

Trade Reforms in Natural-Resource Abundant Economies

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ABSTRACT*

Focusing on perennial crops subject to rent-extraction, this paper reviews the outcomes of trade reforms in low-income natural-resource-based countries. After reviewing the channels through which ‘resource curse’ effects impinge on trade reforms and the cross-country evidence, it reviews lessons from two case studies, the reform of cashew nuts in Mozambique and the elimination of Madagascar’s Vanilla Marketing Board. Both case studies show that deep reforms increased the price to farmers but resulted in small supply response. The small effects on farmers’ income are largely attributable to the quasi-subsistence environment. Political reasons for the rather disappointing outcome are addressed.

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1. Introduction

If trade reform may not have poverty alleviation as its main objective, in low income countries it is expected that trade reforms would at least raise the incomes of the segments of the rural population engaged in exporting activities. Are farmers engaged in crops likely to be reached by trade reforms, and do they benefit from them? What are the adjustment costs? Reductions in government intervention in these markets should be beneficial for the rural poor since it is well-documented that agriculture is taxed both directly via export taxes and indirectly via protection of manufactures (see e.g. Krueger, Schiff and Valdes, 1988; Schiff and Valdes, 1992). Then removal of price controls and taxes and the dismantling of non-operational marketing boards and stabilization funds should benefit the rural poor. Moreover, since these reforms are usually extended to most of the agricultural sector, macro performance should improve, if only because agriculture weighs so heavily in the economy. Yet examination of the record shows that these reforms have been controversial, often yielding disappointing results in the low-income natural-resource-based economies reviewed here.

While the wave of pro-market reforms of the 1990s appeared against a backdrop of widespread failure in government intervention, a growing body of case studies is pointing towards the importance of context-specificity.¹ Export crops are often extracted from a narrow geographic and economic base with few players all along the value chain, a situation ideal for strategic interaction over the appropriation of rents, especially when market and product characteristics result in asymmetric information and marketing externalities.

Variants of the ‘resource curse’ in which rents conjure with geography, weak public institutions and dysfunctional political regimes have been invoked to account for the disappointing performance. Starting with Sachs and Werner (1997), slow growth has been associated with dependence on natural-resource-based export structures. Along the same lines, countries with export structures specialized in ‘point-source’ (as opposed to ‘diffuse’) natural resources have been strongly associated with weak public institutions and low growth (Isham et al., 2005). Most recently, Amin and Djankov (2009), using the Doing Business data on specific micro-measured regulatory or legal reforms, also find a negative correlation between the share of primary exports in total exports and their reform

¹ Two studies illustrate the point. In the case of the allocation of quota rents to Indonesian coffee traders under the ICA, Bohman et al. (1996) give evidence of both rent-seeking activities and the creation of barriers to entry by bureaucrats to increase the level of rent-seeking activities at the national level. Using six crops (cocoa, coffee, cotton, groundnuts, tobacco and vanilla), McMillan 2001 shows that the self-defeating (i.e. high tax policy) is pursued by governments for these cash crops because of time-inconsistency caused by fixed costs associated with tree-crops. Using data for these crops for thirty-two African countries, she finds that tax rates are higher the higher is the ratio of sunk to total costs, and the higher are expected future earnings (proxied by average past profits).

variable (coded as a dummy variable on the basis of reforms in one of ten sets of indicators).

This literature surveyed below isolates the channels through which trade reforms operate in economies specialized in perennial crops where barriers to entry along the value chain create rents, but the cross-country evidence is not robust. This lack of robustness is now well-documented and has contributed to the newer diagnostic-oriented approach to policy reform which is suspicious of ‘best-practices’ where expectations are based on the traditional presumptive approach to reforms (‘we know how markets work and here is the list of reforms to be carried out’).² To illustrate the usefulness of case studies I choose two case studies, the cashew reforms in Mozambique, a cause célèbre for anti-globalists, and vanilla in Madagascar where government and market failures produced also contributed to a disappointing outcome. Both case studies help illustrate the difficulties of assessing the impact of reforms in high-rent environments with strong market failures.

I start in section 2 with a discussion of the channels emphasized in the cross-section literature, then turn to the two case-studies. Section 3 discusses the market characteristics and the reforms in the cashew and vanilla sectors. Section 4 describes the difficulties encountered in measuring the impact of the reforms in each case study. Section 5 draws lessons from these case studies.

2. Trade Reforms in High-Rent Environments

The most heralded framework (Acemoglu, Johnson and Robinson (2001)) describing trade reforms in high-rent environments combines climate (disease vectors, rainfall levels, temperatures) and topography (soil/mineral quality) with the profitability of ‘point-source’ natural resources as the deep determinants of the institutional set-up chosen by colonizers who chose extractive rather than settler colonies, that is predatory institutions facilitating rent-extractions. In turn, these institutions have lasted through inertia characterizing institutional reform. But, as pointed out by Isham et al. (2005), India is different from Mexico and Russia in spite of similar colonial heritage. Digging further, institutional history and the pattern of policies have been linked to endowments through two channels. First via a rentier effect as easily extracted revenues are easily controlled. This implies for the State that: (i) it needs less revenue and hence incentives to develop ‘checks and balances’ are limited³; (ii) dissent can be

² The huge success of this agnostic approach is exemplified in the recent outburst of randomized control trials of projects and aid programs. Unfortunately this approach cannot be applied to evaluate the impact of trade policy reforms for lack of natural control groups. To take the example of the reforms in the vanilla market in Madagascar discussed below, it is difficult to see how the reforms could have been carried out in the Sambave and Antalaha districts but not in the Andapa and Vohémar districts.

