

AMHERST COLLEGE

SMALL IS BEAUTIFUL? SMALL FARMS AND  
THE VIETNAMESE COFFEE EXPANSION

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## ABSTRACT

This thesis studies the history and development of the Vietnamese coffee industry, with a special focus on the role of the small coffee farm. Central to the thesis is the question: why are most coffee farms in Vietnam so small? The first part of the thesis constructs an explanation by examining the small farm as an institution which developed in response to Vietnam's transition from a closed economy into a more open market economy. The small farm was a product of the transition as it embodied the innovations within the political sphere, the emerging private sector's strengths, and the ambiguity these changes created. This institutional approach to the farm looks into macro socio-economic reforms and their specific effects on the coffee industry, such as the development of property rights, and the mobility of productive factors.

The second part of the thesis focuses on the credit markets as a determinant of farm sizes, as credit availability is crucial to expansion and consolidation of production. The credit markets are divided into two categories based on the nature of the sources of credit: the formal market, made up of state-owned commercial banks, and the informal market with private lenders. This section argues that both markets fail to assist farm expansion, using a microeconomic model in which lenders maximise profits while borrowers maximise utility to demonstrate how the current structure of the credit markets helps small farms continue production but lenders have no incentive to help them expand. This section is based on the theoretical work on credit rationing (Stiglitz and Braverman).

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## INTRODUCTION

*“It is sometimes not possible to uncover the logic (or illogic) of the world around us except by understanding how it got that way.”*

*Paul A. David, “Clio and the Economics of QWERTY”*

After three decades of rapid expansion and development, the Vietnamese coffee industry has helped Vietnam become the world’s second largest producer and exporter of coffee. Vietnam now accounts for about 16% of world coffee output; its coffee production has increased sixteen fold in the past three decades, coffee growing area now totals at 506,000 hectares, from the modest figure of 30,000 hectares by the mid-1980s. The magnitude of total output stands in sharp contrast with the dominant unit of production. Small family-run farms whose sizes average 1.2 hectare, and which have been established only within the last two decades, produce about 85 percent of national output.

Despite the rapidity of its development, the coffee industry faces problems of structural inefficiency. Uncoordinated choices of production, harvest and processing techniques across a large number of farms create great variations in the beans’ quality and lower the export values of Vietnamese coffee. Vietnamese coffee exporters often receive 20-50% less than the average price in international markets for their products<sup>1</sup>; Vietnamese coffee is positioned in the world market as the low quality coffee whose main advantage is its price competitiveness. Low prices and small profit margins pressure producers to intensify and improve productivity, which is achieved through intensive use of fertilisers and irrigation, which has long-term environmental and productivity consequences. The life span of the coffee trees is shortened; within the next decade Vietnam will need to replant the

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<sup>1</sup> Doan Trieu Nhan, see Appendix.

majority of its coffee area. Profit margins, no matter how thin, were maintained by low input prices, which became increasingly unsustainable in recent years due to rising inflation. Shively and Rios (2004) also calculated that small coffee farms are less efficient than larger ones. Over the years, farms remain small though their problems are well recognised. Why does the institution of the small farm persist?

In exploring the institutional causes of economic growth and development, Acemoglu (2003) raises a similar question, *“Why do certain societies choose different policies, different institutions, and radically different ways of organizing their lives?”*<sup>2</sup> This question presupposes collective social choice as the mechanism of social organisation, which Acemoglu promptly counters by asserting that social choice can be inefficient because it is *“made by politicians or politically powerful social groups that are interested in maximizing their own payoffs, not aggregate output or social welfare.”*<sup>3</sup> This view highlights the classic principal-agent conflict in a political context, but it also gives the agent disproportionate power in determining the outcome of this process. Acemoglu et al. (2004) extends the argument by dividing political power into de jure and de facto powers; the first is rooted in formal political institutions while the second is derived from effective control over resources and the ability to solve collective action problems<sup>4</sup>. The political outcome results from the interaction between the decisions taken by the group controlling de jure power and the group that wields de facto power. This political perspective on institution implies that economic institutions are the outcome of the political process.

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<sup>2</sup> Acemoglu 2003, p 3

<sup>3</sup> Acemoglu 2003, p4

<sup>4</sup> Acemoglu et al. 2005, Handbook, p393.

Greif tackles the same issue by raising a counterfactual possibility, asking “*Why do societies fail to adopt the institutional structure of more economically successful ones?*”<sup>5</sup> and proposes that “*the capacity of societal organization to change is a function of its history... and cultural beliefs.*”<sup>6</sup> This approach considers the political actors featured in Acemoglu an outcome of a society’s history and cultural factors and not their determinants. While Acemoglu’s framework allows changes in distribution of de facto and de jure powers to influence the outcome, Greif’s explanation takes as given the cultural beliefs on which it gives immense importance. This cultural view of institutions is problematic considering how culture is dynamic rather than static, and how cultures with distinct differences have harboured converging economic outcomes.

Sugden takes on a somewhat more anarchistic view, noting that “*Many of the institutions of a market economy are conventions that no one has designed, but that have simply evolved.*”<sup>7</sup> This view attributes the persistence of conventions, rules and institutions to the intrinsic values- or “versatility”- of these conventions, which help them persist and give benefits to those who adopt them, rather than to human designs. According to Sugden, orders that evolved into establishment are “*not necessarily efficient... they have evolved because they are more successful at replicating themselves than other patterns*”<sup>8</sup> This anarchistic view is useful in analysing the existing institutions; but it is not useful in trying to improve the status quo if the status quo happens to be a suboptimal equilibrium.

The Vietnamese coffee farm as an institution emerged when Vietnam started its transition from a closed economy into an open market, a period that witnessed the

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<sup>5</sup> Greif, 1994, p 912

<sup>6</sup> Greif, 1994, p 943

<sup>7</sup> Sugden, p 86.

<sup>8</sup> Sugden, p 97

relationship between political, economic and cultural factors of the country undergo drastic changes. As shown in figure 1, the brief history of the coffee expansion is charged with the most important reforms in recent history of the nation. Starting from 1986, Vietnam embarked on a series of principal social-economic reforms that aimed to stimulate economic achievements, which replaced the centralised economy of Vietnam with the coexistence and development of the public and private sectors. The government subsequently implemented major policy changes which affected all economic sectors and agents. Rooted in these changes, the coffee expansion embodies cultural patterns, the shifting balances between formal and informal institutions, between de facto and de jure power; and the degree to which political powers can or cannot determine economic orders. Transition is the process in which emerging market orders interact with state interventions and even forced the state to relax its degree of control over the economy. The thesis will focus on the informal agricultural credit market, and how its development in response to the shortcomings of the formal market magnified the formal market's structural problems, as an example of the transitional economy.

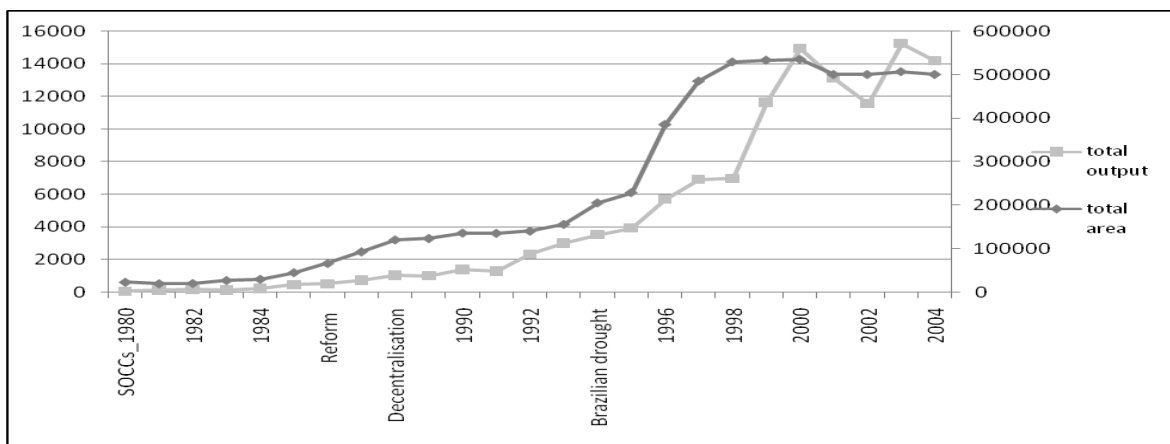


Figure 1: Timeline of Vietnamese coffee production<sup>9</sup>

<sup>9</sup> Output: in number of 60kg bags of green beans, area in hectares, data from ICO.



## THE SMALL COFFEE FARM: A HISTORY

### 1) THE EMERGENCE OF SMALL FARM

Initially, all coffee was grown in large state owned coffee collectivised (SOCCs), but these enterprises now make up only 15% of total coffee growing area and output. Collectivisation dominated Vietnamese agriculture during the establishment of the SOCCs in the late 1970s. In the early 1980s, the government created a number of new economic zones (NEZs) across the country, 225 of which in the Central Highlands, and encouraged people from poor and densely populated regions to move to the new NEZs<sup>10</sup>. People from the nation's poorest provinces were mobilised and transported, often in groups consisted of inhabitants of a whole village or county, to these NEZs, creating a large wave of domestic migration. These workers were known as “*official migrants*”; most of whom belong to Vietnam’s ethnic majority (the Kinh). Precise data on these migrants are not available, but existing studies estimate that from 450,000<sup>11</sup> to 580,000<sup>12</sup> official migrants settled in the coffee region.

