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Christopher B. Barrett
Utah State University

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**MOBILITY BARRIERS AND THE SOCIALLY
DIFFERENTIATED EFFECTS OF FOOD MARKETING
LIBERALIZATION IN MADAGASCAR**

by

CHRISTOPHER B. BARRETT

**Department of Economics
Utah State University
3530 University Boulevard
Logan, UT 84322-3530**

March 1996

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Christopher B. Barrett, Assistant Professor

**Department of Economics
Utah State University
3530 University Boulevard
Logan, UT 84322-3530**

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ABSTRACT

Decontrol of commercial food marketing channels was widely expected to induce massive trader entry and engender more competitive, efficient markets in Africa. Despite strong empirical evidence of trader entry, enterprise expansion is proving difficult and many market observers and participants claim market power continues, if perhaps exercised now by private traders instead of public enterprises. This paper uses the industrial organization concept of mobility barriers to confront this puzzle of substantial market entry that might not enliven market competition. Primary data from a survey of food marketing intermediaries in Madagascar reveal distinct groups within rural food marketing channels, separated by identifiable mobility barriers. Entry has thus been largely limited to a few particular niches. Moreover, the place individuals occupy within the complex matrix of rural food marketing activities is defined largely by one's *a priori* social identity. As a result, the experience and subjective perceptions of food marketing liberalization vary significantly across socially distinct subpopulations.

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Introduction

The manifest inefficiency of state-directed marketing systems based on quantity controls, trade restrictions and administrative pricing has been a principal force motivating the transition of many nations to market-based systems. In the low-income agrarian economies of sub-Saharan Africa (SSA), the reform of food marketing systems previously fettered by interventionist states has been a central component of economic adjustment, both because food represents an unusually large share of household expenditures and because food agriculture employs a plurality of such nations' workers. The presumption in the design and implementation of market-oriented reform programs has been that the elimination of parastatal authority—especially, but not exclusively, monopoly and monopsony powers—would induce significant private entry into food marketing and thus more competitive markets and more efficient pricing. Improved marketing efficiency would squeeze marketing margins, thereby benefitting peasant producers, who would enjoy higher producer prices, and poor consumers, who would face lower retail prices.

There indeed exists preliminary evidence of trade entry, diminished marketing margins and improved market integration in liberalized African food markets (Coulter, 1994; Jones, 1994). Yet one continues to hear widespread complaints from peasant producers and consumers about food traders' market power, and there is some evidence of the transfer of market power from public marketing authorities to private intermediaries in African liberalization experiences (Duncan and Howell, 1992; Gibbon, Havnevik and Hermele, 1993; Barrett, 1994). Researchers

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in this area tend to note that while entry into small-scale trading appears reasonably barrier-free, enterprise expansion has been difficult and rare (Steel, 1992; Bryceson, 1993; Duncan and Jones, 1993; Jones, 1994). Severe credit and foreign exchange constraints, insufficient pre-existing capacity for interseasonal storage or interregional transport, and persistent local regulatory barriers are most commonly cited as barriers to expansion. This points to the puzzle this paper addresses: can we reconcile observations of trader entry with claims of persistent food market power in the liberalizing agrarian economies of SSA and the apparent difficulty of enterprise expansion?

The first section of this paper reviews the concept of mobility barriers introduced to the industrial organization literature by Caves and Porter (1977). This seems an especially appropriate tool for understanding the complex response of food marketing channels to liberal reforms. Much of the literature on marketing reforms talks of “traders” as if they were homogeneous, which leads to blanket statements about the marketing channel becoming competitive or not. The concept of mobility barriers that separate distinct intra-industry subgroups seems helpful to more nuanced analysis of liberalization’s effects on food marketing channels. The paper then goes on to present the results of interviews with and a 1993 survey of food marketing intermediaries in the central highlands of Madagascar. There appear to be important mobility barriers associated with credit access, sunk costs, access to market information and to distant distributors. These mobility barriers not only divide the food marketing channel into distinct subsectors but also represent social cleavages in trading that separate intermediaries by age, ethnicity and gender. The penultimate section presents statistical evidence that social differentiation of the food marketing channel is associated with significantly

different subjective perceptions of the liberalization experience across demographic groups. In places like Madagascar, where political liberalization occurs contemporaneously with economic reforms, the socially differentiated effects of liberalization may have impacts far beyond the rural periodic market.

Much of this paper reinforces others' findings.¹ The value-added of this paper has four components. First, it offers a detailed look at food marketing in Madagascar, a case of considerable interest to students of market-oriented reforms in SSA. Second, unlike most of the literature on the response of food marketing channels to liberalization, the quantitative data used here come from a random sample of market intermediaries, and thus obviate the gnawing question of whether findings are representative of the survey region. Third, this study looks at rural food marketing channels, while most systematic studies of post-liberalization African food marketing have focused on urban systems. Finally, and probably most importantly, this paper views the empirical findings about food marketing channels through the lens of post-Bain industrial organization theory. The concept of mobility barriers motivates the basic construct of the analysis, in which sunk costs, uncertainty, reputation and contract interlinkage figure prominently.

The Concept of Mobility Barriers

Economists generally presume markets to be competitive when there is reasonably free

¹ Particularly good and balanced summaries of the literature can be found in Duncan and Jones (1993), Coulter (1994) and Jones (1994). Bryceson (1993) offers an unusually rich, long-term perspective on food marketing liberalization in a single country, Tanzania.

entry and exit. The threat of entry induces firm efficiency (Liebenstein, 1966, 1969) and limits (or eliminates) price mark-ups by incumbent firms (Baumol, 1982), whether or not a firm has active competitors. As Caves and Porter (1977) point out, however, the theory of entry barriers unnecessarily confines itself to the movement of firms from zero to positive output, and neglects the more general movement of firms among segments of an industry. Caves and Porter's concept of "mobility barriers" that separate groups within an industry seems particularly appropriate to understanding the architecture of food marketing channels in SSA. In particular, it offers a sound theoretical basis for resolving the paradox of observed post-liberalization market entry coexisting with widespread observations of difficulty expanding enterprise operations and persistent claims of market power. This section briefly outlines Caves and Porter's (1977) general theory of intra-industry firm mobility in order to lay the foundation for the empirical analysis of the following sections.

Most industries exhibit subgroup structures that lead to intra-industry differences in market share, profitability, technology and other structural characteristics. Firms within a group closely resemble one another but may differ considerably from those of other groups within the industry. In competitive equilibrium, differences in firm structure should not be associated with differences in firm profitability, otherwise unprofitable firms would metamorphose into the profitable forms. Obstacles to intra-industry mobility, however, permit these differences to persist, enable the exercise of market power and make it possible for firms in some groups to earn positive rents indefinitely. The more complex the structure of groups within the industry, the more competitive the industry's performance, *ceteris paribus*. Thus, barriers to entry are specific to industry subgroups and do not protect all firms in the industry equally.

As Caves and Porter (1977, p.252) put it, “barriers *can vary with the characteristics that define industry groups*. Entry can be easy into one group in an industry, blockaded into another” (emphasis in original). Among the relevant mobility barriers to food marketing in rural Africa are product differentiation, interlinkage of transactions, absolute cost of entry (especially sunk costs), and credit access. Some of these mobility barriers may be endogenous. That is, firms may make investments that reduce others’ mobility into their subgroup (e.g., excess storage capacity or trade-tying credits).

Given that barriers to entry are specific to groups, entry is thus targeted toward a specific group (or, less commonly, the creation of a new group). Prospective entrants will likely self-select into subgroups on the basis of two criteria. First, firms’ alternative activities establish a hurdle rate for their investment in entry. The higher their opportunity cost of time or capital, the less willing will they be to enter into an industry’s least sheltered — and thus least profitable — subgroups. Second, not all prospective entrants enjoy equal ability to overcome mobility barriers. Firms established in other businesses, with established managerial experience, access to working capital and the appropriate personal connections, are more important prospective entrants to groups protected by mobility barriers than are others. If there exists social differentiation (e.g., by age, ethnicity, or gender) along either of these dimensions, it will tend to replicate itself in the subgroup structure of the food marketing channel.

The existence of intra-industry groups separated by mobility barriers also suggests that a firm’s initial entry choice may be determined, in part, by its longer-run objectives of inter-group mobility, i.e., there may be entry paths. Direct entry into the most protected (and profitable) niches will not always yield the highest expected profits or may expose the entrant to excessive

downside risk if there are substantial sunk costs to *de novo* entry into the target group. It may be that indirect entry through a sequence of intra-industry moves offers higher long-term returns or less downside risk. Such sequential planning by firms can induce greater-than-expected entry into particular industry subgroups that serve as effective indirect paths to more profitable niches.

Mobility Barriers in Malagasy Food Marketing

Madagascar provides an excellent case study for examining the effects of food marketing liberalization. Madagascar had a single-channel, parastatal food marketing system for roughly a decade prior to relatively early and comprehensive liberal reforms in food marketing. This section describes the food marketing channel of the Vakinankaratra region of Madagascar's central highlands from qualitative interview findings and quantitative survey data. These data reveal a food marketing channel with distinct subgroups created by identifiable mobility barriers. The evidence suggests that entry has been concentrated in the least protected niches of the marketing channel, that the most sheltered subgroups remain quite small and that entrants into these niches enjoyed some tangible competitive advantage over other newcomers. In short, the evidence is consistent with the mobility barriers model.