³ In the case of vanilla and cashews, few intermediaries purchase the raw crop from farmers in small holdings.

bought off; (iii) if necessary, resources are available to control dissent. Second, modernization is delayed (i.e. institutions do not develop) as small group of elites can extract the surplus, in some cases because they own the land (as in Latin America) or in the case of cash crops grown by small farmers because they are the intermediaries between the producers and the export stage. This corresponds to the case of vanilla and cashews. These same groups oppose modernization or reform as they would create an alternative source of power. By losing political power, the elites would lose control over the rents (as happened between the change of political regime in Madagascar when vanilla policy was altered from phase II to phase III—see table 1). As pointed out by political scientists and evidenced by economists (e.g. Gylafson (2001)), in addition to the dutch-disease overvaluation slowing industrialization, resisting modernization also means less increases in literacy and in education generally, and less labor organization. As put by Isham et al., resource abundance simultaneously “strengthens states” and “weakens societies”, leading to an environment where beliefs about announced policies lack credibility and end up in a lack of supply of response (planting trees involving irreversible costs).

The natural-resource curse comes from the two-way causation between Institutions and performance: institutions are demanded in high performance environments so the rich countries are rich because they ask for institutional quality. However, a recent literature (Brunnschweiler and Bulte (2008a and b) has questioned the evidence on the natural-resource curse which is captured by the negative correlation between natural resources and growth, or the negative correlation between natural resources and income per capita. They question the use of the primary export share as an adequate proxy for natural resources which they argue is a measure of natural resource dependence rather an appropriate measure of natural resource abundance. When they use instead the discounted value of expected future resource rents over a 25 year period—a better measure of resource abundance—, they obtain a positive correlation between resource abundance and growth. This implies that the resource sector becomes the default sector in the absence of decent institutions when no one is willing to invest in alternative forms of capital. Natural resource dependence is endogenous.⁴

If resource rents trigger ‘rentier state’ dynamics, a recent literature starting with Collier and Hoeffler (2004) suggests that the search for rents by greedy rebels (helped by inhospitable geography making it easy to set up the rebel groups and elude the States’ police and military) engenders conflicts over the control of the natural resources (oil for Nigeria, or diamonds for Sierra Leone and Angola). Taking into account the endogeneity of resource dependence in growth and conflict regressions, Brunnschweiler and Bulte find that the curse disappears and that it becomes a symptom rather than a cause of underdevelopment. When using resource abundance as the indicator of natural resources, they obtain a positive correlation between abundance and growth (high-quality institution

⁴ This was particularly striking in the case of Madagascar when the time-limited preferences under AGOA provided a unique opportunity to invest in better infrastructure to attract some irreversible FDI in the EPZ zone producing apparel.

Botswana has diamonds and high-growth, but not low-quality institution neighboring Angola equally endowed in diamonds).

This recent literature highlights two other channels through which natural resources affect policies and outcomes. First, Hodler (2006) and others, recognizing that fighting over rents will depend on the number of contestants, show that there may be rent over-dissipation if ethnic fractionalization and resource abundance have a negative effect on property rights. Then natural resources intensify rent-seeking and can lead to a decrease in production that exceeds the value of the rents if institutions are weak leading to a curse. If, on the other hand institutions are strong, resource abundance is a blessing. Second, the political landscape also enters the picture. Collier and Hoeffler (2009) model income (rents) and substitution (public goods) effects under democratic and autocratic regimes. Under democratic regimes there is a greater provision of public goods and more ‘checks and balances’. But this comes at the expense of more wasteful lobbying-for-rent-appropriation activity than under autocracy. The interplay of these effects is confronted with the data to check the role of the type of government in determining performance in natural-resource-rich environments. They produce cross-section evidence that autocratic regimes appear to outperform democracy along these two channels in resource-rich countries when institutions are weak.

With all these channels it is no surprise that recent evidence is inconclusive about the existence of a ‘resource curse’. In their extensive exploration of the resource curse with the most recent data, Arezki and Van der Ploeg (2008) find a tenuous link between resource dependence or resource abundance and either growth performance or cross-country variations in per-capita income. In regressions exploring the correlates of cross-country per-capita income variations, they fail to find robust evidence that good institutions may turn the curse into a blessing even after controlling for geography, institutions and openness. While they find that bad trade policies worsen the resource curse, since bad trade policies are strongly correlated with other policies (in particular bad fiscal policies, see Easterly (2005)), in spite of exploring several channels through which geography, institutions and politics affect trade reforms, this literature cannot be expected to yield robust lessons about the likely effects of trade policies in natural-resource-based economies. The two case studies below illustrate how trade reforms can unfold in a high-rent environment.

3. Market Characteristics and Reforms in the Cashew and Vanilla Markets⁵

3.1 Characteristics and Market Structure

⁵ Much of what follows is a summary of McMillan et al. (2004) and Cadot et al. (2009).

Both crops share many common characteristics. These are described in table 1 and include: (i) production by small (and poor) farmers and their family on plots of land they own, with production taking place under competitive conditions⁶ ; (ii) few intermediary buyers who either process the raw cashews or cure the green vanilla; (iii) a regulatory environment in which purchase prices and margins by processor-traders were controlled by the government; (iv) export taxation of processed vanilla or of raw cashews. I start with the internal market structure, then turn to the external market structure.