Following the principles of “doi moi” [reform] set at the General Assembly of the Vietnamese Communist Party in 1986, Vietnam entered the ongoing economic transition. Collectivisation was one of the first institutions to be demolished, with the government shifting its preference to family units<sup>13</sup>. The state-owned small farms developed as the SOCCs were disintergrated in the Central Highlands. After the decollectivisation, surviving SOCCs are relabelled coffee companies; some are subsidiaries of the Vietnam Coffee

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<sup>10</sup> “Each received free transports and food during the trip, two tools of production or their monetary equivalent; each family was allowed 500-800 kg of luggage, some money to set up housing and other facilities and six months’ supply of food.” Decree 95/CP of the Vietnamese Ministerial Committee

<sup>11</sup> Muller

<sup>12</sup> FAO, p 30

<sup>13</sup> Directive 29/HĐBT of Ministerial Assembly, 03/09/1988.

Corporation (Vinacafe), which controls 5% of productive coffee area and 7% of output. The rest of the state-owned coffee area is controlled by provincial administrations.

Though former SOCCs retain their workers and administrative units, their nature altered. Their productive areas were divided into small plots, which would be leased to the workers' families; each is allowed only one plot. The state still owns the farms, but the lease is passed within the family. When there is no family member to keep it, the land would be returned to the administration to be leased to another family. The main premise of the lease contract is that the state provides the initial investment while the workers provide the ongoing investments and labours. A typical lease contract (the "soft lease") specifies the SOCC's share in a farm's total output as a fixed quantity<sup>14</sup>. Farmers can freely decide to whom, when, and at what price to sell the share of the output. SOCCs were divided into segments, each has 70-100 family units and is managed by a small team of officials who deal with farmers, handle administrative tasks and collect the SOCC's output share.

While the small farm seemed similar to tenancy structure, it emphasised private incentives and was more beneficial for the workers, who can borrow inputs and capital from the SOCCs at the same rates that SOCCs borrow from banks and other institutions. Hence workers are charged lower rates on their loans than they otherwise would be. Workers have to repay during harvest time with either money or coffee, but debt collecting policies at the SOCCs are not strictly enforced, so that a family could postpone paying for a few years without significant penalties. In addition, SOCC workers receive mandated benefits such as health insurance, maintenance of equipment, technological assistance, which are unavailable to other farmers.

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<sup>14</sup> "2750kg of fresh ripe coffee cherries per hectare", 2007 lease contract of Viet Thang Coffee Company.

## 2) THE RISE OF THE SMALL FARMS: PRIVATE FARMERS

As shown in figure 1, the Vietnamese coffee expansion took off around the time of decollectivisation in 1988. The majority of coffee farmers started to arrive in the region in the late 1980s without direct government initiatives and were largely unrecorded. Known as “unofficial migrants”, they came without government initiatives and were largely unrecorded. Not until 1994 did the influx of unofficial migrants become overwhelming. As Brazil suffered from a drought which drove down output and increased world coffee prices, profits on Vietnamese coffee farms exceeded all expectations, which prompted coffee growing areas to increase at the annual rate of 59% in 1995-2000<sup>15</sup>. The coffee planted during this period accounts for 54% of the current total coffee growing area in Vietnam. The rapid rise in coffee growing area and output implied an equally rapid increase in the level of domestic migration into the region at the time. Unofficial migrants are estimated to outnumber official ones by a ratio of 4:1. The ethnic minorities, native to the region, and the unofficial migrants constitute the majority of the private farmers. Private farmers must provide all initial investments to set up a farm on and running costs of production on their own.

Migration sustained very high population growth rate in the region. In Daklak province *“yearly population growth averaged 7.7% in the period 1977 to 1990 with growth rates above 10% in the years 1987 to 1989. Between 1991 and 2001, population growth per year [averaged] 6.6% with peaks from 1996 to 1999.”*<sup>16</sup> National annual population growth averaged 1.7% in the same period<sup>17</sup>. The peaks in population growth rates coincided with periods of coffee-motivated migration. The ethnic majority (the Kinh) now makes up 70% of the province's population, though they accounted for a very small percentage in the 1970s. There is substantial disparity in the

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<sup>15</sup> Luong & Tauer, p 54.

<sup>16</sup> Muller p 64-65

<sup>17</sup> World Development Data series

level of economic development between the Kinh and the ethnic minorities, with Kinh villages do better than their counterparts by all measures<sup>18</sup>. In coffee production, ethnic farms have lower productivity and sell their output for lower prices, despite being on average larger than the Kinh counterparts<sup>19</sup>. This disparity suggests a strong influence of communal organisation and social capital on economic achievements.

Muller’s research on land use in the Central Highlands concludes that the two most important factors determining the location of agricultural land in the region are distance to the transportation facilities, and the slope of the land. Figure 2 shows that most villages are located within one standard deviation from the nearest roads. These factors are significant given the uneven topography, underdeveloped infrastructure and agricultural techniques of the region. The region is covered by hills and the higher the elevation, the steeper the slope, the higher the risk of erosion and the costs of irrigation. This uneven landscape hinders the development of the interregional transportation network.

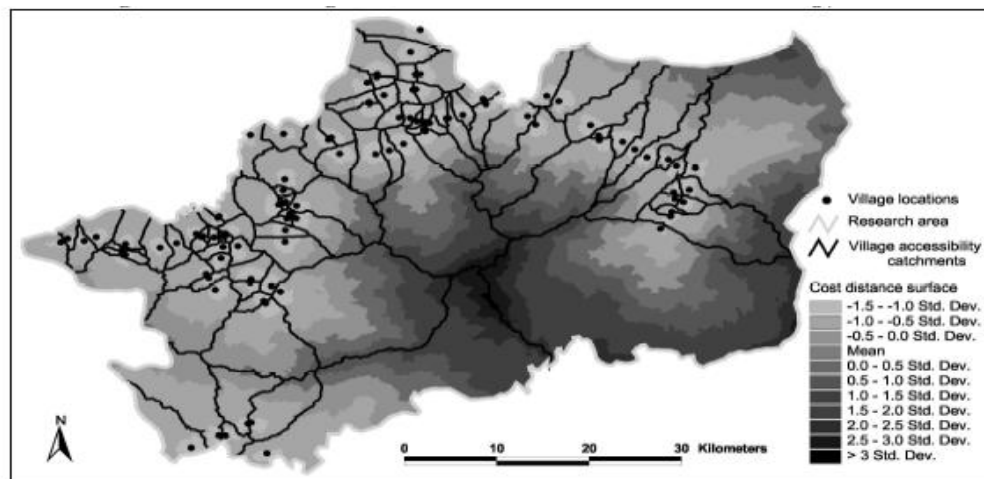


Figure2: Location of villages around transport network, Source: Muller

<sup>18</sup> Muller, p90-91

<sup>19</sup> APPENDIX

### 3) SMALL FARMS AND INSTITUTIONAL DEVELOPMENT

The two kinds of small farms represent a shift from state ownership to private ownership of agricultural production. While this shift initially represented a larger shift the perception of the economic orders among the country's political leaders, the rise of the private farms was a spontaneous surge in private initiatives beyond the framework of government policies. By 2000, coffee growing area was twice the area planned by the government for the period<sup>20</sup>. The most notable difference between the two kinds of farms lies in the forms and benefits of farm ownership. SOCCs workers cannot enjoy a range of economic options open to private farmers: they can neither sell the land or the equipment, nor choose to switch crop, or to expand production. On the other hand, the private farmers must provide the initial investments to buy the farms and the investments; they do not have access to SOCC-backed benefits such as good soil, storage, processing facilities, health insurance, and easy access to formal credit.

#### a) COMMUNAL TIES AND SMALL FARMS

The tradeoff between benefits and ownership does not separate the SOCC workers from the private farmers. Many of the workers and their families started their private farms in addition to their assigned plots<sup>21</sup>. Although there is no data to test the following observation, it has been mentioned in various interviews with locals that there are strong ties between SOCC workers and the “unofficial migrants”. Knowledge of the production process and of the region is passed along communal lines by SOCC workers to their friends and relatives at home. When these people decided to come to the region and become coffee farmers, the SOCC workers would help them start by transferring technical knowhow and social

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<sup>20</sup> Directive 184/1998-TTg, Bui Quang Binh.

<sup>21</sup> Shively, survey

connections. Despite their large number and impressive growth, private farms show no technological or organisational improvement over the state-owned ones. Their structure and mode of production were copied from the state-owned farms because unofficial migrants had limited knowledge about coffee production. Many unofficial migrants also learn to grow coffee while working as landless labourers in other farms before establishing their own. The small coffee farm gained momentum and became the dominant mode of coffee production in the absence of an obvious alternative and with the help of communal ties, which fits well with the evolutionary view of institutional development.

These communal ties have caused ethnic divisions and a visible lack of intergration, with minority groups lagging behind economically compared to the ethnic majority group, though the latter only arrived in the region within the last three decades. Muller's survey of 101 villages randomly selected in Daklak shows "*that mixed villages do not exist, apart from one or two Vietnamese [Kinh] families, who usually own a shop in an ethnic village.*"<sup>22</sup> The benefits of social network and communal ties, which can foster existing communities, constitute one reason behind this division. Another possible reason, widely promoted by the Vietnamese government, is the nomadic lifestyle of the minorities which prevents them from quickly adjusting to farm production. Evidence shows that minority farmers are targeted by a variety of state-backed support programmes, ranging from credit incentives, technical trainings, to land allocations; even the SOCCs are mandated to give them priority when leasing out productive plots<sup>23</sup>.