From 1983 the Malagasy government enforced a legal monopsony in the purchase of rice, maize, manioc and dried beans (as well as several export commodities not discussed in this paper), and a monopoly in the processing, distribution and commercial storage of these commodities. While there existed an active parallel market, official purchases of rice, the principal crop, represented at least half of domestic marketed volumes (AIRD, 1984), and the state similarly dominated other crops at most times and across much of the island. The state's

dominance in food marketing was helped by an enforcement agency, the *Brigade Mixte d'Intervention Economique*, which seized illegal commercial stocks and arrested (selectively) those caught trading illegally.

The World Bank's 1983 report on Madagascar claimed that "first and foremost, fundamental reforms in [food] marketing and pricing systems are needed" (World Bank, 1983, p. iii). Heavy state controls were blamed for stagnating food production, a retreat toward subsistence by farmers, and, by extension, the nation's skyrocketing food import bill. Liberalization began with a decree in May 1983 announcing, but not fully implementing, free competition in food marketing channels. The government introduced more durable and comprehensive reforms in concert with a World Bank agricultural sector adjustment credit in 1986. By the second half of the 1980's the government had made a stark shift from government-administered pricing, processing and distribution to a network of fully freed trade in food agriculture. While reforms have been unevenly agreed and implemented, Madagascar was held up by the IMF and the World Bank in the late 1980's and early 1990's as a model for other African reformers (Rajcoomar, 1991; Barrett, 1994). In the area of food marketing liberalization, Madagascar went further and earlier than most other African reformers.

The Vakinankaratra region lies in the center of the nation, in the highlands to the south of Antananarivo, the nation's capital. With Antsirabe at its semi-urban center, the Vakinankaratra is, by Malagasy standards, a densely populated region (~70 inhabitants/km²) with higher-than-average incomes. The physical infrastructure is better than the Malagasy norm, although still rudimentary. There are two paved, all-weather roads through the region, both passing through Antsirabe, and a rail spur to Antananarivo. The predominantly Merina communities of the

countryside are organized administratively into villages (*fokontany*) of about 1200 persons and regions (*fivondronana*) of 1,000 or so km². The *fokontany* of the Vakinankaratra are almost evenly divided in thirds between those within 8 kilometers of a hard-surfaced, all-weather road, those 8-30 kilometers from an all-weather road, and those greater than 30 kilometers' distance. With an average altitude of 1400 meters and rugged terrain, physical access to market can thus be difficult. A network of periodic (weekly) markets provides the commercial backbone to the agricultural communities of the Vakinankaratra. Few market towns have much economic activity outside agriculture or agricultural marketing: just a few general goods stores, and a few artisans. Moderate seasonal rainfall and topographic variation give the Vakinankaratra an unusually diverse agriculture, based on seasonal irrigated rice cultivation (grown October-May), traditional rainfed grains, roots and tubers, vegetables, dairy cattle and both tropical (e.g., banana, orange) and temperate (e.g., apple, peach, pear) fruits. Most years the Vakinankaratra is a net importer of rice, maize and manioc — the staple foods for humans and livestock — and a net exporter of roots, tubers, fruits, vegetables and dairy products.

The food marketing channel can be identified by functional, spatial or temporal characteristics. The former provide the basis for analysis here, although spatial and temporal issues will emerge at several junctures. Based on existing studies of food marketing in Madagascar (AIRD, 1984; Abt Associates, 1990; Azam et al., 1993; Leplaideur, 1993) we structured the survey instrument described in the next section around five distinct functional areas. Collection concerns the initial entry of crop into the commercial marketing channel, transport of course concerns spatial movement of a commodity, processing is characterized by transformation of the form of the commodity (e.g., milling paddy into rice), interseasonal storage

was defined as the maintenance of stocks for more than three months, with at least half the inventory being sold, and vending represents the delivery of commodity to consumers. While there are a few vertically integrated firms in the Vakinankaratra food marketing channel — notably the remaining state enterprise (SINPA) and a few private spin-offs of former parastatals — there is considerable functional specialization. The average survey respondent undertook 1.20 food marketing functions in 1992-93.²

As one observes food marketing in the Vakinankaratra and examines the data, it quickly becomes apparent that not only are there functional divisions, but there are also quite distinct subgroups within functional areas with considerable variation across subgroups in enterprise structure and strategy. Farmers, market intermediaries and consumers all quickly call one's attention to such differentiation. As the theory of mobility barriers suggests, intermediaries tend to see their welfare as closely bound up with that of their subgroup brethren and cooperate accordingly. Thus, retailers at periodic markets mind each others' stalls when necessary, ox- cart drivers (*charettiers*) travel together to guard against road bandits and reciprocate in loading and unloading wagons, and truck drivers share fuel from spare jerry cans among themselves. Cooperation can also be hostile toward other groups, as when local collectors band together to block roads in order to impede outside competitors' access.

Before launching into the next section's detailed description of the subgroups of the

² Horizontal integration (i.e., across products) is far more common. The sample average was 3.58 products handled per intermediary, with more than half the respondents handling multiple products. This likely reflects not only seasonal complementarity among crops with different agricultural calendars, but also risk diversification and economies of scope in market intermediation.

Vakinankaratra food marketing channel, it may be appropriate to highlight the mobility barriers that keep these subgroups distinct. As the data quickly reveal, there are five major, interrelated barriers to intergroup movement within the Vakinankaratra food marketing channel. First, there is an important element of "product" differentiation associated with interlinked contracts, which are especially important in crop collection. Much as Crow and Murshid (1994) find tied sales common in relatively backward areas of Bangladesh, so too are crop sales commonly associated with other transactions, especially for credit, in the Vakinankaratra. Whatever the genesis of the original interlinkages — e.g., imperfect information and enforcement capacity, transactions costs — the existence of interlinked contracts impedes the ability of entrants to strike separate spot market contracts according to comparative advantage. Interlinked contracting institutions can persist indefinitely, even if they are dysfunctional (Akerlof, 1984).

The second crucial mobility barrier is capital access. Studies across Africa repeatedly find finance a binding constraint on small enterprise investment and growth (Steel and Webster, 1992; Daniels, 1995). Zeller's (1994) study of rural finance in this region reveals credit rationing and informal sector loans rarely exceeding a couple months' duration, while less than 2% of formal credit in Madagascar went to agriculture (including marketing) in the early 1990's, and less than 10% of agricultural intermediaries received any formal sector credit (World Bank, 1991). Thus only those with independent access to working capital can enter subgroups requiring substantial start-up costs or inventories.

Fixed costs can be substantial in some subgroups, particularly since there is little rental market for commercial equipment. Respondents rented, on average, less than 2% of their trade equipment, by value. Moreover, respondents declared more than half of their fixed costs sunk

(i.e., irrecoverable, defined as purchase price less salvage value). Sunk costs are thus the third major root of mobility barriers in food marketing since irreversibilities discourage entry into subgroups with relatively high sunk costs (Caves and Porter, 1977; Baumol, 1982; Sutton, 1991; Dixit and Pindyck, 1994). Moreover, the investment disincentive effects of sunk costs increase with temporal uncertainty in prices, even if firms are risk neutral (Chavas, 1994). Since liberalization seems to have brought increased food price variability (Barrett, 1995b), particularly in rural areas (Barrett, forthcoming), the importance of sunk costs as a mobility barrier has likely increased in rural food marketing.

Fourth, the risks of intermediation transcend the "normal" business risks and include considerable political risk. As Bryceson puts it in describing Tanzania's liberalization, the ideological "legacy of traders as pariah could not be removed at the stroke of a pen," (1993, p. 101). Shortly after the first, tentative steps toward marketing liberalization in 1983, the central government released decree 2683, which required grains traders to secure a license from the local jurisdiction (*fivondronana*), for which intermediaries had to agree to pay the FMG2/kg commissions that village-level authorities (*fokontany*) had previously received (supposedly) from parastatal marketing agencies. Despite the repeal of decree 2683 several years later, many jurisdictions continue to enforce it, with *fokontany* economic committees (*vatoeka*) refusing to permit outsiders to collect crop within their area, sometimes erecting road barriers to complement the moral suasion they exercise locally (Berg, 1989; Azam et al., 1993; Barrett, 1994).

Moreover, past government actions discourage investments necessary to move into a more capital-intensive and more profitable subgroups. In the course of the socialist revolutionary transition of 1972-75, many private marketing intermediaries lost their investments in silos,

vehicles, and warehouses to government expropriation (Pryor, 1990). Like other African nationalization episodes, ethnic Asians suffered disproportionately from government asset expropriation and monopolization of marketing channels. With memories of these losses still fresh, continuing political uncertainty in Madagascar has dominated government expressions of commitment to honor private property rights, and many private businessmen express reluctance to invest in expropriable assets,³, especially ethnic Asians, who have been targeted in thuggery and food riots since liberalization began (Mukonoweshuro, 1990; Barrett, 1994).

Moreover, panseasonal and panterritorial pricing policies create strong disincentives to invest in silos, trucks and other fixed assets necessary to intertemporal or spatial arbitrage. Government policy thus leaves a legacy of limited storage and motorized transport capacity, which a balance of payments crisis, currency controls and sharp monetary contraction prolong by making it difficult to borrow for fixed capital formation or to import foreign-made capital. Mainly former state trading companies (e.g., SINPA) or those who served as subcontractors for state companies have the capital to undertake large-scale intermediation.