Cashews. McMillan et al. figure 5 show three layers of intermediation between cashew farmers and world markets: (i) local buyers and small traders ; (ii) larger wholesale traders; (iii) exporters and the domestic processing factories. Entry barriers at each level as a result of set-up costs and regulatory restrictions combine to explain the monopsonistic power along the value chain. These barriers to entry contribute to explain the resulting low share of the world price received by producers (see figure 2b). McMillan et al. note that there were 8-10 exporters of raw and processed cashews at the time of the reforms.

Labor is the most important input in cashew with 50% of costs associated with curing the trees prior to harvesting, the remainder taking place at harvesting. Processing could take place either in large factories using one of two highly mechanized technologies that depend on a constant flow of calibrated nuts (to yield a high proportion of whole rather than broken kernels which fetch a higher price), or on semi-mechanized more labor intensive technologies closer to the hand-shelling done by Indians at home.⁷ There is disagreement about the causes of the failure of the processing industry following its privatization, some arguing that a more labor-intensive technology would have been appropriate.

Vanilla. Cadot et al. figure 1 shows the three phases in vanilla production: (i) vanilla growing, which produces the “green” beans; (ii) curing, the stage at which it develops its quality (flavor profile and natural vanillin content); (iii) packing (sorting, grading, and tying in small homogenous bunches). Each stage requires specific skills.

Growing is highly labor-intensive, as crop husbandry requires 260 man-days per hectare during the first year and about 460 during the 4 to 8 years where plants reach maturity. Pruning and weeding are then supplemented by hand-pollination – which means that each flower on the vine has to be pollinated by hand and at

⁶ Vanilla is a cash crop with all production sold. According to the household survey in Madagascar in which around 500 families in each survey listed vanilla production as their main activity, the share of vanilla in full income was around 30%. For cashews, McMillan et al. report that farmers only sell about half of their crop, the remainder being kept for on-farm consumption. These characteristics imply that the income effects of trade reforms will be muted.

⁷ The manual technology yields a higher proportion of whole kernels but is hazardous for the workers because they get in contact with a corrosive and toxic liquid called cashew nut shell liquid.

different times— and harvesting.⁸ Most workers engaged in growing belong to the family and very few producers turn to employed workers because of the meticulous work required for vanilla production. With few purchased inputs (producers need very little equipment and pesticides are useless), entry and exit costs are low although plants require over three years to become productive and growing conditions are rather exacting (small tracts of rich soil under the shade of trees).

Curing entails dipping beans in near-boiling water, then triggering an enzymatic reaction by alternate heating and “sweating” which means boxing the beans and exposing them to sunlight. The process is repeated 10 to 20 times before the beans are left to dry outdoors for 2-3 months. By then, they possess a uniform dark color and strongly smell of vanilla. Once cured, vanilla beans are prepared, packed and stored in order to keep their flavor, a stage that is peculiar to Indian-Ocean producers. The storage process, which can last up to two years, is risky, as vanilla can mold and weekly inspections are required. Though it need not be the case, packers often export, and importers from the three main importing countries —the USA, France, and Germany— keep close and lasting marketing contacts with exporters as this helps establish confidence and overcome informational failures described below.⁹

Several of a bean’s quality characteristics are unobservable (five months after flowering, vanilla beans have reached their optimal size but if harvesting takes place before eight months, the beans will have less than half the full vanillin content) and largely determined by growing conditions, time of harvest, and the curing process. When prices are high, stealing will occur and fringe traders will compete on collection dates.¹⁰ Less than a half-dozen packers operated in the packing industry at the time of the reforms. This high concentration arguably resulted as much from government policies and rent-seeking as from economic rationality (because of marketing externalities and the production—farm, curing and packing levels—associations among producers would help reduce risks for buyers and risks for buyers). In fact, prior to its elimination, the Vanilla Stabilization Fund (VSF) was the quasi-sole purchaser from the packers.

⁸ Ecott (2004) is essential reading for anyone interested in the “story” of vanilla. Chapter 4 describes the discovery of hand-pollination in La Réunion in the 19th- Century. Blarel and Dolinsky (1995) provide a very detailed discussion of market failures in the market for vanilla.

⁹ Blarel and Dolinsky (1995, p. 263) also emphasize the asymmetric information between buyers (the food industry and brokers) and the sellers of vanilla beans. They “....note that confidentiality about the quality and technical characteristics of the vanilla bean and its processed products is of paramount importance in the commercial relationship of the food industrialist and the vanilla broker.” (Blarel and Dolinsky (p. 263)

¹⁰ The resulting market failure could in principle be addressed by a variety of market mechanisms, including vertical integration, branding, or industry standards but as a matter of fact, vertical integration between farming and processing is virtually nonexistent. Vertical integration is still limited because the activities require specific skills. As a result, the industry has developed weaker mechanisms to alleviate adverse-selection issues, such as the introduction of identification marks that remain visible after curing.

On the external front, both products face highly non-competitive markets except for processed cashews. For raw cashews, Mozambican exporters directed sales to one country India, with only a few importers with little bargaining power for the exporters because of a lack of storage facilities and high financing costs. As a result, reducing the export tax on raw cashew probably resulted in a terms-of-trade loss for Mozambican exporters of raw cashews (reportedly Mozambique accounted for 10% of the world market for raw cashews). For processed cashews, where Mozambique holds about 5% of the world market share, the market structure is far more symmetric with about the same degree of concentration on both sides of the market.