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<sup>22</sup> Muller, p 70

<sup>23</sup> Viet Thang Coffee Company, Lease Contract 2007.

## b) SMALL FARMS AND PROPERTY RIGHTS

The rapid multiplication of small farms also attests to a shift in the balance between de jure and de facto political powers as manifested in the development of property rights in the coffee region. The land law of 1987-1988 which pronounced the end of the era of collectivisation caused the subsequent shift of ownership of productive assets from the state to families and individuals; but the state retained ownership over agricultural land. While individuals were now allowed to trade the product of their work, land transactions and unauthorised land use were strictly forbidden<sup>24</sup>. Not until 1993 was the ban removed, yet private coffee farms sprang up in great numbers between 1987 and 1993.

And though the Land Law of 1993 defined the rights of agricultural producers to exchange, transfer, lease, mortgage and inherit agricultural land, the implementation of property rights in the Central Highlands takes a much slower pace. To reap these benefits, farmers must obtain the Land Use Certificate (LUCs), a formal document that certifies their long term rights over their land. There are two kinds of LUCs: the Red Book certifies ownership over land used for living purposes, and the Green Book certifies ownership over land used for agricultural production. The issuance of LUCs is far from complete, and most existing data apply only to Red Book holders. Decree 64, issued in 1994, allows the extension of these rights to forest land, but it is yet to be implemented. The issuance of Green Book was accelerated only after it was mandated in a series of land law amendments in 2003. The data from Shively show that out of 210 households, only 6 did not have any kind of legal title, but 58 only have partial title, which is substantial given that the data was collected in the same year that LUCs were mandated.

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<sup>24</sup> Land Law 1987, National Assembly

Private farms set up by unofficial migrants are legally problematic for they mostly remain on the map as forest land, which denies their owners of their legal claims over the land and much of the benefits of these rights. Therefore, in the coffee region, *“the impacts of this relatively recent devolution of secure property rights for agricultural and forest land are of little measurable importance for land-use changes”*<sup>25</sup>. The development of private farms preceded and outpaced formal property rights development. Most of the households that have received their Green Books did so in the past five years, but coffee farms have sprung up over the last two decades.

An informal land market whose participants need not legally own their farms assisted the coffee expansion. This market is informal and its transactions take place in private negotiations, using hand-written contracts and documents. The movements of reported coffee land prices, which correspond to the fluctuation of coffee prices, provide evidence for the market’s existence and activities. In 2008, the price for green beans in Vietnam reached VND 41,000/kg, the same nominal value as that of the all time peak in 1994, and the highest price since 2002. Within the first six months of 2008, the price of a hectare of four-year old coffee doubled or tripled depending on location, amounting to VND 500-600m (USD 30,000-35,000)<sup>26</sup>. Conversely, in 2000, as coffee prices started to drop, farm land prices halved<sup>27</sup>; and as prices dropped further and remained low, farmers were unable to sell their land. When coffee prices reached the all time low of \$0.12/pound in 2001, which is a tenth of the all time peak, coffee area shrank by a disproportionately small margin<sup>28</sup>, losing less than 10% of total area.

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<sup>25</sup> Muller, p76

<sup>26</sup> [http://www.metvuong.com/thongtin/1982\\_Gia-dat-nong-nghiep-tang-nhanh-o-Tay-nguyen.html](http://www.metvuong.com/thongtin/1982_Gia-dat-nong-nghiep-tang-nhanh-o-Tay-nguyen.html)

<sup>27</sup> <http://nld.com.vn/80313P0C1002/kon-tum-gia-dat-vuon-ca-phe-giam-manh.htm>

<sup>28</sup> See Appendix



While land prices are strongly influenced by coffee prices, they do not reflect the level of land market activities. When coffee and land prices are high, few farmers would sell their farms in expectation of high returns. When prices drop, there are few buyers in anticipation of low revenue. The market is most active when prices are high, but mostly with activities that assist the development of new farms. It is calculated that a 1% increase in coffee prices would produce a 4.19% increase in total coffee growing area in Vietnam, despite the fact that in certain location, such as Daklak province, a 10% increase in total area would raise total output by only 0.008%<sup>29</sup>. Yet many farmers who were growing other crops were ready to convert their farms into coffee farms<sup>30</sup>. In 2007 and 2008, coffee area by only 4% of existing coffee area<sup>31</sup>, which shows that the land market's responsiveness to coffee prices has slowed down significantly since the 1990s, due to both the low prices in 2001-2004 and the lack of suitable land for production.

When nominal coffee prices reached the all time low of \$0.12/pound in 2001, which is a tenth of the all time peak, coffee area shrank by a disproportionately small margin, losing less than 10% of total area. There are a few reasons for this asymmetric responsiveness. First, the large sunk costs invested in a coffee farm prevent abrupt large scale switching of crop. Ha and Shively (2008) find that coffee farmers respond to price drops by cutting input levels and shifting crops, with small farms more likely to change crops than larger ones because financially they are less buffered. Luong and Tauer calculate that only the least efficient farms would terminate production when prices were too low, the rest of the farms could

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[http://vbqppl.moj.gov.vn/law/vi/1981\\_to\\_1990/1986/198601/](http://vbqppl.moj.gov.vn/law/vi/1981_to_1990/1986/198601/)

<sup>29</sup> Bui Quang Binh, p 33

<sup>30</sup> <http://www.nongthon.net/apm/modules.php?file=article&name=News&sid=6587>

<sup>31</sup> The Weekly Legal Protection, issue 33, 08/16/2008, p 21.

wait for prices to bounce back to a profitable level, since the efficient farms should be profitable in the long run.

There is a general consensus that property rights are one of the key factors underlying development and growth. North and Weingast (1989) reckon that the main institutional innovations in 17<sup>th</sup> century England were those that *“allowed the government to commit credibly to upholding property rights”*<sup>32</sup> and assisted the development of an impersonal capital market which provided *“secure contracting across time and space”*<sup>33</sup> at low transaction costs. Acemoglu (2004) sees property rights as solving the incentive problem that might hinder innovation, *“Without property rights, individuals will not have the incentive to invest in physical or human capital or adopt more efficient technologies.”*<sup>34</sup> The Vietnamese coffee expansion, which involves millions of people moving away from their homes to resettle in a new region, and making significant investments on a piece of property they do not own, seems to undermine the importance of property rights.

Strange as it may seem, this phenomenon is consistent with the role that state-sponsored property rights play in Vietnam as a whole. Kim (2004) detailed how in the property market in Ho Chi Minh City, Vietnam’s largest urban area, *“Although most houses did not have legal title... buyers were willing to buy houses without property rights.”*<sup>35</sup> Ownership is defined locally by the recognition of the community and its members that certain objects or properties belong to certain people, not legally by the recognition of the state. The land law reforms in effect were the state’s response to the existing informal notion of property rights, and the issuance of LUCs serves primarily to synchronise informally recognised property rights and the formal

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<sup>32</sup> North and Weingast, p 803

<sup>33</sup> North and Weingast, p 831

<sup>34</sup> Handbook of development economics, p 369

<sup>35</sup> Kim, p 300

legal system. The process of obtaining land title in Ho Chi Minh City <sup>36</sup> in figure 3 illustrates this point: claims to ownership must pass three ascending layers of local administrations before they reach the City People Committee. Though the de jure power to reject or accept the claims lies with this Committee, the de facto investigation and recognition of the claims take place at local levels.

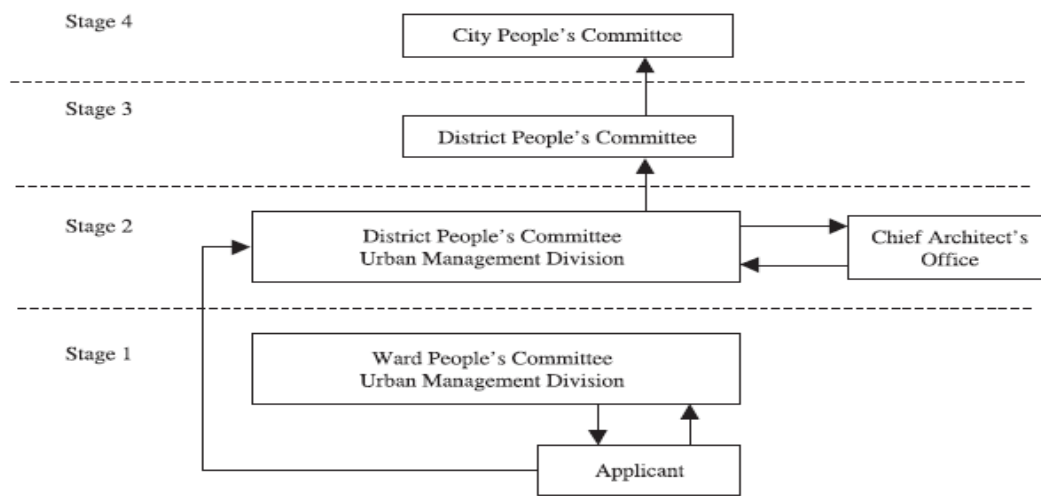


Figure 3: The Process of obtaining LUC in Ho Chi Minh City, Source: Kim.