Finally, in addition to capital access and related to government obstruction, firms in certain subgroups must have connections to supply crucial spare parts and energy inputs. In an economy plagued by foreign exchange rationing and fuel and electricity supply disruptions, one must have a network to surmount such obstacles in order to succeed in mechanical niches of the marketing channel.

³ Dioné (1989) reports similar reluctance to undertake fixed investment in Mali in the wake of food marketing liberalization.

The Functional Subgroups of Food Marketing

This section describes the functional subgroups of the Vakinankaratra food marketing channel and the mobility barriers that keep them distinct. The data come from open-ended interviews conducted with farmers, traders and local leaders in 1992 and 1993, and from a survey fielded among food marketing intermediaries in the second half of 1993. Using cluster sampling techniques, nine periodic markets⁴ (shown in Figure 1) were chosen in which we constructed sampling frames⁵ of marketing intermediaries in five functional areas — collectors, transporters, processors, interseasonal stockers, and vendors — for fourteen food commodities. From these we drew a sample 267 enterprises, stratified by the functional areas, and ultimately compiled a usable sample of 261 respondents.⁶ There is likely some underrepresentation of itinerant, village-level subcollectors (discussed below) in the sampling frame, but otherwise there do not appear to be any serious statistical bias in the sample. While accurate measurement of intermediary costs or enterprise market shares proved infeasible, the survey revenue data nonetheless appear reliable, as do basic structural characteristics of firms, their market histories, equipment inventories, and operators' assessments of market conditions. Therefore, gross

⁴ Ambohibary, Ambondromisotra, Antanifotsy, Faratsiho, Iandratsay, Manandona, Mandoto, Soanindrariny and Vinaninony.

⁵ The sampling frames were built from lists of registered traders and, especially, interviews with scores of local officials, farmers and market participants. In all, our census enumerated 1,558 marketing intermediaries in these nine markets, more than seven times the total number of registered traders.

⁶ A detailed description of the survey methods, the spatial distribution of non-responses, the joint distribution of respondents across location, activity and products, etc. is available from the author on request.

revenues and firm structural characteristics serve to differentiate among industry subgroups in this paper.

The vast majority (93%) of surveyed intermediaries are or were farmers themselves. Men ran 57% of the sample enterprises, women 43%. Better than 90% of the intermediaries employed fewer than five people, and all but 3% of the operators reside in the Vakinankaratra. Most of the 37% who were active in food marketing prior to liberalization had no commercial relationship to the state food marketing channel prior to liberalization. Liberalization resulted not so much in the emergence of a private food marketing channel as in the expansion and recognition of that which already existed.

Crop Collection and Assembly:

While the Vakinankaratra has high population density and purchasing power by Malagasy standards, it remains a semi-subsistence agricultural economy, with only 25-33% of agricultural production marketed (AIRD, 1984; Place, 1991). Low spatial density of marketable surplus and consumption in rural areas sharply limits the number of external collectors willing to service villages since wholesale collectors need a minimum volume of throughput to cover their transactions costs. These minimum efficient scale obstacles are reinforced by occasional local government barriers to outsider entry of the sorts discussed earlier (e.g., road blocks). As a consequence, the only products collected directly from villages are major grains, roots and tubers.⁷ Producers of low volume crops like cabbage, oranges and tomatoes must take their crop

⁷ In locations with especially good growing conditions and high volumes there are also seasonal village-level collections of temperate fruits (apples especially) and vegetables (mainly carrots).

to periodic markets for sale. None of the village-level collectors in the survey handled these crops and none of the 67 surveyed intermediaries who handled one or more of these three commodities collected them at farm-level. But even in the major crops, village-level collection is limited. Nationally, a 1990 survey of 825 rice farming households found that only 29% had sales outlets to more than one collector, and that figure fell to only 6% outside the central highlands (Bernier and Dorosh, 1993).

The relative economic inaccessibility of villages leads to the existence of two distinct subgroups in crop collection and assembly: subcollectors and wholesale collectors. Subcollectors resident in villages are usually the initial purchasers of commercialized grains, roots and tubers. Subcollectors tend to be farmers or petty merchants who buy crops for bulk resale to wholesale collectors. Wholesale collectors contract with a network of village subcollectors and also purchase crop from processors and periodic market vendors in towns. There is thus a hierarchical relationship between subcollectors and wholesale collectors, with produce flowing from the former to the latter and credit moving the opposite direction. Table 1 presents some of the basic structural differences between these two subgroups.

All surveyed subcollectors lived in one of the *fokontany* from which they collect crops. They tend to have a small geographic range, 5.7 *fokontany* on average (with a modal value of 1). Few were associated with the state marketing system and 70.0% began subcollection since liberalization.⁸ Since respondents report few profits to subcollection and the sunk costs in entry are relatively low, the massive rate of entry into subcollection is most likely the product of

⁸ Note that this is not an estimate of entry rates into the subgroup since we have no information on firms that entered and subsequently exited the industry.

excess labor supply looking for additional income-earning opportunities.⁹ A large proportion of Malagasy farmers are net food buyers and suffered significant welfare losses from the price increases associated with liberalization (Barrett and Dorosh, 1995). A natural response to such welfare loss is to commit additional labor time to income generation (substituting away from leisure), and such household's hurdle rate of return will be relatively low, so they are willing to enter low-profit niches that others might pass up. While the survey data don't cover land holdings and longevity of residence, recent immigrants lacking access to sufficient irrigable lowlands appear disproportionately among the subcollector population. This further suggests that entry into crop subcollection is probably driven largely by excess labor supply, as does the fact that 95.2% of subcollectors use the proceeds of these activities for the purchase of agricultural inputs for their own use of to increase their own nondurables consumption.

A high rate of subcollector start-ups helps explain the spatial broadening of crop collection reported by some observers (Abt Associates, 1990). Although a minority (28.6%) of subcollectors have expanded their collection area, the added number of sub-collectors reach out further into the hinterland to purchase crops for market, although the marginal increase in quantity collected from the expanded frontier cannot be established and is unlikely to be very large.

Subcollection is founded on personal relationships often observable in interlinked contracts. Note that the subcollectors cite personal reputation and relations as the most important

⁹ Many small enterprises begin not for demand-pull reasons related to emerging profit opportunities, but to supply-push reasons associated with surplus labor (Steel and Webster, 1992; Liedholm, McPherson and Chuta, 1994; Daniels, 1995; Steel, 1995).

ingredient to successful operations (Table 2). These relations extend both down to the farmers from whom they obtain produce and up to the wholesalers to whom they sell an assembled crop. Within the village there are few land contracts (involving only 14.3% of subcollectors), but most subcollectors hire labor from households from whom they purchase, 23.8% sell them consumption goods, and 57.1% extend them loans. Many of these loans are advances against a crop. Most subcollectors (52.4%) buy crop forward, and those buying forward account for 71.9% of total subcollectors' revenues. All crop purchases involve cash and 71.4 percent of subcollectors only undertake cash transactions, none in kind. Purchase volumes are usually recorded in kilograms, not in sacks (a wholesale level unit measure) or *kapoaka* (a retail level unit measure).¹⁰

Subcollectors must gather enough marketed volume of a crop to make it worth a wholesale collector's while to send a truck to gather the marketed crop. In the event that subcollectors in an area don't generate sufficient volume to justify pick-up, they must then hire an ox-cart to take the collected crop to a truck-accessible pick-up point, often at a periodic market site. With poor communications infrastructure, it is difficult for a wholesale collector to establish what volume a subcollector has amassed. When asked how they decide whether to fetch the crop themselves (at their expense) or to have the subcollector evacuate it (at the subcollector's expense), most reported using the previous season's experience with that subcollector as a guide. Only if the subcollector generated substantial collected volume the preceding year, will the collector come evacuate it at his expense. Reputation and past

¹⁰ The *kapoaka* is a small tin, generally a Nestle condensed milk can, that holds about 285 grams of milled rice.

performance thus matter.¹¹ Subcollectors sometimes they sell on the spot market, to collectors, processors (who also get credit from the formal financial system) or directly to consumers at periodic markets.

Most subcollectors finance their operations through buyers' credits; less than 10% used any bank financing. They contract with a wholesale collector or a processor to deliver a certain crop volume and get a credit advance on this delivery. These loans have no collateral associated with them, again highlighting the importance of personal reputation to subcollection. An interesting phenomenon is that only one-third of the wholesale collectors believe themselves to have an exclusive buying arrangement with their subcollectors and yet these credits flow routinely. Subcollectors try to leverage buyers' credits, using the advance to buy a crop, sell it on the spot market for a profit, and then repurchase the originally contracted volume for delivery to the lending wholesaler. In this way bank credits concentrated in their disbursement to a few established wholesale collectors de facto finance the collection of a much larger cohort of intermediaries.

Where subcollectors' comparative advantage lies in personal reputation and presence in a village, wholesale collectors enjoy superior access to market information and credit. Wholesale collectors need not live in any of the *fokontany* from which they collect crop, and they cover a far larger geographic area, 40.1 *fokontany* on average. The average wholesale collector buys from a network of 7.7 subcollectors, two-thirds of whom are only seasonal suppliers. Wholesale collectors are relatively more likely to have, presently or in the past, a commercial affiliation

¹¹ This can be understood as a variant of the assurance game, described by Platteau (1994) in the context of market institutions.

with the state marketing channel and only one-third of the surveyed wholesale collectors have entered since 1986.