For vanilla, Madagascar accounted for between 40% and 60% of the world market for high-quality 'bourbon' vanilla. As described in Melo et al. (2000) following the high rent-extraction policy during phase II (see table 1) where the export tax reached 82% of the FOB price, Indonesians entered the market, with their market share equaling that of Madagascar by 1993 just before Madagascar abandoned its extortionary policies (and had just burnt 4 years worth of stock in 1990). After major fires in Indonesia in 1996-1997, Madagascar regained prominence in market share, accounting for around 60% of the world market.

The US accounts for about half of the value of imports of vanilla (the world leader both for high and for low quality vanilla with the dominance of McCormick in the former and CocaCola in the latter)¹¹, and as a result of re-exports of processed or packaged vanilla by developed countries, less than half the world share of vanilla trade is accounted for by developing countries.¹²

3.2 The Reforms

The reforms were straightforward in both cases. For vanilla, following a phase I when regulation was cooperative¹³, rent-extraction policies were carried out during phase II culminating in the hands of a single packer-exporter effectively creating a monopsonist buyer of green and cured vanilla on the domestic market and a single exporter of vanilla in the export market (Blarel and Dolinsky, p. 304). When they were abandoned (this coincided with a change of presidential regime and the reforms were not carried out under World Bank conditionality), the 'golden goose' had been killed, with export volumes about half those achieved under phase I. Trees were largely abandoned, the quality had fallen and rents

¹¹ About 70% of cured natural vanilla is bought by around 10 multinational companies. Another 10 'flavor houses' dominate the flavor compound business. See May and Arnold (section 4.4).

¹² As discussed by May and Arnold (section 5.1) the labelling laws are more stringent in the EU than in the US with the result that only Madagascar produces vanilla that meets the standards of 1.6% vanillin per single fold extract from 100 grams of vanilla extract per 1 liter of extract. As a result, European food producers and flavor houses have had to rely on Malagasy vanilla. Branding in the bean to distinguish the grower provides identification that survives the curing stage.

¹³ See the discussion in Cadot et al. During this phase a vanilla stabilization fund (VSF) was established with a licensing committee overseeing export trade with, at all stages of the process, prices set by a cost-plus formula and the VSF committed to buying the stock at the prevailing price. Curers, packers and exporters had to obtain a license to operate.

were dwindling for the Indian ocean cartel. Putting dynamic considerations aside, Melo et al. (2000) estimate that the export price set by the VSF was about twice the static welfare-maximizing level, and a third above the revenue-maximizing level implying welfare losses adding to about 1% of GDP.¹⁴

Table 1: Cashews and Vanilla: Background and Reforms

As shown in table 1, the reforms boiled down to a withdrawal of the government except for sanitary/quality inspections and the important role of announcing the date when the harvest can start to prevent competition among traders to pick vanilla before maturity when vanillin content is low.

For cashews, Mozambique had been the world leader until independence in 1974, and the first African country to process cashews on an industrial scale under the Portuguese. In 1974, 150,000 tons of raw cashews were processed, with the decline starting at independence ending at 8,000 tons in 1992 at the end of the 10-year civil war. Even when it was successful, cashew production was highly regulated, much like vanilla, with prices and marketing margins regulated throughout the chain. This continued after independence, with raw cashew exports banned starting in 1978. Following initial reforms in 1991-2, as part of adjustment lending operations under the World Bank, conditionality in the reforms involved removing/lowering the export tax on raw cashews in a first step to be later followed by privatization of large processing plants that were already in deep trouble. As documented in McMillan et al., privatization took place first (at a much lower price than expected) and was followed by the reduction in export tax. This sequencing of reforms was vehemently opposed by processing plant owners who then managed to get the export tax raised again (see table 1). Unemployment in the industrial processing plants reached 10,000 or 90% of the work force, the flambeau for this cause célèbre espoused by the anti-globalization movement.

4. Measuring the Impact of the Reforms

Lack of adequate household data hampered the analysis of the reforms for both case studies making it difficult to come up with a reasonably accurate diagnosis of the outcome with both papers relying on suggestive simulations based on anecdotal evidence about the increase in the number of traders in the processing chain and data suggestive of increasing margins for farmers. To begin with neither case study had access to reliable price and quantity data to assess credibly the effects of the reforms.¹⁵ In the case of cashews, no household surveys were

¹⁴ The simulations come from an econometrically estimated Stackelberg model with Madagascar the leader and Indonesia the follower, with vanilla demand competing with vanillin substitutes. Demand elasticities were estimated quite precisely, but not supply elasticities for either Madagascar or Indonesia.

¹⁵ In the case of vanilla, discerning the effects of the reforms was further complicated by several exogenous events: a major hurricane in April 2000 in Madagascar; a contested Presidential

available, the trade statistics were questionable (no exports of raw cashew by Mozambique in spite of an estimated world market share estimated at around 10%). With lack of firm-level data that would have allowed measurement of efficiency, there was disagreement in the diagnosis of the causes of failure in the cashew processing industry (see McMillan et al. section 7).

4.1 Prices, Margins and Supply Response.

In the case of vanilla, four household surveys for 1993, 1997, 1999 and 2001 are available. Unfortunately, although they straddled the reforms with around 500 vanilla-growing households in each survey, they are far from comparable both in terms of data collected and sampling methods. Inspection of the household data does not reveal clear-cut changes in inequality and poverty indices in the vanilla-growing regions. Attempts at estimating supply response from the household survey data met with mixed results.¹⁶ In the case of cashews, no household data were available.

