities for richer farmers. Thirdly, we substantiate the hypothesis that the positive performance of rural households in coffee regions is driven by higher incomes earned from non-agricultural activities, in particular for richer households – an adjustment that is not reversed during the second period. For poorer households, we find evidence that important multiplier effects work through increased demand for agricultural products.

Notwithstanding the importance of the coffee price boom, one needs to highlight that the agricultural policy framework and government strategy has certainly played a role in triggering overall agricultural growth. It may thus well be, for example, that the income diversification observed for Ugandan coffee farmers would not have been possible without the thorough structural reforms in which the coffee market liberalization was embedded. In the same vein, windfalls from temporary commodity price booms may only be saved at least partly if there are reliable investment opportunities in other sectors of the economy. These

factors appear to have played a major role especially in the second half of the 1990s when prices go down but poverty reduction continues.

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Appendices

Appendix A: Determinants of per adult equivalent expenditure

Dependent variable Independent variables	Log per adult equivalent expenditure
Coffeefarmer in 1992	-0.015 (0.50)
Coffee region in 1992	-0.026 (0.77)
Coffeefarmer in 1995	0.097 (3.08)**
Coffee region in 1995	0.093 (2.62)**
Coffeefarmer in 1999	-0.012 (0.63)
Coffee region in 1999	0.032 (1.48)
Time dummy 1995	-0.026 (0.48)
Time dummy 1999	0.245 (5.72)**
Controls significant at least at 10 percent level	years of schooling (interacted with time dummy for 1999, years of schooling squared (interacted with time dummies for 1992, 1995, 1999), experience (squared), female, urban (interacted with time dummies), land (interacted with time dummy for 1999), land squared (interacted with time dummy for 1995, 1999), nonfarm household, share of non-farm income (both interacted with time dummies), no agricultural sales-dummy
Controls not significant at 10 percent level	years of schooling (interacted with time dummies for 1992, 1995), land (interacted with time dummies for 1992, 1995), land squared (interacted with time dummy for 1992), distance to nearest product market
Pseudo-R^2	0.3109
Observations	12863

Note: Robust z statistics in parentheses, * significant at 5%; ** significant at 1%

Source: Authors' calculations.

Appendix B: Results of the logit-model

	1992/93	1995/96	1999/2000
Dependent variable	coffeefarmer	coffeefarmer	coffeefarmer
years of schooling	0.136 (4.05)**	0.087 (2.01)*	0.098 (3.68)**
years of schooling squared	-0.009 (3.19)**	-0.007 (2.70)**	-0.01 (4.77)**
experience	0.03 (9.53)**	0.026 (5.75)**	0.019 (8.27)**
land	0.148 (3.60)**	0.152 (4.95)**	0.305 (9.74)**
land squared	-0.003 -1.69	-0.002 (4.02)**	-0.008 (5.35)**
land quality decile	0.112 (5.99)**	0.07 (3.35)**	0.098 (7.38)**
other agricultural assets decile	0.036 -1.78	0.087 (4.08)**	0.083 (6.57)**
livestock assets decile	-0.088 (2.38)*	0.014 -0.7	-0.028 (2.26)*
Constant	-3.687 (17.76)**	-2.688 (10.70)**	-2.58 (18.25)**
Observations	3580	1621	4515

Robust z statistics in parentheses

* significant at 5%; ** significant at 1%

Source: Authors' calculations.

Appendix C: Income imputations

Income data from surveys in Sub-Saharan Africa is notoriously unreliable, which is also true for Uganda. Income from agriculture is very difficult to estimate for the households (who are often asked for "crop income") and possibly even more difficult to estimate from agricultural production data. As regards non-agricultural income, the difficulties are less pronounced, but a lot of missing income values for households with members engaged in some form of non-agricultural activity turned out to be a significant problem in the 1992/93 and 1995/96 surveys. We therefore applied the following rough method to arrive at household level estimates for the different sources of income. To impute incomes from crop farming, we estimate an income equation on a sub-sample of those households who do not report any other agricultural (livestock) or non-agricultural activities using OLS. As left hand side variable we use monthly expenditure as a proxy for income. The explanatory variables include the years of schooling, experience (squared), cropped area (squared), land quality (land value/land size), number of household members engaged in farming activities, and the distance to the nearest producer market. The estimated relationship is then used to impute agricultural incomes to those households where at least one member is engaged outside crop agriculture. For other agricultural incomes we also estimate a simple income equation using OLS. Here, the sub-sample on which we estimate the equation consists of all those who report this income source. Again, the explanatory variables include education and experience, and, more importantly, the value of livestock assets as well as the number of household members engaged in this activity. Non-reporters' incomes are imputed using the estimated parameters. To non-agricultural incomes, we apply the same procedure. We are aware that this simple procedure ignores many apparent econometric problems. Yet, we think that applying this imperfect procedure consistently across the three surveys should allow us to draw some broad conclusions on changes in the composition of incomes, at least when coffee and non-coffee farmers are compared. The regression results are available from the authors upon request.

Appendix D: Growth decomposition by income sources for households in non-coffee regions

Expenditure decile	*Growth in income from* *coffee*	*other crops*	*other agriculture*	*non-agricultural act.*	*remitt., transfers, other*	*Total growth*	*Per capita expenditure level, initial year*
Rural households in non-coffee regions, 1992-95							
bottom 30%	11.9	-2.1	-2.2	-5.0	2.6	13547	
middle 40%	8.7	-0.7	-2.9	-6.3	-1.2	23744	
top 30%	-7.3	-2.6	12.7	2.5	5.2	33973	
Total	1.7	-1.9	4.6	-1.9	2.6	23755	
Rural households in non-coffee regions, 1995-99							
bottom 30%	40.0	3.9	13.7	6.6	64.2	13897	
middle 40%	34.1	-0.6	10.3	4.2	48.0	23467	
top 30%	52.2	6.0	9.7	0.3	68.2	35746	
Total	44.1	3.5	10.6	2.8	61.0	24370	
Urban households in non-coffee regions, 1992-95							
bottom 30%	16.7	-2.4	4.9	-2.3	16.8	20430	
middle 40%	-5.5	-0.6	49.6	1.5	45.1	30992	
top 30%	1.5	0.5	20.1	3.2	25.3	56774	
Total	2.4	-0.4	25.7	1.7	29.4	36065	
Urban households in non-coffee regions, 1995-99							
bottom 30%	7.7	-1.0	30.9	-1.2	36.3	23870	
middle 40%	15.4	0.1	10.3	2.1	28.0	44960	
top 30%	2.0	2.0	67.7	-5.0	66.6	71144	
Total	7.3	0.9	43.0	-2.1	49.1	46658	

Source: Authors' calculations.