Why has entry into wholesale collection been so much less than into subcollection, especially since there is widespread belief that wholesale collection returns handsome profits? The answers lie largely in Tables 1 and 2. First, and most importantly, wholesale collection demands considerable capital access, both to cover the sunk costs of entry, which average 25 times those of subcollection, and to provide advances to a network of subcollectors. The returns to investment appear quite high. The simple bivariate regression of the natural logarithm of gross annual revenues on the logarithm of sunk costs yields a coefficient of 0.56, suggesting that equipment investments pay for themselves in just a few years in crop collection.¹² Almost all (86.7%) wholesale collectors extend loans to subcollectors. A relatively large proportion of wholesale collectors used bank credit (46.7%), and most also secured advances from buyers (generally retailer-wholesalers or large retailers). Finance in Madagascar in general and in the Vakinankaratra in particular is characterized by significant credit rationing (Zeller, 1994). Only a small subpopulation of traders receive formal sector credits and informal credit is of limited use for wholesale collection because of maturity and volume limits. Formal (i.e., banking) credit for food agriculture is almost wholly concentrated on rice and is disbursed through two types of intermediaries: collectors and processors.

The second major reason for limited entry into wholesale collection concerns access to bulk transport. Subcollectors want evidence that a wholesaler can come collect assembled crop,

¹² The OLS regression results are $\ln(\text{Revenues}) = 10.45 + 0.56 \ln(\text{sunk costs})$. With a t-statistic of 3.73 on the coefficient estimate and an $r^2 = 0.40$.

since they want to incur neither the cost of moving the crop to market nor the risk of loss in the event the collector never arrives. The biggest wholesale collectors have vehicles of their own or longstanding relations with independent truckers (see next section). While perhaps less important than in subcollection, personal reputation and connections also matter at the wholesale collection level since one must get physical access to a market. Local officials are often inclined to forcibly exclude those lacking suitable personal connections.

In addition to their subcollector networks, wholesale collectors also purchase in bulk at periodic markets and from town-based processors, frequently intercepting ox carts laden with produce as they enter the market town, then evacuating larger, consolidated shipments by truck to urban centers for sale to retailers and retailer-wholesalers, many of whom transship to other regions. Periodic markets are thus both retail sales and wholesaling locations.

Direct evacuation of crop, bypassing the local channel of subcollectors and periodic markets, is fairly rare and concentrated in just a few commodities and represents only about 15% of marketed crop volume. There are a few irrigated perimeters in the Vakinankaratra where farmer co-ops have formed and agreed to contracts directly with wholesale collectors who come shortly after harvest to evacuate several dozen tons of rice directly to cities. Direct evacuation is more common as a seasonal practice for specialty crops grown in bulk in particular locations: e.g., carrots (in Ambohibary), apples (in Soanindrariny) or potatoes (in Faratsiho). For instance, TIKO, a dairy processor that has diversified into boxed fruit juices, contracts with agents to collect oranges and apples meeting their quality standards in bulk from growing regions for direct evacuation to the processing facility.

Wholesale food collection is concentrated in the Vakinankaratra. Our survey uncovered

an average of only 1.5 pure wholesale collectors¹³ per periodic market area. This concentration can be maintained because the sunk costs to entry into the subgroup are relatively high and the keys to successful operations are access to credit, which is sharply rationed in the region, and capacity to ensure crop evacuation, which is constrained by transport availability. There are many anecdotal reports that private traders, often families with strong ties to the ruling party, collude in the collection of rice, maize, beans, manioc and fruits (Berg, 1989; Abt Associates, 1991; Kristjanson and Martin, 1991; Azam et al., 1993). Both anecdotal and survey evidence suggest that the wholesale collection subgroup is difficult to enter, thereby affording its members opportunities to collude, at least episodically.

Transport:

Transportation functions have distinct subgroups analogous to those in crop collection and assembly, i.e., likewise driven by geographic scale, throughput volume and sunk costs. The simple distinction is between short-haul, ox carts and long-haul, motorized transporters. Table 3 reflects the structural and behavioral differences between the two subgroups.

Ox cart transporters (*charretiers*), like subcollectors, tend to operate in narrow geographic domains, picking up crop at farms and taking it to periodic markets for processing, sale, or both. They are somewhat more likely to reside in the same area they work and more than twice as likely as truckers to use the proceeds of their trade to purchase agricultural inputs for their own farm or to increase household nondurables consumption. Charretiers were less than

¹³ By “pure” wholesale collectors I mean collectors who only buy from subcollectors, not from farmers directly. This is a proper subset of the wholesale collectors identified in Table 1, who are defined as those who buy from subcollectors, whether or not they also purchase directly from farmers.

one-third as likely as truckers to have ties to the state marketing channel. They have far less access to credit, either formal or informal, than do motorized transporters and thus rely far more heavily on their own farm revenues to finance transport operations. The cattle used to pull carts are almost always draught animals who also serve ceremonial and wealth accumulation functions in the Vakinankaratra. A majority of the surveyed *charretti*ers began transport operations since liberalization. Given the low cost of entry into this subgroup (particularly for households already owning cattle), and the seemingly low rate of profit from ox cart transport it again appears reasonable to conclude that much of this entry is in response to continued recession rather than to newfound rents. Unlike long-haul, motorized transport, short-haul ox-cart transport is atomistic. Cattle have a special place in Malagasy society, so every village has several households with animals capable of pulling a cart. Typically the *charrettier* earns a small fee for transporting neighbors' crops to market.

Like the other village-based activities in the food marketing channel, personal reputation and relationships are cited as the most important factor in success as a *charrettier* (Table 4). This likely follows from both the obvious need for clients to trust the *charrettier*'s reliability in handling and delivering cargo, as well as because ox carts tend to travel in convoys now for mutual security against bandits.

Natural economies of scale in long-haul, motorized transport are accentuated by the state of the road system, physical security problems in rural areas and the problems of spare parts and fuel availability. Most motorized transporters have more than one truck in order to realize economies of scale in spare parts inventorying (including the ability to cannibalize a vehicle for spare parts for another) and to be able to redirect vehicles to ensure cargoes don't perish and

important pick-up or delivery dates aren't missed. Unlike *charrettiere*s, truckers cite access to spare parts and fuel and a broad route network as the keys to success in food transport. While fewer than 3% of *charrettiere*s move crop between more than 2 *fivondronana*,¹⁴ 75 percent of the truckers have a network exceeding 2 *fivondronana*. Trucks obviously perform the interregional transport functions of the food marketing channel.

There are very few long-haul motorized transporters operating in the Vakinankaratra, a majority of which are run by ethnic Asians operating from an urban base. Ethnicity factors in for several reasons. First, it provides improved information flow in a spatially extended route network within a nation of poor communications infrastructure and weak legal institutions for contract enforcement. Second, a large proportion of Madagascar's truck fleet are imported used from Asia (Indian, Japanese and Chinese makes). Overseas contacts facilitate spare parts procurement, which is essential to keeping a truck fleet rolling on Madagascar's battered road network. Third, Asian traders controlled much of the food marketing network relinquished by the French at independence in 1960, but suffered large-scale asset expropriation in the early 1970s' nationalization of the food marketing channel. These families have relatively generous savings but report reluctance to invest in fixed assets (e.g., warehouses, mills) that are more easily seized. Trucks are widely seen as a safer investment by Asian intermediaries, especially in the wake of riots against Indian and Pakistani wholesalers and retailers in the mid-1980s as initial liberalization efforts brought sharp interseasonal grains price increases. Trucking is perceived as

¹⁴ Moreover, these two were based in the Ambohibary market, only about 15 kilometers distance from the neighboring *fivondronana* to both the east and the west.

a less visible form of intermediation than wholesaling or interseasonal storage.¹⁵

Only about one-quarter of the surveyed truckers began operations in the preceding eight years, since liberalization was largely completed. This low rate of entry into the subgroup is almost surely due to the considerable sunk costs involved in long-haul, motorized transport, averaging slightly more than US\$100,000 in sample. As in crop collection, the returns to such investments are great, with a 1.0% increase in sunk costs associated with a 0.8% increase in annual revenues.¹⁶ Entry into this subgroup of the marketing channel also turns on technical expertise. Aptitude in vehicle maintenance and (safe) fuel storage are important to management of a trucking enterprise, and the typical peasant probably doesn't possess such skills, nor has he access to appropriate vocational training.

Given widespread evidence of significant post-liberalization spatial market segmentation in Madagascar (Barrett, 1995a), it is apparent that long-haul motorized transport remains a serious bottleneck in the food marketing channel. Reforms to date have done little to relieve these pressures.

Processing/Milling:

The principal products in the Vakinankaratra food marketing channel, rice and maize, generally require processing prior to human consumption. Most grain production is retained for

¹⁵ It is difficult to overstate the sensitivity of ethnic Asian food marketing intermediaries to the political risks of their trade. For example, most Asian respondents (about ten percent of the total sample) refused to be interviewed in Malagasy by my local research assistants and would only consent to private interviews in French with the (caucasian) author alone.