In the end, both case studies relied on government FAO price data and on COMTRADE data, both of questionable quality which produced at best suggestive estimates. For example, in the case of vanilla, there was a large discrepancy in the price series even though the farm-gate prices show the same increasing trend across the series.¹⁷ Nonetheless, it is clear from figure 1 that the producer price share (of the FOB price) was falling for both crops through time indicating rent-extraction from the farmers. In both cases, the producer share of the FOB price rose after the reforms with this increase attributable to greater competition among intermediaries (the case studies give anecdotal evidence of increased competition along the production chain). For vanilla, the fraction of vanilla FOB prices retained by producers, from a low of less than 2% in 1991 to a high of close to 34% in 2004 while for cashews, the fraction of the FOB price retained by

election in late 2001 that brought the country to a standstill until July 2002; and large scale fires in Indonesia in 1997 which destroyed a large chunk of the world's supply of natural vanilla.

¹⁶ Figure 5 in Cadot et al. on plantation and yields over a 20 year period show no break around the reforms. Using household survey data, they model farmers' decisions in a two-stage Heckman process with the decision to grow vanilla identified using location and community characteristics and expected profits based on past prices. The model was estimated for 500 households over the two most comparable surveys (1997 and 1999). First stage results are plausible and show a positive supply response to the variable used to capture expected profits. But the aggregate statistics on vanilla production show no increase in supply (there were cyclonic conditions on several occasions) and a report on the Sava region ("Monographie de la région de la Sava", GOM, 2003) states that the increase in vanilla-planted area following the elimination of the marketing board corresponds to a better care given to vanilla sprouts and to the renewal of old sprouts rather than to a physical increase in plantation, even though some planting reportedly took place in 2004 when prices rose dramatically. Lack of complementary data at the community level and on the determinants of land allocation to food and vanilla crops precluded trying to disentangle the determinants of the decision to produce vanilla as in e.g. Balat et al.(2008) did for an aggregate of exports crops.

¹⁷ According to the household surveys, farm-gate prices increase over 8-fold in real terms over the period 1993-2001 while the corresponding increase in the FAO series is less than 4-fold, and the government figures are flat over the available period (1993-1997).

producers rose from 30% to 50-60% (as expected by the World Bank when it pushed for the reform).¹⁸

Figure 1. Producer Price and Intermediation Margin

A last outcome of the reforms was the boom-bust cycle in the vanilla market. Such cycles common to tree-crops had occurred before, but this one summarized in figure 2 was particularly strong and reflected both the inherent instability in the market (cyclonic conditions, fires in Indonesia), the asymmetric information at several links along the value chain, and also the consolidation in the industry that was getting increasingly concentrated during the period (May and Arnoldus (2009) provide the details). The result was opportunistic behavior all along the value chain, with as an end result a shift away from natural vanilla in the food processing industry wherever, natural vanilla content was not protected by required labeling. As put by Ecott (p. 238) :

“... in Madagascar, Mexico, India and Indonesia the farmers spread rumors about the amount of vanilla they think will be available during the next season. They hope to frighten the curers into offering them a higher price for green beans. In turn, the curers spread rumors among farmers about how much the foreign buyers are willing to pay for the dried product....Meanwhile the international brokers spread ‘market intelligence’ to their customers about how much vanilla may or may not be on the market during the forthcoming year.”

And, as he got to know the major dealers, Ecott reports (about the rising prices in 2004) that the major dealers were accusing each other of predatory behavior to drive out the competition.

Figure 2 : The Vanilla Boom and Bust 1990-2007

The overall impression is one of widespread opportunistic behavior in a highly concentrated market. In relation to the denouement of the reforms, market failures which had been successfully addressed in phase I were replaced by government failures in phase II, but were back at center-stage by the end of the reforms.

4.2 Counterfactuals

In the end, with little supply response for both crops, and sustained instability in the natural vanilla market, were there any benefits for the growers from these reforms? Using plausible, but not estimated, supply elasticities, both studies used counterfactual simulations to try and squeeze orders of magnitudes from the stylized facts indicating higher farm-gate prices for both cashew and vanilla producers. In both studies, Cournot competition was assumed among the

¹⁸ The abrupt reversal in the squeeze on the intermediation margin for vanilla around 2001 is puzzling (see Cadot et al. for possible explanations).

intermediaries with the number of intermediaries calibrated to the plugged-in intermediation margin (between producer and FOB export prices).

In the cashew case study, there are three layers of intermediaries, small traders, large traders and processors/exporters, each layer determining price in Cournot-Nash fashion and the inverse of the intermediation margin, θ is given by :

$$\theta = \frac{p^P}{P^* (1-t)} = \left(\frac{n_1 \varepsilon}{1 + n_1 \varepsilon} \right) \left(\frac{n_2 \varepsilon}{1 + n_2 \varepsilon} \right) \left(\frac{n_3 \varepsilon}{1 + n_3 \varepsilon} \right) \quad (0.1)$$

where P^P is the producer price, and P^* is the (exogenous) world price. It is clear from (0.1) that the share of the producer price in the world price is an increasing function of the degree of competition at each stage captured by the number of traders at each layer. In this set-up, the deep discount suffered by farmers comes from the multi-tiered nature of the market. Any measure that increases competition along the value chain, such as improving infrastructure, so that each farmer has access to more traders is helpful for the farmers. Using a supply elasticity of $\varepsilon=0.25$, and actual margins at each stage, Mc.Millan et al. estimate $\theta=48\%$.