Land law reforms are not without merits. The first land reform directive of 1988, in which the government recognised and encouraged private production at the expense of collective farms, had profound impacts on agricultural production. With regards to coffee, it unleashed the potential of private initiatives and ignited the coffee expansion. The series of land reforms also confirm the state’s recognition of and commitment to protecting individuals’ rights to private ownership of factors of production, which was significant in the country’s transition from a closed economy into a more open market system. As such,

<sup>36</sup> Kim, p 285

properties with LUCs are regarded as more secure and on average are priced more highly than properties without<sup>37</sup>.

Apart from security, however, legal recognition of property rights in Vietnam is largely detached from the other theoretical benefits and incentives it supposedly brings. Do and Iyer find “*no evidence that land titles increased access to credit on the part of rural households; neither were they significant determinants of land market activity... [there is] no evidence that the 1993 land law resulted in major changes in the land distribution in Vietnam*”<sup>38</sup>. It is within this context that the coffee expansion should be understood: it was not driven by the rights defined by the 1993 land laws, but by farmers’ ability to freely make production decisions and to collect the profits. While the lag between the provision of legal status and production limits some benefits of land ownership, it does not hinder agricultural activities.

Legal ambiguity even helps the expansion. The lack of legal titles denies farmers of certain benefits, but shields them from taxes and potential punishment for their activities, be it cultivating existing farms, or cutting down forest to establish new ones. In effect, de jure recognition by the state strengthens but does not define property rights in Vietnam. Rather, property rights are founded mainly on the recognition of de facto ownership by the owner’s immediate community, and are locally enforced. While the institutions with de jure power still considered the majority of coffee farms illegal, the de facto power over land belonged to farmers’ communities, and the market for coffee land functioned under their sanction. The Land Law reforms represented the process of synchronising the formal and informal notions of property rights, with formal institutions slowly internalising the informal status quo.

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<sup>37</sup> Kim, p 299

<sup>38</sup> Do and Iyers, p27

#### 4) WHY ARE SMALL FARMS SO SMALL?

##### a) THE INITIAL COST CONSTRAINT

The question concerning farm size is two fold: why were coffee farms established small, and how they do not become larger over time. The answer to the first part of the puzzle is more straightforward. Initially, farms were small for two reasons. First, the SOCCs were divided into roughly equal plots among its workers, and the sizes of these plots do not change over time. Among the private farmers, the story was more complex, since these farmers have the freedom to determine the scale of production. A larger farm would require more inputs but still uses the same production techniques as does a small one; technical knowledge does not limit the scope of production per se. It is therefore necessary to put the coffee farm in the national context. Small coffee farms are not small by Vietnamese standards. The national average size of agricultural units is 0.24 hectares, while in coffee it is 1.24 hectares<sup>39</sup>. Coffee farms also require larger investments than do many other crops; and it should also be noted that for the first three years, farmers have to pay the variable costs without revenues, for it takes at least three years for the coffee trees to be productive.

The lowest estimate for coffee land price is by Luong and Tauer, which stands at VND 10m (\$600) per hectare. This figure matches the reported price for a hectare of cleared forest land, whether or not it is suitable for coffee production, in 2008<sup>40</sup>, and would equal the land cost if farmers cleared the land themselves. Anecdotal evidence suggests that this is a common practice, especially at the beginning of the coffee expansion. Estimates that include costs other than clearing forest land are much higher. The lease contract between Vinacafe and its workers states that average total investments on a hectare of productive coffee trees

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<sup>39</sup> Bui Quang Binh, p 19

<sup>40</sup> <http://www.sggp.org.vn/thongtincanuco/2008/6/157204/>

amount to VND 42,349,300 (\$ 2641). Most farmers would have to use a different estimate, since Vinacafe does not have to purchase the land, but land prices account for most of the variations in coffee farm costs. Within the first six months of 2008, due to high coffee prices, the price of a hectare of four-year old coffee trees doubled or tripled depending on location, amounting to VND 500-600m (USD 30,000-35,000) per hectare, which implied that the pre-boom land price was about \$10,000-12,000 per hectare<sup>41</sup>. At any rate, a coffee farm was a large investment, especially for farmers who often are among the poorer parts of the population. Vietnam's GNI per capita in 2004 stood at \$540<sup>42</sup>. The farms' relative expensiveness presents a natural cap on farm size.

As to why farms remain persistently small despite their size-induced inefficiencies, there is not a simple answer. That property rights are communally enforced and that ethnic groups do not mix in their location can prevent farm expansion across ethnic villages, but not within them. This thesis will focus on the credit market as a major factor responsible for small farm sizes over time. There is a great amount of evidence pointing to the lack of capital among coffee farmers. They tend to sell their output immediately during and after the harvest season. Every year, less than 1% of total output is retained by farmers<sup>43</sup>, although most farms have their own storage space and coffee beans can be preserved for years without rotting, and despite the observation that *"households that receive higher prices for their coffee are those with retained output; the majority of households sell [their coffee] immediately"*<sup>44</sup>. Farmers repeatedly cite capital needs as the main reason for not retaining their outputs; by the end of harvest they must clear last season's debts and prepare to immediately start the next season's

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<sup>41</sup> [http://www.metvuong.com/thongtin/1982\\_Gia-dat-nong-nghiep-tang-nhanh-o-Tay-nguyen.html](http://www.metvuong.com/thongtin/1982_Gia-dat-nong-nghiep-tang-nhanh-o-Tay-nguyen.html)

<sup>42</sup> See Appendix 1.

<sup>43</sup> Bui Quang Binh, p 50.

<sup>44</sup> Bui Quang Binh, p 50.

production. Besides, farmers commonly practice strip-picking during harvest season and frequently use private milling facilities to cut costs despite knowing that these methods are detrimental to the beans' quality and prices.

The lack of credit compromises both production and consumption choices, but it is even more detrimental to the possibility of expansion. Taking on a mortgage to buy real estate remains an unknown practice in rural Vietnam. In a land transaction the buyer is required to pay a cash deposit and a few large cash transfers, which amount to the total value of the property, often within less than a year. To expand a farm is different and costlier than to establish a new one, because the owner would have to buy off neighbouring farms, which cost much more than uncultivated land. The credit markets available to coffee farmers fail to assist cash-constrained farmers in farm expansion. Vietnamese farmers have two sources of credit; one is formal institutions such as banks, credit funds, government initiatives; the other is the informal market which includes friends, family, and local lenders. Farmers borrow from the first group to finance their production, and from the second group to finance consumption and expenses that arise unexpectedly<sup>45</sup>. Both the formal and informal credit markets, under their own constraints, exclude the expansion option while lending to coffee farmers.

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<sup>45</sup> Pham and Izumida, p 332

## b) THE FORMAL CREDIT MARKET

The extensive literature on agricultural finance has clarified the major issues facing formal credit institutions. Information asymmetry and adverse selection<sup>46</sup> lead to the practice of credit rationing; in practice, the lack of flexibility in lending procedures and the collateral requirements discriminate against small farmers and make them hesitant to borrow from these institutions<sup>47</sup>. Formal agricultural credit institutions (FACIs) in Vietnam are not immune from these problems; but they have even more pressing shortcomings. Their greatest constraint is their intrinsic affiliation with the state, which introduces public policy objectives into lending decisions. FACIs interact with agricultural production in three fundamental ways: they provide commercial loans to companies that process and export the products, production loans to farmers, and subsidised credit to the poor, some of whom are farmers. Some FACIs are specialised in one kind of interaction, some are involved in all three and have overlapping activities.

The three kinds of interactions differ in the degree of policy influence over the lending process. Most policy-driven are state-sponsored credit programmes, which lend exclusively to the poor. The government created these institutions as part of their long-term Complete Poverty Reduction and Growth Strategies (CPRGS)<sup>48</sup>, a set of measures adopted to reduce rampant poverty in rural areas. The nation-wide Hunger Eradication and Poverty Reduction (HEPR) programme, initiated in 1995/1996, *“reached 25% of the interviewed ethnic minority households and 15% of the ethnic Vietnamese households mainly with subsidized credit, inputs and tree seedlings as well as with support in kind”*<sup>49</sup>, and HEPR aims to provide subsidised credit to six

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<sup>46</sup> Stiglitz and Weiss

<sup>47</sup> Basu

<sup>48</sup>[http://siteresources.worldbank.org/INTVIETNAMINVIETNAMESE/Resources/CPRGS\\_Vietnames\\_edit.ed.pdf](http://siteresources.worldbank.org/INTVIETNAMINVIETNAMESE/Resources/CPRGS_Vietnames_edit.ed.pdf)

<sup>49</sup> Muller, p77



million households in 2006-2010<sup>50</sup>. Its most eminent effort to distribute subsidised credit to the poor is the creation of the Vietnamese Bank of Social Policies (VBSP) in 2002. The VBSP is backed by various ministries and by the largest state-owned commercial bank, though it also channels funds from foreign sources. Besides, the state helped set up People's Credit Funds (PCFs), credit cooperatives which organise poor, rural farmers into saving and lending units. These institutions depend on local administrations to distribute funds. Figure 4 shows how instead of applying for loans directly to VBSP, borrowers must go through two local units, and VBARD's loan allocation must pass through three intermediary organisations before it reaches the clients. The numbers and directions of the arrows indicate the order of the steps to be taken