¹⁶ The OLS regression results are $\ln(\text{Revenues}) = 1.45 + 0.82 \ln(\text{sunk costs})$, with a t-statistic of 13.67 on the coefficient estimate and an $r^2 = 0.67$.

home consumption and artisanally milled within the household. That which enters the commercial marketing circuit, however, is generally mechanically milled for a small fee per kilogram of raw product. Even processing operations that are vertically integrated into a large wholesaler's operation (e.g., the mills for SINPA, the former state monopoly) dehusk paddy, grind maize or shred desiccated manioc for external clients for a fee. The customer base for commercial food processors in the Vakinankaratra — almost entirely paddy and maize mills — is thus largely small-to-medium sized independent collectors (served by 50% of the respondents) and producers who sell crop at periodic markets (served by 83% of sample processors).

Mills are almost always located near larger towns for several reasons. First, few rural residents have the capital necessary to purchase milling equipment; the sunk costs involved are considerable relative to average annual income. Second, one needs a reliable source of power, and electricity and fuel stations are only available in large towns. Electricity is cheaper and thus the preferred source of power, used by more than half the respondents. Mills in the smallest towns (e.g., Ambondromisotra, Vinaninony), however, uniformly rely on hydrocarbon fuels, usually diesel, since rural electrification is sparse. Reliable energy availability is problem most commonly cited by sample processors (91.7%). Third, few villages have sufficient volume of crop needing mechanical milling to justify rural investment in processing machinery. Mills concentrate near the periodic markets through which bulk grain moves.

While there is no standardized machinery used for milling — especially in smaller towns, the mills are an impressive mix of parts cannibalized from broken-down vehicles — the sunk costs to entry into processing are nonetheless considerable, averaging FMG34.292 million in the sample. The variety of equipment in use leads to variation in milling yields, from 63-73% by

weight in converting paddy to rice. Rice milling yields averaged 69% across the processors in the sample, with an average annual volume of 23.8 metric tons processed per mill. The larger, more expensive mills have a somewhat higher yield; the three largest volume millers had yields of 71-73 percent.¹⁷

Given the high sunk costs to entry, the technical skills required to maintain and operate the machinery and the necessary access to spare parts and fuel, one would expect to find few recent entrants into the processing subgroup. Yet 75% of the respondents began operations since liberalization, the highest proportion of recent entrants of any subgroup. While this at first seems puzzling, there exist two primary reasons for this entry pattern. First, processors are the other point, besides crop collection, at which formal credit enters the food marketing channel and they quickly develop a large network of clients among subcollectors who have had to evacuate a crop from the countryside to a periodic market. Several rice mill operators openly identified processing as an intermediary step toward their longer-range objective of becoming wholesale paddy collectors, which they perceive as the most lucrative subgroup in the food marketing channel. 83% of processors have used their receipts to expand into or save for future expansion into other intermediation activities. Recall that the theory of mobility barriers suggests there may be indirect entry paths to well-protected subgroups. That notion appears to go some way toward explaining the high rate of entry into processing. Because the national agricultural development bank disburses agricultural marketing credit only to collectors and processors, processing is a means to establish access to bank credit. 41.7% of the sample processors accessed bank credit,

¹⁷ The weighted average yield (by volume) is thus somewhat higher: 71.1%.

well above the sample average, although processors don't consider credit access an especially important issue to successful mill operation (Table 5). Furthermore, since independent subcollectors commonly process or sell assembled crop to town-based mills, processing also provides an unusually good means to establish a network of subcollectors, the other key element to successful wholesale collection strategy besides access to working capital (although Table 5 suggests establishing such a network is not deemed particularly crucial to milling per se).

The second reason for high rates of entry into processing is that milling is a natural step toward vertically integrated pork production. Leplaideur (1993) finds that 86% of rice mill proprietors in his non-random survey raise hogs. Hogs have been growing in popularity among Vakinankaratra farmers because they are far more difficult to steal than cattle. All but one processor in my sample retained the crop residues from processing. All those who retained crop residues used part of it as feed for their own livestock and two-thirds sold rice husks as livestock feed. The returns to grain milling in the Vakinankaratra are thus partly found in the sale of livestock and feed.

Since almost all consumers, at least outside the biggest cities, engage in artisanal milling, there are strong competitive pressures from outside the mechanical milling subgroup that limit its fees and profits. Despite high entry costs and the widespread perception that there are limited profits to be made from grain milling, many food marketing intermediaries have begun grains processing since liberalization in the Vakinankaratra, indeed throughout Madagascar (Rassas, Rabenarivo and Meserve, 1988; Leplaideur, 1993). One reason is the spillover benefits associated with pork production, but an apparently important alternative explanation is intermediaries' perception of processing as a fruitful platform for entry into the more lucrative

wholesale grains collection subgroup.

Interseasonal Storage:

All food marketing intermediaries store transitional stocks of produce, but the vast majority of these stocks are held in unimproved sites (e.g., a room in a home, under a tarp outside) and move within several weeks, if not days. Likewise producer households retain food stocks interseasonally, but most household storage is for auto-consumption. Interseasonal commercial food storage is surprisingly rare in the Vakinankaratra.

We defined commercial interseasonal storage as the holding of stocks for more than three months, at least half of which is ultimately sold. While there is certainly some storage and subsequent sale on-farm, no farmers met this definition of an interseasonal stocker. Indeed, in the entire sample frame we could only identify 36 intermediaries that met this definition, and all of these vertically integrate commercial interseasonal storage into wholesale collection or distribution. Moreover, 93% of respondents' aggregate interseasonal storage capacity is located in the urban center of Antsirabe. This pattern of heavy urban concentration of commercial grains storage is consistent with national evidence that 50-75% of all grains storage capacity resides in the capital city, Antananarivo, and the two major ports of Mahajanga and Toamasina (Barrett, forthcoming).

The explanation traders most commonly give for the dearth of interseasonal commercial storage is political risk. Perhaps the most politically sensitive area of food marketing in Madagascar is interseasonal storage. Most rice farmers are net buyers (Barrett and Dorosh, 1995) and undernutrition is widespread during the *soudure* (hungry season) each year. Politicians and the press routinely rail against "exploitative speculators". The well-known excess

storage capacity of the public food marketing enterprise, SINPA, poses a threat of price warfare against speculative stockers, and a history of asset expropriation and occasional hungry season riots against commercial stockers creates strong disincentives for intermediaries to undertake interseasonal commercial food storage.

There could be significant net social gains to more commercial storage. Commercial stockers seem to experience substantially lower rates of crop loss than noncommercial (on-farm) stockers. The average storage loss rate, by weight, among surveyed stockers was only 1.7%, an order of magnitude lower than the loss rates recorded in the government's study of after-harvest loss rates (MPARA, 1977). Moreover, increased interseasonal storage does appear to stabilize prices, which rise quite sharply in the pre-harvest hungry season, causing nutritional problems among the nation's poor. Toward this end, the government (through the Ministry of Agriculture's food security directorate) has been engaged for the past several years in helping construct community grain stores (GCVs, for *gréniers communautés villageoises*), wherein members of a community association deposit modest amounts of grain in a village-based warehouse (most having an 8-ton capacity of paddy). These persons are advanced credit by the national agricultural development bank (BTM) using the stored, locked grain reserve as collateral. Six to eight months later the "paddy bank" is unlocked, the bank loan repaid, and the farmers generally sell some portion of the stored grain on local markets.

As a crude indicator of the effect of these facilities on the interseasonal variability of rice prices, I regressed the coefficient of variation of the weekly rice prices recorded on each of the nine survey periodic markets over the course of the 1992-93 growing season on the number of GCVs located in that market area. The OLS results were that each GCV reduces the coefficient

of rice price variation by 0.04, with a t-statistic of 4.16 on this coefficient estimate (and an $r^2=0.31$ for the relation, including an intercept). While this is obviously a back-of-the-envelope method, the evidence suggests the GCVs are having measurable effects on interseasonal price stability, serving as a substitute for more traditional commercial interseasonal storage activities.

Only 20% of surveyed stockers began interseasonal storage since 1985, the lowest rate of entry of any subgroup in the survey. The low ratio of recent entrants into interseasonal storage likely follows from the significant political risks outlined earlier, the substantial sunk costs involved in building or buying appropriate warehousing space (FMG 56.5 million on average) and, especially, the considerable working capital demands of interseasonal grains storage. All the surveyed stockers cited financing as a problem. As a group they rated access to credit the most important variable in determining the success of storage operations (an average of 3.9 on the same 1-4 scale found in Tables 2, 4 and 5).¹⁸ 40% of stockers accessed bank credit, 70% used informal credit from family and friends and 80% drew on their own monetary savings to finance interseasonal grain holdings. Rice prices typically double over the course of the agricultural year (Barrett, 1995a), so there would seem to be considerable expected profits to be made on speculative interseasonal storage. By all accounts, however, credit rationing and the political risks of speculative activity discourage interseasonal arbitrage.

Insufficient interseasonal storage capacity is a serious problem in rural Madagascar and, it appears, many liberalized food marketing systems in Africa (Duncan and Jones, 1993; Jones, 1994; Coulter), although creative community-level innovations like the GCVs may mitigate the

¹⁸ Storage capacity (with a 3.4 mean) was the only other variable deemed very important to successful storage.

problem somewhat. Insufficient interseasonal storage begets significant variability in market supply and prices, particularly in rural areas relatively starved of commercial storage capacity (Barrett, forthcoming). Such price variability also serves to discourage fixed capital investment involving sunk costs in other subgroups of the food marketing channel.