In the Mozambique study, the rising price paid by processors as the export tax is lowered for raw cashew exports creates unemployment (which is costly to society under their assumption that the opportunity cost of workers is zero which they justify because of the reported unemployment in the range 20%-50%).¹⁹ When this unemployment estimate is subtracted from the gains to farmers, they obtain an overall welfare gain that is negligible.

In the Madagascar study, the counterfactual involved reducing the number of traders to a single one to resuscitate the marketing board and re-imposing the taxation at the pre-reform maximum rate of 82% during phase II. The set-up is one in which two countries where Madagascar competes with Indonesia in the world market for vanilla. As in the cashew model, the share of the world price retained by Madagascar's producers, θ^M , is a function of the number of local intermediaries, n , and of demand and supply elasticities, yielding a similar profit-maximizing outcome to the one in the case-study:

$$\theta_M = \frac{p^P}{P^*} = \frac{1 - \left\{ (1/\sigma) + [1 - (1/\sigma)]s \right\}}{1 + [1/(n\varepsilon)]}. \quad (0.2)$$

¹⁹ Mozambique has been growing at 8% per year for the past ten years, so this assumption over-estimates the welfare loss from unemployment. A more appropriate assumption would have been to subtract revenue losses evaluated at a fraction of the wage in the processing industry for a period of a few (perhaps 5) years from the overall gains to account for these adjustment costs.

The simulation gives new values for prices and quantities of vanilla that were then fed into the household survey data. These simulations, which provide an upper-bound of the effects of the reforms, are shown in figure 3.

Figure 3 : Kernel density estimates of income distribution, vanilla region

In spite of large changes in prices (depending on the values assumed for the elasticities, the simulated margin under the VSF set-up with an 82% export tax lies between 2% and 11% of the FOB price compared with the actual estimate of 22%), effects on the distribution of income are negligible. This is so because most of the effective consumption of Malagasy rural households is self-produced. Cash income represents at most 50% of income for the richest decile. Under the central assumption about elasticities, the estimated change in the poverty headcount is that about 20'000 households (representing around one quarter of vanilla-growing households) were lifted out of poverty as a result of the 1995 reforms.

5. Discussion

The two case studies illustrate the difficulties of extracting information on the effects of trade reforms with limited data, but more importantly when delving into the characteristics of the markets and of the policies adopted, one finds clues for the observed outcomes. For vanilla, the characteristics of the vanilla market (highly variable due to unstable climatic conditions) and of vanilla preparation suggest sufficient externalities and market failures (e.g. asymmetric quality information and externalities in marketing) to justify intervention of the type that was initially set up. So if opportunistic behavior could be controlled, as it was during the early phase I period, cooperation among agents involved in the value chain would help overcome market failures, to stabilize prices for the producers, and to exploit its (increasingly limited) monopoly power on high-quality ("Bourbon") vanilla. In the case of cashews, it is the lack of credibility of government policies around the conditionality for World Bank assistance together with a wrong sequencing in the reforms that contributed to the disappointing outcome.²⁰

For both cashews and vanilla, the low supply response to the reforms is attributable to several factors. First, in both cases, the income effects of any price increase were small because the households were not specialized in the cash crop: in effect the families engaged in the cultivation of these crops are very poor and close to subsistence income (in the case of vanilla, the household surveys show very low annual per-capita expenditures of around 30\$). Second, in both cases high sunk costs dampened any expected supply response from an increase in

²⁰ Sequencing is important. For example, when Mongolia abandoned central planning where the herd was owned and their number controlled by the State and when pastures were part of the 'Commons', the herd was initially privatized without accompanying privatization of the land.

farm-gate prices, and high sunk-costs required credibility on the part of government policy. This credibility was largely lacking because of the predatory behavior encouraged by the natural resource base. As emphasized by McMillan (2001), high sunk costs involved in tree-crop production imply that farmers have to incur labor costs prior to knowing the price they will get at harvest in markets which are, furthermore, controlled by a few intermediaries. Farmers can only hope to recuperate some of the costs by harvesting even if the price received does not cover the cost of maintaining the trees or pollinating the vines. For both crops, the sunk costs associated with planting new trees require a credible pricing policy.

Irreversible investments on the part of governments, like improving roads and transport would help make these crops more profitable leading to greater specialization in export crops which in turn would likely be associated with less poverty (see the evidence in Barlat et al. 2008 for Ugandan export crops). One might also expect that the reduction in the market power of intermediaries that followed the trade reforms in cashews and in vanilla would have been amplified by complementary investments that would have reduced transaction costs.

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Table 1: Cashews and Vanilla: Background and Reforms