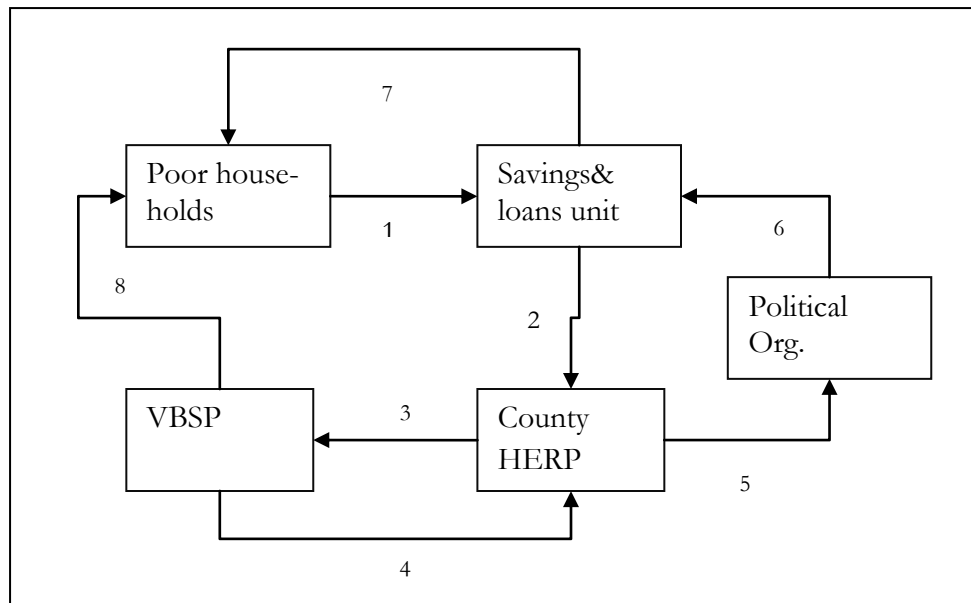


Figure 4: The Lending Structure of VBSP, Source: <http://www.vbsp.org.vn>

The second group of FACIs are banks lending directly to farmers for production purposes. The most important of these is the Vietnamese Bank Agriculture and Rural Development (VBARD or Agribank). Founded in 1988 as the financial subsidiary of the

<sup>50</sup> General Statistic Office.

Ministry of Agriculture and Rural Development (MARD), it has evolved into a financial behemoth with the largest network, widely present and deeply embedded especially in remote rural areas, which makes it the designated institution to handle development aids<sup>51</sup>. The last group of FACIs are commercial banks who lend chiefly to agricultural factories and companies engaged in the processing and commercial activities following the production and harvest of agriculture products. VBARD also belongs to this group.

Regardless of their respective group, all FACIs are strongly connected with the state. “The government still exerts strong control on the banking sector ... indirectly through the interference of a myriad of agencies and ministries, both local and national, who want to have a say on how scarce credit resources are allocated.”<sup>52</sup> The allocation of fund, especially to poor, rural areas and agricultural sectors, is a policy instrument employed by all administrative levels. In 2001-2004, following the dramatic fall in coffee prices, banks were directed to “[freeze] repayments for up to 3 years during the low coffee prices of 2000 to 2004. The government has also been able to direct credit to specific areas and ethnic groups to stimulate growth.”<sup>53</sup> In return, the balance-sheet pressure on the FACIs is alleviated by the government underwriting their debts or relaxing regulatory scrutiny. Their performance is a well-guarded secret, and emphatically so with VBARD whose information disclosure is the most limited among state-owned banks’. Besides, banks without state intervention would not expand to agricultural lending due to high setup, administrative and information costs, while farmers do not make the most attractive clients.

Coffee farmers benefit from the first and second groups, but only moderately. The average loan of the VBSP in 2003 was VND 3.1m (\$200). Annual production costs of a

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<sup>51</sup> Microfinance Industry Report Vietnam, August 2008, p 19

<sup>52</sup> Vina Capital Banking Report, p8

<sup>53</sup> FAO, p 32

small coffee farm alone far exceed that sum, which makes lending to coffee farmers unfavourable from a policy viewpoint, because it takes more money to assist the same number of people. Besides, the farmers able to establish their own farm are evidently better off than those who cannot; they mostly do not fit in the targeted groups of HEPR programmes. VBARD and similar institutions cap loan sizes to cover only production costs, currently VBARD loans for coffee farmers is capped at VND10m(\$600) per year. Finally, the legal status of coffee farms prevents farmers from using them as collateral to obtain larger loans. Even farmers with the Green Book rarely use it as collateral, since the legal framework for property seizure is ineffectual. Seizing land from farmers is politically unsound. Banks have to give out loans without a mechanism to enforce payment. They have a larger incentive to limit the amount of capital available.

### c) THE INFORMAL CREDIT MARKET

The literature on credit markets in Vietnam displays a disparity between the perceived importance of informal credit and its quantitative description. Quantitative evidence gives informal credit little significance, but qualitative analyses are disproportionately emphatic on the continuous reliance of farmers on informal sources and the need to eliminate these sources<sup>54</sup>. The formal credit sources are estimated to provide as much as 80% of rural credit needs<sup>55</sup>, and portrayed as gaining strength against informal ones in rural areas and agriculture<sup>56</sup>. For the coffee region specifically, an Oxfam study shows only 6.6% of surveyed households are indebted to traders or middlemen, versus 66% being indebted to banks<sup>57</sup>. Advocates for reducing the role of the informal market draw their reasons from well-established observations of high interest rates and extractive behaviours associated with, and often considered a cause of, economic stagnation in “*backward agricultural regions*”<sup>58</sup>. Certainly the informal credit sector in Vietnam shares the same problems observed elsewhere in the developing world, but in the country’s economic transition the informal sector is better positioned to respond to legal loopholes and ambiguities. Within the coffee expansion, its influence extends beyond financing production and it serves to distribute capital from formal institutions to farmers.

A large number of FACIs lend to coffee companies with no connection to coffee production. These companies are mostly involved in exporting activities; they buy the green beans, sort and package them and sell to foreign importers. Buying takes place towards the

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<sup>54</sup> “If the formal sector entered the market for non-production loans (on financially sustainable terms) this would provide borrowers with an alternative to private money lenders. This could well be welfare increasing, especially for marginalized low-income households”. Barlund and Tarp, p32

<sup>55</sup> Pham and Izumida, p 322

<sup>56</sup> “Data from the 1993 Vietnam Living Standards Survey (VLSS) shows 40 percent of loans in rural areas were from private individuals, 33 percent from private money lenders, and 25 percent only percent from banks and other formal sources.” Vietnam Development Report 2006: Business, p 60

<sup>57</sup> Oxfam p 22

<sup>58</sup> Basu, chapters 13, 14.

end of harvest season during the month of December, while selling takes place in late December and during January. The need for capital among companies falls heavily on the beginning of harvest season, and most exporters borrow heavily. It is estimated that the annual capital needs amount to VND 12,000 - 15,000bn (USD 700-870m). Once the exporters have received their allocated funds, they use the fund for purchasing green beans from farmers. An organisational problem arises: there are about one hundred exporters, and roughly half a million coffee farms. The buying process requires an extensive network of buying agents, which the exporters do not have. Exporters buy directly from farmers only 7% of the total output, the rest is purchased from a network of private buyers and middlemen, as shown in figure 5.

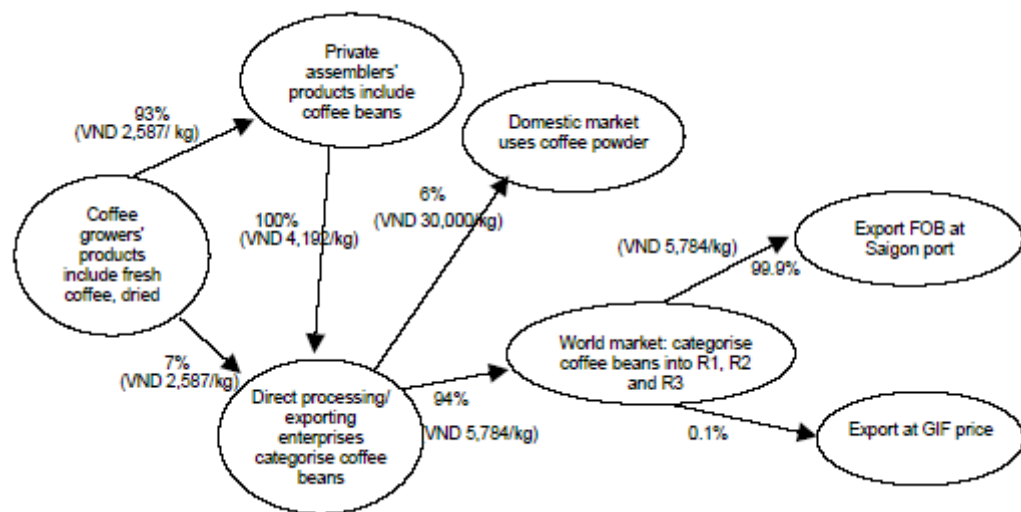


Figure 5: Vietnamese Coffee Chain

The middlemen are coffee farmers who also act as informal credit providers and a buyers during harvest seasons, mainly working within their locality. They have both the technical knowhow and the knowledge of personal circumstances that might affect the production and output in the neighbourhood. The relationship between middlemen and other farmers is a process of repeated interactions, even if no transaction is expected in the immediate future.