Retail Distribution:

Food reaches market consumers in the rural areas of the Vakinankaratra through small stores in towns and villages, and through periodic market vendors. The periodic markets are especially important in the most rural areas, where there are likely to be few stores and those generally carry only a limited range of products. The periodic markets surveyed range in size from about 100 vendors (Vinaninony, a remote mountain location) to better than 1000 (Antanifotsy, just 2 kilometers from the main north-south highway and a railroad station). The markets themselves offer only rudimentary infrastructure: a few small stalls with sheet metal roofs for butchers and fish vendors, some thatched-roof stalls for retailers of fruits, vegetables, clothes and primary household products, and sometimes an open water source and a set of scales. Electricity, physical security protection, refrigeration, telephone service and temporary warehousing space are uncommon in these market places.

One can crudely distinguish between two subgroups in retail food distribution: casual retailers and retailer-wholesalers. Casual retailers sell out of the periodic markets to final consumers and in the smallest units of measure (kilograms and *kapoaka*). The key criterion is that they have no permanent installation, neither in the periodic market nor in a store. Most casual retailers report selling only on a seasonal basis or as a need for cash arises in the household (e.g., for medicines or ceremonial expenses). Casual retailers of staple grains, roots

and tubers, fruits and vegetables usually work in open air, on sisal mats, using small scales or tin cans (*kapoaka*) as measures. They tend to sell their own produce (Table 6), especially those selling perishable produce, 86.8% of whom grew at least some of what they sold. About 80% of casual retailers sell in only one *firaisana*, (roughly a town) the jurisdictional unit between *fokontany* and *fivondronana*.

Wholesaler-retailers, by contrast, have a permanent presence in the market, and have generally made some fixed investment in improved facilities (e.g., a store). These distributors sell not only on a retail basis to final consumers (in *kapoaka* and kilograms) but also on wholesale terms to other retailers (in kilograms and sacks). Almost half the wholesaler-retailers sell in more than one *firaisana* although participants in each subgroup usually live in the *firaisana* in which they sell. This indicates that peasants in remote villages, i.e., outside the market town *firaisana*, rarely sell their produce to final consumers at periodic markets. Rather, villagers sell to collectors, while farmers in or around towns frequently sell directly to final consumers at market.

Both casual retailers and wholesaler-retailers use sales proceeds to increase their own nondurables consumption and to purchase agricultural inputs for their own production, but wholesaler-retailers are almost twice as likely to invest sales proceeds back into their retailing operations. Given their more permanent presence in the market, it is little surprise that wholesaler-retailers are far more likely than casual retailers to receive credit, whether formal, bank loans (16.2% versus 2.8%) or informal loans from family and friends (63.2% versus 38.2%). Wholesaler-retailers are more likely to use their own monetary savings than farm revenues to help finance commercial operations, while casual retailers depend heavily on farm

revenues for necessary working capital.

Leplaideur (1993) claims there has been a doubling in the number of rice retailers, nationally, since 1986 and the survey evidence from the Vakinankaratra confirms this for the food marketing channel more generally. A larger proportion of casual retailers are new to the market since liberalization (57.7%) than of wholesaler-retailers (40.5%), as might be expected by the definitions of the subgroups: wholesaler-retailers must make a greater commitment. This is also partly a consequence of the sunk costs to entry, which are small in both subgroups but particularly so in the case of casual retailing, which requires little more than a few sacks or sisal baskets and a measure. Most periodic markets assess a daily vendors' charge, typically FMG100-500 (\$0.05-\$0.25), enabling casual retailers to tackle the (tiny) fixed cost of market participation on a weekly basis rather than as an initial lump sum. As in crop collection and transport, the data reflect a strong, positive relationship between retail distributors' sunk investments and annual gross revenues, with a 1.0% increase in retailers' sunk costs associated with a 0.4% increase in annual revenues, on average.¹⁹

Only about half the retailers of either subgroup deemed the availability of finance a problem for them, a far lower proportion than in other subgroups. Contract interlinkages were fairly uncommon, equipment maintenance is not an issue and there are no particular political risks to retail operations. Thus, in striking contrast to the other segments of the food marketing channel, retailers of both subgroups view pricing as the key issue to trading success (Table 7). Easy mobility into retail distribution makes this an almost paradigmatic competitive market,

¹⁹ The OLS regression results are $\ln(\text{Revenues}) = 10.51 + 0.43 \ln(\text{sunk costs})$, with a t-statistic of 8.60 on the coefficient estimate and an $r^2 = 0.25$.

wherein pricing and reputation are the key determinants of firm performance.

The principal bottlenecks in the food marketing system are clearly in wholesale collection, long-haul, motorized transport, and interseasonal storage. These subgroups are reasonably protected by a complex web of mobility barriers related to the weakness of the rural financial system, considerable sunk costs to subgroup entry, the legacy of panseasonal and panterritorial pricing that discouraged private fixed capital formation in food marketing, and the unfortunate history of asset expropriation and continued political uncertainty that continues to inhibit private investment. Nonetheless, marketing liberalization has brought considerable entry into other subgroups in the food marketing channel, if often apparently by individuals looking to compensate for declining real wages and farm productivity. induce increased competition in important subgroups.

Social Differentiation in the Food Marketing Channel

Unless one subscribes to a purist version of Marxist or Walrasian social science, in which all market participants are intrinsically anonymous, then social identity matters to one's place in the complex matrix of food marketing activities. It is exceedingly difficult, if not impossible, to disentangle individuals' market and social identities. This section calls attention to the social differentiation apparent in the survey data on the Vakinankaratra food marketing channel.

The feminist literature on development has long claimed that women are often marginalized and excluded from market opportunities, if not harmed outright by the process of agricultural commercialization (Boserup, 1970; Beneria and Sen, 1981). The more recent feminist literature on economic liberalization echoes these themes, focusing on how market-

oriented reforms often reinforce barriers to women's participation in markets (Gladwin, 1991; Elson, 1992). While the evidence from Madagascar is inconclusive with respect to the welfare effects of liberalization on women, it does reveal structural patterns in the food marketing chain participation of women, farmers and persons affiliated with government. In particular, the data suggest that women, farmers and the not-well-connected have a far more difficult time overcoming mobility barriers to entry into more protected, higher profit subgroups in the marketing channel. These less privileged groups access primarily the easy-entry, highly competitive, low-return subgroups of subcollection, short-haul ox cart transport, and casual retailing. In part this is likely due to socially differentiated opportunity costs of entry. A well-connected town resident can earn more for himself than the returns to casual retailing and so won't enter that subgroup, while he might enter motorized transport or wholesale collection or distribution if he can raise the necessary capital to cover the fixed costs of entry.

As Table 8 indicates, women are disproportionately represented among the small vendors of foodstuffs, especially basic grains. 91% of surveyed women intermediaries were retailers, and 79% of women sold basic grains (maize or rice). The only subgroup dominated by women is casual retailing. This is the easiest segment of the marketing channel to enter, in that there are minimal sunk costs and no unusual demands for credit, technical skills or a network of contractual relations. By all accounts this is also the least profitable subgroup of the marketing channel. This echoes Steel and Webster's (1992, p.429) findings that "the problems women face in business in Ghana appear to arise mostly from their concentration in easy-entry, highly competitive activities and from gender-related differences in education and family responsibilities." If women face considerably greater domestic time demands (e.g., childcare,

food preparation) than do men, this may inhibit women's capacity to invest in more time-consuming marketing activities than irregular retailing and local collection. There are cultural obstacles to women's participation in mechanical activities such as processing and motorized transport and men handle the cattle in Merina culture, hence the low rate of female participation in short-haul transport. Moreover, Zeller (1994) finds that although women certainly have access to credit in Madagascar, it is almost solely very short-term, limited principal loans in the informal sector. Such finance is only suited to income-generating activities with high turnover rates, e.g., vegetable production and sale or the transformation and sale of rice.

Intermediaries with a position in local government or with commercial experience in the parastatal food marketing network appear in disproportionately large numbers in the wholesale collector, long-haul, motorized transporter and interseasonal stocker subgroups. Since most observers consider these the segments suffering the greatest bottlenecks — and offering the most lucrative opportunities — this suggests that social privilege brings its rewards in food trading. This of course makes sense, since the well-connected will have relatively high reservation wages, relatively larger (often salaried) income, and comparative advantage in coping with variable administrative requirements and local officials' corruption. The flip side of this is that farmers, being relatively more bound to the countryside and thus having inferior access to market information, are least likely to be involved in the subgroups requiring the greatest outlays for equipment (processing, interseasonal storage, long-haul motorized transport and wholesale collection). Of course these are also the most protected niches of the marketing channel.

Socially-Differentiated Experience of Liberalization

Since firms within an industry characterized by mobility barriers exhibit intergroup variation with respect to structural characteristics, profits and the degree of competition they face, they may well also experience structural shifts differently. Moreover, given that the subgroups within the Vakinankaratra's food marketing chain exhibit distinctive social characteristics, interfirm variation in the experience of liberalization should manifest itself socially as well. The 1993 survey of market intermediaries included a brief section that elicited respondents' binary (yes or no) response to a number of questions regarding their opinion about liberalization's effects on market conditions. This section explores how these opinion data vary across social groups and how the findings might relate to mobility barriers within the food marketing channel.