	Cashews	Vanilla
Background Production	1 million small farmers Stable production, High sunk costs: Trees start producing after 5 years for a productive life of 25 years Labor costs: 50% of time caring for trees prior to harvest and rest harvesting	100,000 small farmers proprietors (2ha size) Highly unstable (c.v. of production of 15% (41%) for 1961-1979 (1979-1990). Low perishability, low substitutability across producers. High sunk costs: Trees take 3 years; productive life of 8 years Labor Costs: hand-pollination; no inputs
Regulatory environment	High regulation during and after the Portugese left. Trading and processing under State control; producer prices and trading margins set by government	Prices and margins set by government and licenses required for all stages (curing, packing and exporting) until phase III (see below)
Internal Market Structure	Three layers (small rural traders/retailers co-existing with large traders/wholesalers), processing factories; exporters (for raw and processed cashews)	Two layers: Curing (gives commercial value), and packing (sorting, grading and storing).
International Market Structure	All production exported, raw (5%) or processed (10%)--world market shares in parenthesis India is single buyer of raw cashews with less concentration on the export side; similar levels of concentration on both sides of market for processed cashews	40-60% world market share with few competitors (Indonesia, PNG, Uganda). Protection by labelling laws. Few buyers from the food-processing and fragrance industry.
Policy reforms	1) Export ban on raw cashews lifted in 1992, but 60% export tax and QR of 10,000 tons. 2) In 1995, as part of conditionality, liberalization of cashew marketing (export tax on raw cashews reduced to 14%) to be followed by privatization of processing industry and elimination of rationing of export licenses (but actual sequencing was the opposite leading to strong protests by the industry and reinstatement of the export tax to a level between 18% and 22%). Privatization brought 10% of expected revenues.	Phase I (60-75): Successful vanilla stabilization fund with tri-partite process involving growers, packers-stockers and GOM Phase II (75-93): Replacement by centralised and politically motivated decisions with rent-seeking, inefficiency and extortionary taxation Phase III (93-): GOM abandons the VSF and intervention in the sector except for sanitary/quality inspections and setting date for marketing