Middlemen are organised in a hierarchical community. Small middlemen sell to larger ones; the largest middlemen sell directly to exporters. This is an even more rigid process of repeated interactions, since transactions take place every season. Companies deposit capital to the largest middlemen, who distribute it to smaller ones, to gather and deliver coffee to the companies; though middlemen also buy coffee using their independent resources. Middlemen are widely recognised for their role as buying units within the coffee exporting process, bringing coffee to exporters. In so doing, they fulfil another, equally important role, that of distributing funds from exporters to farmers.

## CREDIT MARKETS AND COFFEE: THEORY

### 1. MONOCULTURE MODEL.

The microeconomic model in this section is based on the models in Stiglitz and Weiss (1981) and Braverman and Stiglitz (1986). The first model was developed to demonstrate why banks ration credit when borrowers possess information that banks do not; the second is an elaboration of the first to explain the specific cost-sharing arrangements in the sharecropping relationship between tenants and landlords. While the second paper addresses issues that are highly relevant to this thesis, it does not apply to the immediate subject matter because Vietnamese coffee farmers informally own their land. The relationship between farmers and lenders is not tenancy; and Vietnamese banks face constraints that the hypothetical, well-behaving banks do not. This section will quantify the specific conditions of the Vietnamese credit markets for coffee farmers, and use the analyses of the results to explain the role of credit markets in the coffee expansion.

Coffee farmers have two sources of credit: state-owned institutions and social programmes, and private lenders. Private lenders can be family members, friends or relatives, but the model takes into account the case when the private lenders are the middlemen who act as both lenders and buyers of crops. The model examines three scenarios. In the first, banks are the only source of credit for farmers. In the second, farmers can only borrow from private sources. And the third scenario is the status quo, when farmers can borrow from both sources but face different conditions in the formal and informal credit markets.

#### SCENARIO 1: BANK CREDIT ONLY

In the absence of the informal sources, farmers borrow from banks. For the most part, farmers do not have legal title to their farms, and when they do, the legal framework for seizing collateral by financial institutions is incomplete, therefore banks cannot use collateral.

Another constraint on banks is interest rate, which is fixed at a low level in accordance with state policies to subsidise the poorer part of the population, most of whom are in the agricultural sector. For the sake of simplicity, assume there is only one bank that lends to farmers. This assumption is quite close to reality, as VBARD is the only significant bank with a stake in agricultural finance.

Production function of farmer:  $F=F(k,e)$ ;  $e$  is farmer's effort level, which represents labour and other inputs controlled by farmers;  $k$  is the amount of capital bank allocates to a farmer.  $F(k,e)$  is concave in  $k$  and  $e$ <sup>59</sup>.

Output value:  $Q=\theta F(k,e)$ .  $\theta$  represents the state of nature, or the output and price movements, that all farmers receive;  $P(\theta)$  is the probability density function of  $\theta$  and expected value  $E(\theta)=1$ . Bank can observe  $Q$  but not  $e$ .

$$\text{Farmer's return: } y = \begin{cases} X = Q - (1+r)k & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad \text{Bank's profit: } \pi_B = \begin{cases} (r_B - r)k & \text{if } X \geq 0 \\ Q - (1+r)k & \text{otherwise} \end{cases}$$

$$\bar{\theta} \text{ is the value of } \theta \text{ at } X=0; \quad \bar{\theta} = \frac{(1+r_B)k}{F(k,e)}$$

Farmers' utility function:  $U=U(e,y)$

Banks set  $k$  to maximise total expected profits, subject to:

$$\begin{cases} U^0 - U^1 \geq 0 \\ U^0 - U^2 \geq 0 \end{cases} \quad (1) \text{ and } \begin{cases} U^1 = \text{Max}U[0, y] \\ U^2 = \text{Max}U(e, y | k = 0] \end{cases} \quad U^0 = \text{Max}U[e, y]$$

$U^1$  is the utility when farmer puts no effort into production;  $U^2$  is farmer's reservation utility when farmer does not borrow.

Banks' expected profits:

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<sup>59</sup>  $F(0,0)=0$  but  $F(0,e)\geq 0$  and  $F(k,0)\geq 0$



$$(2) \quad E\pi_B = n\{(r_b - r)k + \int_0^{\bar{\theta}} [\theta F(k, e) - (1 + r_b)k]P(\theta)d\theta\}$$

In (2),  $(r_b - r)k$  is a constant term which represents the profit from lending of banks in the absence of default; the rest of the RHS is a negative term signifying the potential losses of lending. Here  $r_b$  is set to equal  $r$  to capture the fact that credit is subsidised.

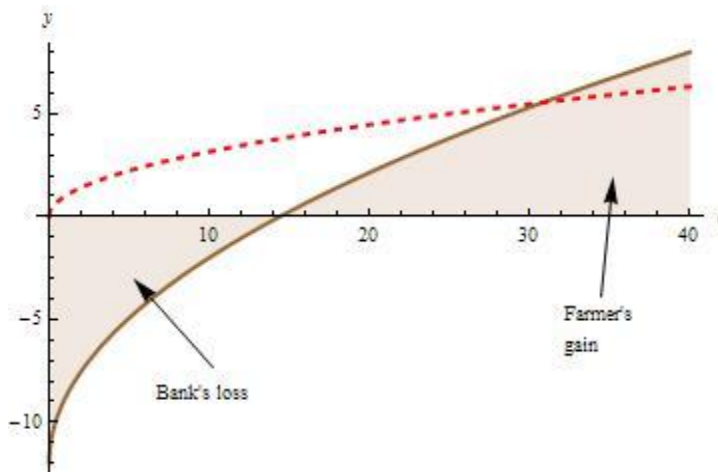


Figure 6: Bank's and Farmer's gain with continuous effort

In figure 6, the dashed line represents farmers' continuous effort. The shaded area below the x-axis shows bank's loss if effort is continuous as plotted, and the shaded area above the x-axis shows farmer's gain.

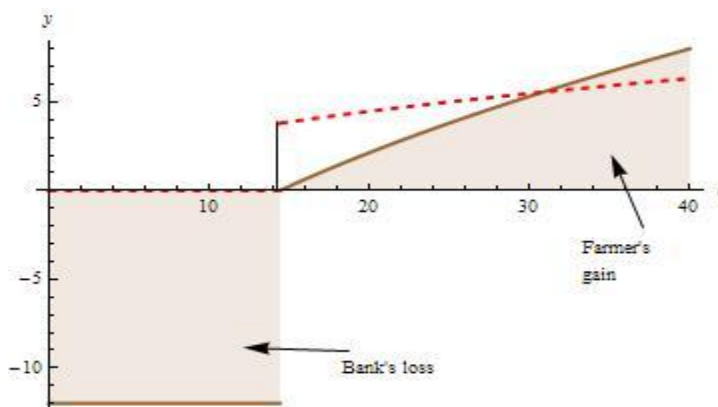


Figure 7: Bank's and Farmer's gain with discontinuous effort

In reality, effort is not continuous. Once farmer's gain drops to 0 and below they gain nothing by maintaining positive effort. Utility maximising farmer would lower effort to 0 at this point. As shown in figure 7, farmer's effort is discontinuous at breakeven point, and the total loss to bank would be the entire shaded area in figure 7, which is larger than in figure 6. Since banks can only observe  $Q$  and not  $e$ , when  $\theta$  is below  $\bar{\theta}$ , farmers will contribute minimal effort. The higher  $\bar{\theta}$ , or the higher farmer's utility from defaulting, the larger the losses to bank. Subsequently bank has two incentives to reduce  $k$ : first, to reduce farmer's defaulting utility; and second, to reduce  $\bar{\theta}$ .

This scenario reflects the biggest problems with Vietnamese FACIs that engage in financial transactions with farmers: they face high risks of default and the limited means to minimise losses. These problems cannot be cured by the banking industry, until it ceases to be instrumental to the implementation of public policies and assumes greater independence. Second, de jure property rights must translate into de facto property rights. This requires both the issuance of LUCs to all coffee farmers, and the establishment of a mechanism that allows banks to exercise their rights on the property of debtors and use them as a credible threat to enforce payment and induce farmers' effort at low cost.

Even when the legal and practical frameworks are established, banks still have an incentive to ration credit, as *"increasing interest rates or increasing collateral requirements could increase the riskiness of the bank's loan portfolio, either by discouraging safer investors, or by inducing borrowers to invest in riskier projects, and therefore could decrease the bank's profits."*<sup>60</sup> Finally, the practice of credit rationing when the demand of fund exceeds supply implies that banks get to choose its borrowers. Farmers' competition for loans from the formal market generates

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<sup>60</sup> Stiglitz and Weiss, p 408.

rent-seeking behaviour. While the systemic problems with banks are unsolved, their current practice will persist. Banks will continue to ration their capital among farmers, giving out small loans to avoid losses. The banks' current agricultural lending model does not include the expansion option, and public policies that prioritise giving small loans to a large number of poor farmers over giving out a large loan to a well-to-do farmer is partly responsible for it. But there are powerful loss-minimising rationales behind the practice.