Surveyed food marketing intermediaries were asked several questions about how they perceive market conditions to have changed since the onset of market liberalization in the mid-1980's. Responses to two of the questions are of particular interest: "have government marketing restrictions lightened since market liberalization?" and "has profitability of market intermediation improved since market liberalization?" Opinion was nearly evenly divided among respondents regarding the effects of liberalization on government interference and enterprise profitability. Only 46.4% agreed with the first statement and only 48.7% agreed with the second. These results are consistent with earlier reports of continued (illegal) market interference by local authorities, and with considerable entry due to falling opportunity costs of market intermediation caused by real wage and welfare declines among rural inhabitants, not just due to newfound opportunities for profit (i.e., demand-side impetus to entry).

These sample averages nonetheless mask prospective intergroup variation in the

experience of liberalization. Probit analysis was thus used to investigate any systematic differences in the demographic groups' perceptions of liberalization, conditioning on age, gender, government affiliation, the intermediary's subgroup and gross revenues. Table 9 presents the results of the analysis.

Processors, interseasonal stockers and wholesale collectors stand out by their disagreement with the statement that government interference has decreased with liberalization. Because they have disproportionate access to the banking system these operators are most vulnerable to administrative restrictions on credit, and because their activities are quite visible they attract populist political interventions such as road blockades. Most importantly, these intermediaries operate in niches protected by considerable mobility barriers and are thus subject to continued suspicion by the many government officials less-than-fully committed to market-oriented reforms.

By contrast, intermediaries with government responsibility quite predictably believe that liberalization has lessened their interference in market activities. Perhaps more interestingly, women, ox cart transporters, and subcollectors also perceive government restrictions on food marketing intermediation as having lessened with liberalization, which is consistent with these relatively unfettered subgroups (considering most women as retailers). These same groups nonetheless tend to disagree with the claim that liberalization has improved the profitability of intermediation. Again, this is consistent with reasonably open entry into short-haul, ox cart transport, casual retailing and subcollection that limits profitability in these subgroups. Interseasonal stockers and wholesaler-retailers are most likely to perceive gains to profitability resulting from liberalization. Given the social division of the food marketing channel, these

results suggest that the non-agricultural males, especially those with government or parastatal ties, are most likely to perceive their trade as more lucrative as a result of liberal reforms.

Conclusions and Policy Implications

The irony of economic liberalization efforts in much of Sub-Saharan Africa is that their logic rests on microeconomic axioms regarding the efficiency of competitive market pricing, yet empirical evidence on the nature of markets has infrequently informed the design and implementation of reforms. Moreover, since there are systematic social patterns of market participation, a careful mapping of markets can contribute to an understanding of the welfare effects and social consequences of structural reforms, which are of paramount concern to all parties to economic reforms in SSA.

Several commentators claim liberalization induced considerable entry into Madagascar's food marketing channel and that this proves liberalization has brought competition to food marketing (Rassas, Rabenarivo and Meserve, 1988; Berg, 1989; Leplaideur, 1993).²⁰ However, the evidence from a major agricultural region in Madagascar with a relatively advanced commercial marketing system suggests a more nuanced conclusion. There has indeed been substantial entry into particular subgroups of the food marketing channel but that there are

²⁰ These data on which these claims are based originate from the national statistical agency (*Banque des Donnés de L'Etat*, BDE) and should be interpreted cautiously. Prior to liberalization, intermediaries were generally not permitted to compete formally with public enterprises and thus would operate on the black market without registration. However, since liberalization and the 1983 trader registration decree (number 2683), the incentives switched diametrically, with intermediaries failing to register bearing the greatest risks. It is thus unclear how much of the recorded increase in intermediation is merely the recordation of longstanding operations and how much is *de novo* entry. Moreover, these capture only particular subgroups.

important mobility barriers to entry into some of the most important niches having to do with wholesale crop collection, interregional transport and interseasonal storage. Advocates of marketing liberalization point to evidence of market entry and claim increased competitiveness, while detractors claim (usually with only anecdotal support) that reforms haven't significantly affected the real bottlenecks in the food marketing system. Examined through the lens of the theory of mobility barriers, it appears that both may be right.

Many of these findings echo those of other students of African food markets (e.g., Dioné, 1989; Santorum and Tibaijuka, 1992; Bryceson, 1993; Duncan and Jones, 1993; Leplaideur, 1993; Coulter 1994; Jones, 1994) who caution that liberalization has brought advances, yet the food marketing channel remains plagued by insufficient motorized transport and interseasonal storage capacity — legacies, in part, of an era of panseasonal and panterritorial pricing and of state expropriation of traders' assets — poor communications and transport infrastructure, weak rural financial systems, and rearguard actions by local governments as yet uncommitted to free trade. As a consequence, entry has been predictably concentrated into certain easily accessible niches, and the relatively few operators in subgroups protected by mobility barriers of interlinked contracts, capital or parts access, or risk bearing capacity may well continue to enjoy market power. By recognizing the existence of mobility barriers within the food marketing channel it becomes relatively easy to distinguish between entry due to supply-push factors (e.g., falling real wages or crop failure) and that due to demand-pull (i.e., profit opportunities) and to reconcile empirical observations of significant market entry with continued complaints of intermediary market power.

Industry competitiveness is a function of both the extent of intra-industry firm mobility

and the complexity of the industry's subgroup structure. So there exist two complementary strategies that policymakers can follow to finish the job of food marketing liberalization. First, they might help reduce not only entry barriers into food marketing, which has largely been accomplished now by legal and institutional reforms, but also intra-industry mobility barriers. Here the familiar prescriptions include market information systems, increased trade finance, improved infrastructure maintenance and reliable law enforcement. There is also an important role for technical assistance in helping inexperienced farmers and shopkeepers learn such skills as proper storage techniques (e.g., climate control, chemical use, rotational schemes) and transportation management (e.g., vehicle maintenance, spare parts inventorying, network routing).

Second, governments and donors can facilitate the emergence of new sub-groups to squeeze difficult-to-enter subgroups that may maintain market power. One such seemingly effective example from Madagascar is the emergence of cereals banks facilitated by the Ministry of Agriculture's food security directorate and organized through local farmer groups and the national rural development bank. These compete locally with large-scale speculative grains stockers and appear to reduce interseasonal price variability.

Finally, as the data from Madagascar reveal, some demographic groups' market opportunities are relatively restricted and, likely as a consequence, they thus have a different experience of liberalization than do their more privileged counterparts. The troublesome issue is how to modify the social structure of food market intermediation so as to ensure the favorable participation of all segments in society, especially traditionally disadvantaged subpopulations like women and immigrants.

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Table 1: Subcollectors and Wholesale Collectors

	Subcollectors	Wholesale Collectors
Number Surveyed	21	15
% live in fokontany	100.0	80.0
Mean # fokontany covered	5.7	40.1
% with parastatal ties	19.0	40.0
% entered since 1985	70.0	33.3
% extended market area since 1985	28.6	20.0
Mean eqpt sunk costs (FMG mn)*	0.413	10.520
% extending loans	57.1	86.7
% buying crop forward	52.4	40.0
% using proceeds to buy agricultural inputs for own production or to increase nondurables consumption	95.2	46.7
% using proceeds to buy crop collection equipment or to extend collection market area	61.9	80.0
% financed by advances from buyers	81.0	53.3
% financed by bank credit	9.5	46.7

* The exchange rate averaged 1870 FMG/US\$ during the survey period.

Table 2: Keys to Success in Crop Collection and Assembly
(1= not important, 4=very important)

	Subcollectors	Wholesale collectors
Personal reputation and relationships	3.55	2.87
Access to credit	3.00	3.47
Price paid	3.00	2.27
Ability to evacuate crop	2.64	2.93
Ability/willingness to extend loans	2.18	2.93
Ability to supply consumption goods	1.64	1.67
Ability to supply agricultural inputs	1.27	1.60

Table 3: Transporters

	Short-haul, ox carts	Long-haul, motorized
Number surveyed	68	16
% live in fokontany	98.5	87.5
Mean # <i>fivondronana</i> covered	1.2	3.6
% with parastatal ties	7.4	25.0
% entered since 1985	54.5	27.8
% extended market area since 1985	7.4	25.0
Mean eqpt sunk costs (FMG mn)*	0.465	197.101
% who pick up at farms	91.1	43.8
% who deliver to periodic markets	85.3	37.5
% using proceeds to buy agricultural inputs for own production or to increase nondurables consumption	88.7	43.8
% using proceeds to buy transport equipment or to extend market area	32.2	50.0
% financed by informal credit	28.6	69.2
% financed by bank credit	4.8	38.5
% financed by own farm revenues	87.3	46.2

* The exchange rate averaged 1870 FMG/US\$ during the survey period.

Table 4: Keys to Success in Crop Transport
(1= not important, 4=very important)

	Short-haul ox carts	Long-haul motorized
Personal reputation and relationships	2.91	2.25
Communications links	2.54	2.13
Freight rate charged	2.24	1.94
Vehicle capacity	2.13	2.44
Pick-up/delivery network breadth	1.97	2.94
Access to parts and fuel	1.96	2.94
Willingness to pay bribes	1.50	1.28

Table 5: Keys to Success in Grain Milling
(1= not important, 4=very important)

	All respondents
Access to parts and fuel	3.67
Processing capacity	3.50
Milling technology used	3.42
Personal reputation and relationships	3.17
Milling charge	3.08
Established network of intermediaries	2.92
Access to credit	2.33

Table 6: Retail Distributors

	Casual retailers	Wholesaler-retailers
Number surveyed	144	37
% live in <i>firaisana</i> in which they sell	92.4	94.6
% selling in just one <i>firaisana</i>	79.9	51.3
% entered since 1985	57.7	40.5
% extended market area since 1985	7.4	25.0
Mean eqpt sunk costs (FMG mn)*	0.021	1.877
% who sell their own produce	62.5	48.6
% who deliver to periodic markets	85.3	37.5
% using proceeds to buy agricultural inputs for own production or to increase nondurables consumption	97.9	83.8
% using proceeds to buy stocks or equipment or to build market presence	38.2	73.0
% financed by informal credit	36.8	63.2
% financed by bank credit	2.8	16.2
% financed by own monetary savings	29.9	62.2
% financed by own farm revenues	76.4	54.1

* The exchange rate averaged 1870 FMG/US\$ during the survey period.