Figure 1: Trend in Producers' Share of World Price

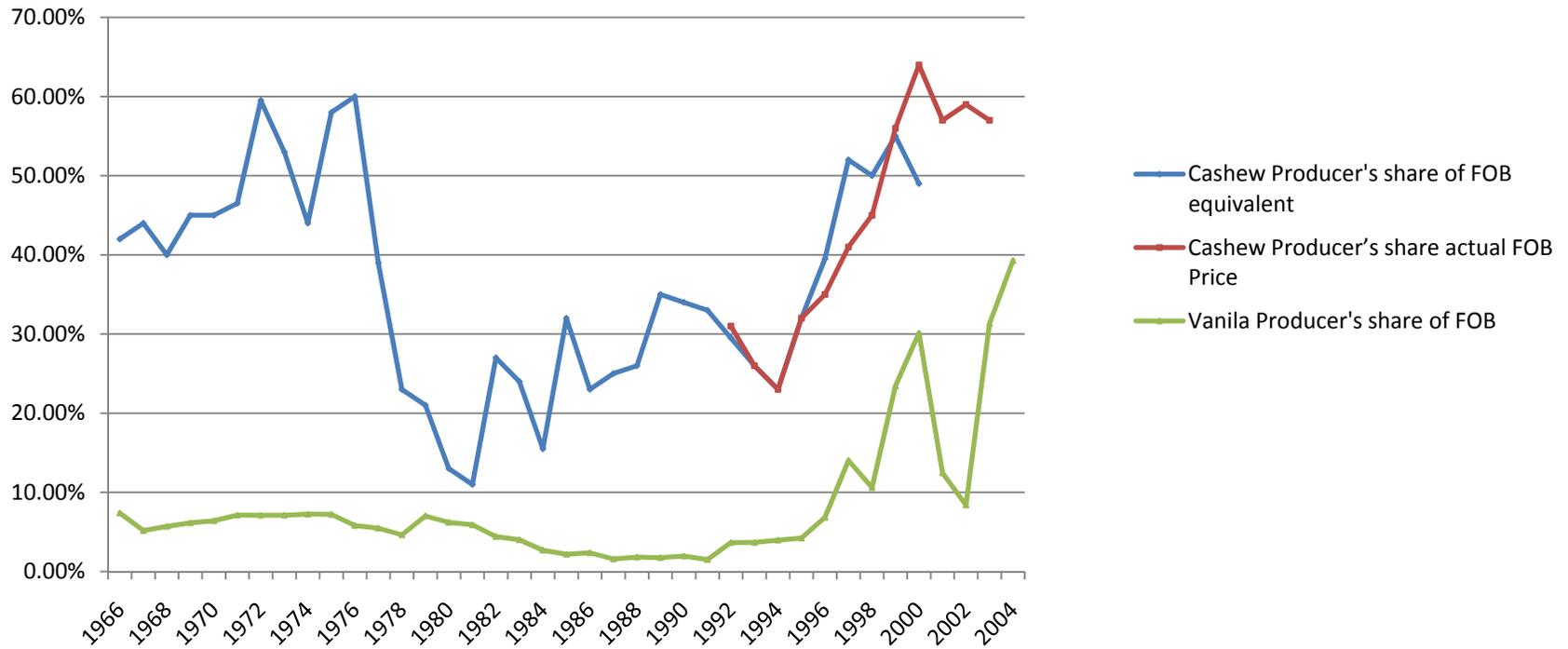
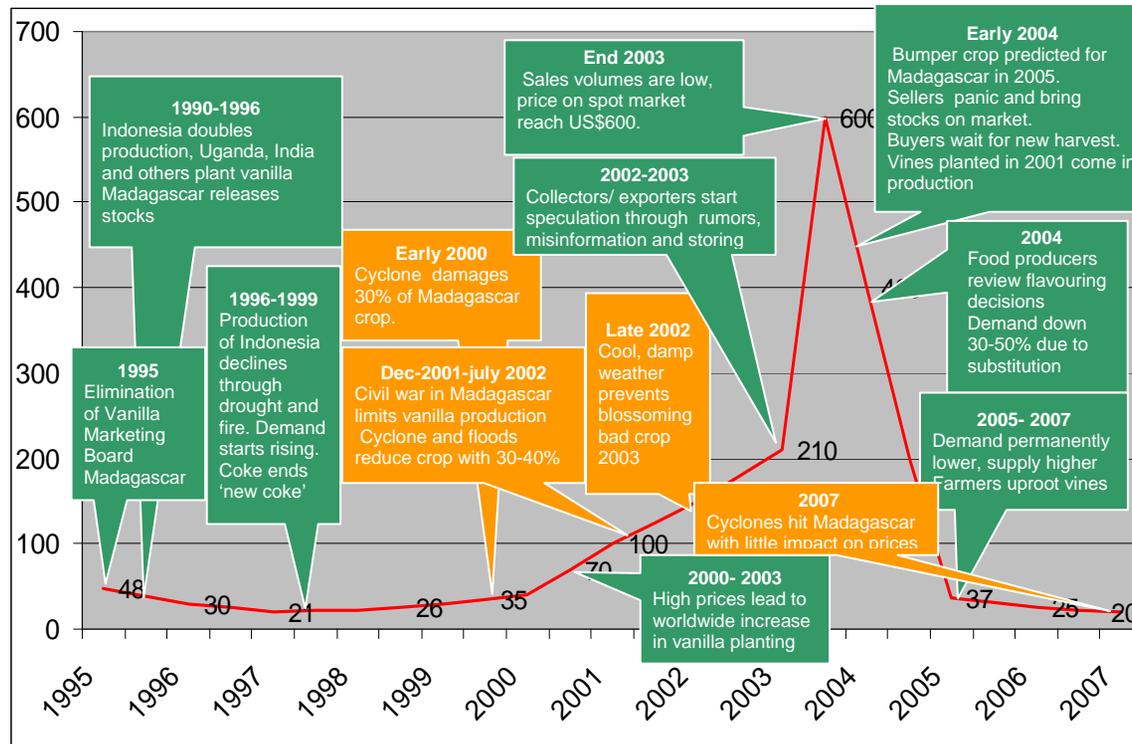
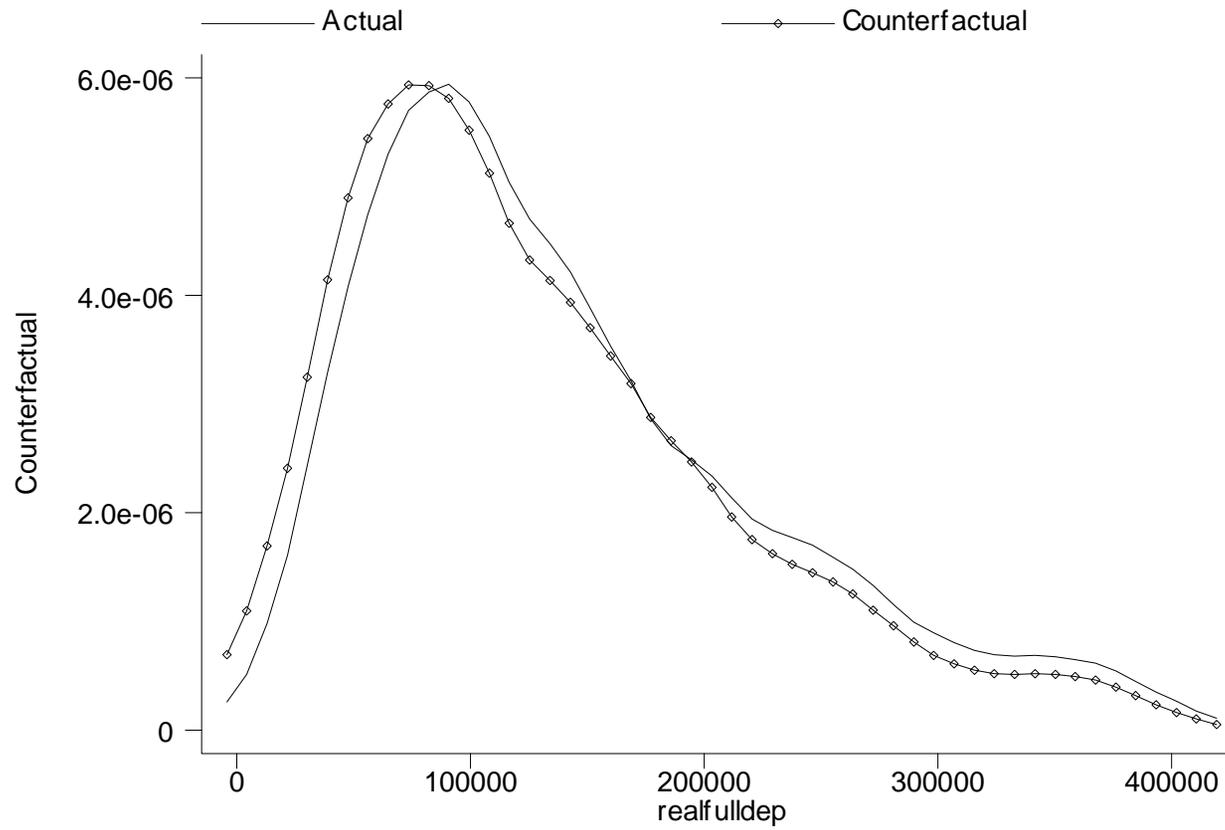


Figure 2 : The Vanilla Boom and Bust 1990-2007



Source: Adapted from May and Arnold (2009, figure 8)

Figure 3
Kernel density estimates of income distribution, vanilla region



Source: Cadot et al. (2009) figure 6.