## SCENARIO 2: PRIVATE CREDIT ONLY

In this scenario, there is no formal credit. Farmers borrow from local lenders. The informal credit market has two distinct characteristics. First, the market is localised and monopolistic, thus every village or neighbourhood has only one lender who lends to farmers in that area. If a farmer wants to borrow from a lender from a different area, he is charged with higher interest rate. This assumption is reasonable if information costs are considered. The local lender has more knowledge of a borrower's history than his outside counterpart, which would reduce the cost of monitoring and enforcement if necessary. The second characteristic is that the use of collateral is applicable for two reasons: first, the informal markets recognise de facto property rights that banks do not and lenders can exercise their threat to seize a property without adhering to legal procedures; second, lenders and borrowers are bound by communal ties which would be costly to farmers if they defaulted on their debts.

There are two kinds of loan contracts within this scenario. The first is a normal loan contract, similar to the contract between farmer and a bank. The second is an interlinked contract. Interlinkage is a practice whereby agents are engaged in multiple transactions simultaneously; the terms and completion of one is conditioned upon others. Over normal transactions, interlinkage lowers transaction costs by providing more information and more

channels to align the interests of involved parties. In this context, lenders often trade coffee themselves, and have the incentive to make the relationship between the lender and borrower an interlinkage in which the loan offered to a borrower is conditional upon a share in output value for the lenders. This share can take the form of a discount in the price of the crop that the lender pays to the borrower.

a) Normal contract

Lender has limited capital endowment  $C$  and divides it between  $n$  identical farmers, each receiving amount  $k = C/n$ . Lender sets  $k$  (and hence  $n$ ), and interest rate  $r^1$ .  $r^1 > r$  which is also lender's opportunity cost.  $sc$  is a farmer's cost of default. It could be either the collateral, which the lender can seize if  $e$  is 0, or the social capital that farmer would lose by defaulting. To show how this is a primarily preventive measure,  $sc$  is modelled as having no value to the lender.

$$\text{Farmer's return: } y = \begin{cases} X = Q - (1 + r^1)k & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Lender's profit: } \pi_L = \begin{cases} n(r^1 - r)k & \text{if } X \geq 0 \\ n[Q - (1 + r)k] & \text{otherwise} \end{cases}$$

Lender maximises expected profit, subject to

$$(4) \quad \begin{cases} U^0 - U^1 \geq 0 \\ U^0 - U^2 \geq 0 \end{cases} \text{ Given: } \begin{cases} U^1 = \text{Max}U[0, y] - sc \\ U^2 = \text{Max}U(e, y | k = 0) \end{cases} \text{ and } C = nk$$

$$(5) \quad E\pi_L = n\{(r^1 - r)k + \int_0^{\bar{\theta}} [\theta F(k, e) - (1 + r^1)k] dP(\theta)\}$$

FOCs:

$$(6) \quad E\pi(r^1) = n\{k[1 - \int_0^{\bar{\theta}} P(\theta) d\theta] + F_e \frac{\partial e^0}{\partial r^1} \int_0^{\bar{\theta}} \theta P(\theta) d\theta\} + (\lambda + \mu)U_{r^1}^0 = 0$$

$$(7) \quad E\pi_L(k) = n\left[F_k + F_e \frac{\partial e^0}{\partial k} - \frac{F(e, k)}{k}\right] \int_0^{\bar{\theta}} \theta P(\theta) d\theta + (\lambda + \mu)U_k^0 = 0$$

The first term on the RHS of (6) is the derivative of  $E\pi_L$  with respect to  $r^1$ . If it is equal 0, by the concavity of  $F$ ,  $\frac{\partial e^0}{\partial r^1} < 0$ , which means that effort level falls as interest rate increases. This is a simple and intuitive result. The effect of  $k$  on effort is less straightforward. Using the FOCs, farmer's effort level could be solved as a function of the variables controlled by the lender:  $e = e(k, r_1)$ .

The FOCs bespeak many fundamental differences between this case and the case of formal credit. Private lenders can choose both the amount of loan and the interest rate, and use both to influence the choice of effort level by farmer. The response of a private lender to farmers' incentive to default is more nuanced. Bank's choice of  $k$  is used to minimise default risks, while the lender's choice of  $k$  has to balance two requirements: reducing farmer's incentive to default, and inducing more production which will increase the probability of repayment. What makes their use of capital and interest rate more effective is the variable  $s_c$ , which lowers the utility from defaulting rather than lower farmer's immediate return. This is partly because  $s_c$  denotes social capital that cannot be quantified, but was costly to accumulate and costly to recover when lost. The loss of social capital due to default might signify, for example, that the borrower can no longer borrow from his local lender in the future; and since it is costlier to borrow from an outside lender,  $s_c$  can also be taken as the cumulative costs of borrowing from outside. Additionally,  $s_c$  can also represent the threat to seize collateral which are more valuable to the borrowers than to the lender, or that seizing collateral is costly to borrowers.

b) Interlinkage

There are four variables: capital ( $k$ ), effort ( $e$ ), farmer's share in output ( $\alpha$ ), and interest rate ( $r^1$ ). In this model, farmer determines effort while the lender determines the other three, given the lender's limited capital endowment  $C$ . Farmer chooses  $e$ ; lender chooses  $(\alpha, k, r^1)$ .

$$\text{Farmer's return: } y = \begin{cases} X = \alpha Q - (1 + r^1)k & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Lender's profit: } \pi_L = \begin{cases} n[(1 - \alpha)Q + (r_B - r)k] & \text{if } X \geq 0 \\ n[Q - (1 + r)k] & \text{otherwise} \end{cases}$$

Lender maximises expected profit subjects to (4)

$$(8) \quad E\pi_L = n\{[(1 - \alpha)F(k, e) + (r^1 - r)k] + \int_0^{\theta^0} [\alpha\theta F(k, e) - (1 + r^1)k]P(\theta)d\theta\}$$

FOCs:

$$(9) \quad E\pi_L(\alpha) = n[-F + (1 - \alpha)F_e \frac{\partial e^0}{\partial \alpha} + (F + \alpha F_e \frac{\partial e^0}{\partial \alpha}) \int_0^{\bar{\theta}} \theta P(\theta)d\theta] + (\lambda + \mu)U_\alpha^0 = 0$$

$$(10) \quad E\pi_L(r^1) = n\{F_e \frac{\partial e^0}{\partial r^1} [(1 - \alpha) + \alpha \int_0^{\bar{\theta}} \theta P(\theta)d\theta] + k[1 - \int_0^{\bar{\theta}} P(\theta)d\theta]\} + (\lambda + \mu)U_{r^1}^0 = 0$$

$$(11) \quad E\pi_L(k) = n\{(1 - \alpha)[F_e \frac{\partial e^0}{\partial k} - \frac{F}{k}] + \alpha(F_k + F_e \frac{\partial e^0}{\partial k} - \frac{F}{k}) \int_0^{\bar{\theta}} \theta P(\theta)d\theta\} + (\lambda + \mu)U_k^0 = 0$$

The first term on the RHS of (9) is the derivative of  $E\pi_L$  in  $\alpha$ . When that equals 0, it follows

that  $\frac{\partial e^0}{\partial \alpha} > 0$ , meaning that effort level increases as farmer's share of output increases.

Similarly, using the first term on the RHS of (10),  $\frac{\partial e^0}{\partial r^1} < 0$ , which is a similar result to one

obtained by (6). Comparing (6),(7) with (9),(10), (11), the rationale for interlinkage becomes

clear. Lender has another instrument to manipulate the choice of effort level, since

$e = e(\alpha, k, r^1)$ . If interlinkage does not increase lender's expected profit, lender can simply return to the use of a normal contract by setting  $\alpha=1$ , in which case (10) and (11) will converge to (6) and (7). Part of lender's profit comes from output, therefore lender has a direct incentive to induce farmer to produce more by giving farmers lower interest rates and higher output share. The impact of loan size on effort level is undetermined.

In scenario 2, the lender's incentive to induce farmers to produce more becomes evident, and the lender can do so through the use of interest rate and output share. Though private lenders are the least affected by market movements, nothing indicates that they are in a better position than banks to finance expansion. If lenders are in an interlinked contract, they have a strong incentive to lend for production purposes to increase their returns, because small production loans maximise their return in output. If they are engaged purely in normal loan contracts, small loans still lower default risks. Therefore it is impossible to make any assertion as to what impact the size of the loans  $k$  has on the effort level of farmers. Lender's incentive does not automatically make farmers give out larger loans.

The incentive of lenders becomes even clearer when the source of their capital is taken into consideration. Most exporters get short-termed commercial loans (six to twelve months) from banks and other institutions to buy the coffee, and repay once they have sold the crop to international buyers. As the exporters distribute the capital to their agents and these agents give out loans to farmers, commercial loans are transformed into agricultural loans. From the perspective of the banks, this is more secure than lending directly to farmers, because it incorporates the advantages of private lenders' low information and enforcement costs and combines them with the guarantee of repayment from exporters. The double role of the middleman, like the incomplete establishment of property rights, embodies the complementary roles of formal and informal institutions in the Vietnamese economy.

### SCENARIO 3: THE STATUS QUO

The status quo is a combination of the first two scenarios. Formal and informal credit markets coexist and are bound by the same constraints stated above.