Table 7: Keys to Success in Retail Distribution
(1= not important, 4=very important)

	Casual retailers	Wholesaler-retailers
Product prices	2.92	2.97
Personal reputation and relationships	2.86	2.89
Network of suppliers	2.19	2.43
Access to credit	1.97	2.16
Willingness to sell on credit	1.85	2.22
Storage capacity	1.59	1.95
Location	1.38	1.78

Table 8: Demographic Characteristics of Food Marketing Channel Subgroups

	Average Age (years)	% Female	% Having State Connections*	% Crop Producers
Collectors	43.8	16.7	33.3	66.7
Subcollectors	38.0	45.0	5.0	90.0
Long-Haul Motorized Transporters	37.7	11.1	27.8	61.1
Short-Haul Ox Cart Transporters	41.4	9.1	12.1	97.0
Interseasonal Stockers	37.4	20.0	40.0	60.0
Processors	43.1	8.3	16.7	58.3
Casual Retailers	33.8	60.4	6.9	88.9
Wholesaler-retailers	36.9	43.2	13.5	81.1

* State connections are defined as a position of responsibility in local government or a past or present commercial affiliation with a state food marketing enterprise.

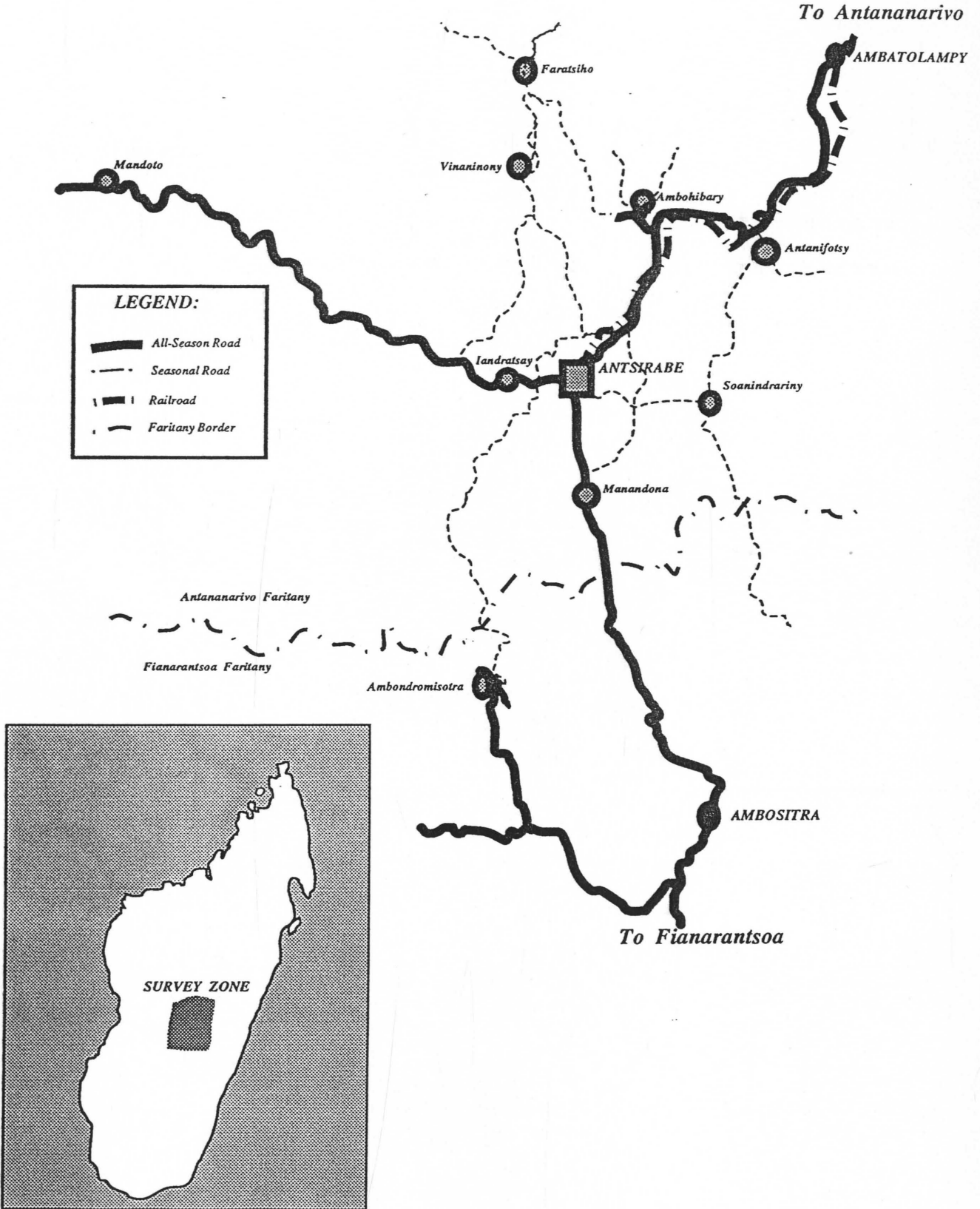
Table 9: Probit Analysis of Respondents' Opinions on Liberalization's Effects

(1 = yes)	Q: Have government restrictions lightened with liberalization?		Q: Has liberalization improved the profitability of intermediation?	
	Estimate	Standard Error	Estimate	Standard Error
Constant	-0.49	0.42	0.38	0.29
Age (years)	0.02	0.02	0.01	0.02
Female	*0.76	0.29	*-0.41	0.16
Gov't responsibility	*0.32	0.12	-0.15	0.20
Subcollector	0.33	0.43	-0.30	0.36
Wholesale Collector	-0.33	0.62	0.05	0.62
Motorized Transport	0.17	0.49	-0.09	0.27
Ox-Cart Transporter	*0.63	0.25	*-0.62	0.22
Processor	*-1.11	0.66	-0.18	0.37
Interseasonal Stocker	*-0.89	0.62	*0.47	0.26
Wholesaler-retailer	0.34	0.42	*0.62	0.15
Revenues(FMG mn)	0.05	0.07	0.04	0.05

* indicates statistical significance at the 90% level or above (i.e., p value \leq 0.10).

Figure 1

RURAL MARKETS SURVEY REGION



Mobility Barriers and the Socially-Differentiated Effects of Food Marketing Liberalization in Madagascar

Christopher B. Barrett
Department of Economics
Utah State University
Logan, UT 84322-3530
Phone: (801) 797-2306
Fax: (801) 797-2701
Email: cbarrett@b202.usu.edu

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Mobility Barriers and the Socially-Differentiated Effects of Food Marketing Liberalization in Madagascar

Abstract: Decontrol of commercial food marketing channels was widely expected to induce massive trader entry and engender more competitive, efficient markets in Africa. Despite strong empirical evidence of trader entry, enterprise expansion is proving difficult and many market observers and participants claim market power continues, if perhaps exercised now by private traders instead of public enterprises. This paper uses the industrial organization concept of mobility barriers to confront this puzzle of substantial market entry that might not enliven market competition. Primary data from a survey of food marketing intermediaries in Madagascar reveal distinct groups within rural food marketing channels, separated by identifiable mobility barriers. Entry has thus been largely limited to a few particular niches. Moreover, the place individuals occupy within the complex matrix of rural food marketing activities is defined largely by one's *a priori* social identity. As a result, the experience and subjective perceptions of food marketing liberalization vary significantly across socially-distinct subpopulations.

Mobility Barriers and the Socially-Differentiated Effects of Food Marketing Liberalization in Madagascar

Introduction

The manifest inefficiency of state-directed marketing systems based on quantity controls, trade restrictions and administrative pricing has been a principal force motivating the transition of many nations to market-based systems. In the low-income agrarian economies of sub-Saharan Africa (SSA), the reform of food marketing systems previously fettered by interventionist states has been a central component of economic adjustment, both because food represents an unusually large share of household expenditures and because food agriculture employs a plurality of such nations' workers. The presumption in the design and implementation of market-oriented reform programs has been that the elimination of parastatal authority — especially, but not exclusively, monopoly and monopsony powers — would induce significant private entry into food marketing and thus more competitive markets and more efficient pricing. Improved marketing efficiency would squeeze marketing margins, thereby benefiting peasant producers, who would enjoy higher producer prices, and poor consumers, who would face lower retail prices.

There indeed exists preliminary evidence of trader entry, diminished marketing margins and improved market integration in liberalized African food markets (Coulter, 1994; Jones, 1994). Yet one continues to hear widespread complaints from peasant producers and consumers about food traders' market power, and there is some evidence of the transfer of market power from public marketing authorities to private intermediaries in African liberalization experiences (Duncan and Howell, 1992; Gibbon, Havnevik and Hermele, 1993; Barrett, 1994). Researchers