Farmer decides effort level  $e$ , bank decides fixed amount  $k$  to lend at  $r_b = r$ , and lender decides farmer's share of output  $\alpha$ , size of loan  $b$  (and hence number of farmers,  $n=C/b$  since lender has limited endowment  $C$ ), and interest rate  $r^1$ . In the most complex scenario, the relationship between the lender and the farmer is an interlinked contract.

$$\text{Farmer's return: } y = \begin{cases} X = \alpha \theta F(k, b, e) - (1 + r^1)b - (1 + r)k & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Lender's return: } \pi_L = \begin{cases} n[(1 - \alpha)\theta F(k, e) + (r^1 - r)b] & \text{if } X + (1 + r)k \geq 0 \\ n[\theta F(k, e) - (1 + r)b] & \text{otherwise} \end{cases}$$

$$\text{Bank's return: } \pi_B = \begin{cases} (r_b - r)k & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

Without going into the specific equations and FOCs, there is an obvious and intuitive result: under the status quo, farmers would repay to lender before they repay to the bank, because the cost of default is higher in the private contract. There are two threshold values of  $\theta$  instead of one.

$$\begin{array}{ll} \bar{\theta}_1 : X = 0 & \bar{\theta}_2 : X + (1 + r_b)k = 0 \\ \Leftrightarrow \alpha \theta F(k, e) - (1 + r^1)b - (1 + r_b)k = 0 & \Leftrightarrow \alpha \theta F(k, e) - (1 + r^1)k = 0 \\ \Leftrightarrow \theta = \frac{(1 + r_b)k + (1 + r^1)b}{\alpha F(k, e)} = \bar{\theta}_1 & \Leftrightarrow \theta = \frac{(1 + r^1)k}{\alpha F(k, e)} = \bar{\theta}_2 \end{array}$$

Since  $\bar{\theta}_1 > \bar{\theta}_2$ , the bank is put in a precarious position by the coexistence of the informal lender. Figure 8 shows the gains and losses to all parties involved. Lenders receive their full expected profit from lending at  $\bar{\theta}_2$  while bank does not receive their lending profit till  $\bar{\theta}_1$ . If



$\bar{\theta}_2 \leq \theta \leq \bar{\theta}_1$ , farmer can generate positive return both by defaulting on bank loans and by putting in continuous efforts. This situation is illustrated in figure 8. The dotted line represents lender's return. The shaded area under this line represents farmer's return if they default on bank's debt but not on private lenders' debt. Since the level of  $e$  that guarantees  $\bar{\theta}_2 \leq \theta \leq \bar{\theta}_1$  is lower than  $e^*$  - effort level at  $\bar{\theta}_1$  - and the utility function decreases in  $e$ , there is a possibility that farmer would choose default. This choice does not affect lender's return, but increases bank's loss, which is the entire shaded area under the x-axis. The existence of the informal credit market magnifies the principal-agent problem between the bank and farmer by reducing the output value that bank can observe by the same amount as farmer's private debt. When  $\theta$  is high and the return from continuous effort outweighs the effect of effort level on utility, the choice to default is less likely; but when crop value falls, the reverse is true.

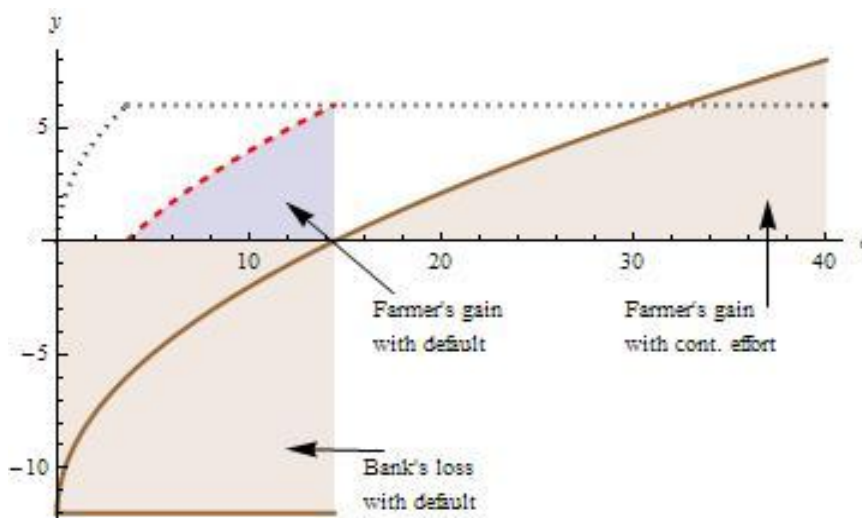


Figure 8: The Status quo

## 2. TWO-CROP MODEL

The preference of the credit markets for small production loans explains the low demand for farm expansion; even if farmers want to enlarge their farms, they often cannot obtain the necessary resources. However, the supply of farm land is also low, which further assists the persistence of small farms. In 2000, as coffee prices dropped to 10% of peak level, prices of coffee farms nearly halved<sup>61</sup>, and by 2003, less than 10% of the coffee growing area was converted for production of some other crop. Despite the lack of data, existing evidence highlights how farmers are unwilling to give up their farms, which held up coffee farm prices even when prices were low.

Luong and Tauer (2004) assume that the value of investment in the form of a farm is a function of current prices. This assumption explains the rate of overall coffee expansion during boom years, but can account for neither the low rate of contraction nor the relatively high price of coffee farms in bust years. Dang and Shively (2004) show that small farmers responded to price declines mainly by cutting inputs and input costs; and *“Small farms appear to have been somewhat restricted in their willingness or ability to respond to falling coffee prices... small farms and ethnic minority households appear to ... adjust to price changes in more fundamental ways, including shifting land to new crops”*<sup>62</sup>. None of the 210 surveyed household in the Shively data sold land. In the period when expected values of farms were at the lowest, farmers refused to give up their land. This lack of supply drove up capital requirement and discouraged potential buyers.

Why do coffee farmers consistently hold on to their land? The most obvious explanation is a combination of high initial investments and the lack of an alternative. The farm represents most, if not all, of farmers' wealth, which cannot be fully recovered during a period of price collapse. Besides, by selling off the farm, farmers must switch out of

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<sup>61</sup> <http://nld.com.vn/80313P0C1002/kon-tum-gia-dat-vuon-ca-phe-giam-manh.htm>

<sup>62</sup> Dang and Shively, p 322-323

agricultural production altogether, and there is no alternative route for them. Therefore, individual cases of land sales can take place but not on a scale large enough to drive down overall land price levels.

The second reason is that farmers could afford to hold on to their farms. Price collapse implied a sudden fall in the value of  $\theta$ , which rendered the formal loans void. Informal loans are settled with lenders seizing the whole of borrower's output, but at a very low  $\theta$  the losses would fall on the lender because market value of total output is less than the debt. The usual effect of price collapse on farmers is the immediate depletion of capital, which prevents production in coming seasons. Switching to other crops and reducing inputs in this case are the appropriate responses since they lower capital requirement, but they also lower  $e$ , raise farmer's reservation utility, and lower  $Q$ . According to the model, credit markets should reduce the amount of capital available due to increasing default rates. However, the banks decided instead to not ask farmers to repay existing loans in 2000-2003. This decision, which is deeply rooted in the political calculations surrounding coffee production, in effect provided more liquidity to farmers and helped them weather the low prices via the aforementioned responses.

The first model, which assumes that coffee farmers all practice monoculture, does not capture the fact that many farmers responded to price collapse by diversifying their crops. The following model includes a second-crop option and explains farmers' crop choices as a response to their beliefs about crop values.

Farmer has total input  $\bar{e}$  and chooses to allocate it between two crops: coffee-  $e_c$  - and other-  $e_o$  . Farmer can also choose to not work:  $e = \bar{e} - e_c - e_o \geq 0$  . Farmer obtains credit  $\bar{k}$  from banks and lender. In this simple model, assume that farmers get all their capital

from a private lender in a normal contract. Lender controls  $\bar{k}$  and  $r^1$ . Farmer allocates capital between coffee- $k_c$ - and other- $k_o$ . Farmer can also choose not to put capital into production, but into consumption:  $k = \bar{k} - k_c - k_o \geq 0$ .

Farmers face two production output functions:

$$\begin{cases} \text{Coffee : } Q_C = \theta_C F(e_c, k_c) & \theta_C : \text{state of nature for coffee, } E(\theta_C) = 1 \\ \text{Other : } Q_O = \theta_O F(e_o, k_o) & \theta_O : \text{state of nature for other crop, } E(\theta_O) < 1 \end{cases}$$

$$\begin{cases} P(\theta_C) : \text{Probability density function of } \theta_C \\ P(\theta_O) : \text{Probability density function of } \theta_O \end{cases} \text{ And covariance of } \theta_C \text{ and } \theta_O \text{ is } 0.$$

$$\text{Farmer's return: } y = \begin{cases} X = \theta_C F(e_c, k_c) + \theta_O F(e_o, k_o) - (1 + r^1) \bar{k} & \text{if } X \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Farmer's utility function: } U = U(y, k, e) = U(Q_C + Q_O - (1 + r^1) \bar{k}, \bar{e} - e_c - e_o, \bar{k} - k_c - k_o)$$

$$\text{Lender's profit: } \pi_L = \begin{cases} (r^1 - r) \bar{k} & \text{if } X \geq 0 \\ X = \theta_C F(e_c, k_c) + \theta_O F(e_o, k_o) - (1 + r) \bar{k} & \text{otherwise} \end{cases}$$

The two crops have similar production functions; the only difference is that they face different fluctuation patterns in overall values, represented by the expected value and the distribution of the state of nature variables. Coffee has higher expected value  $E(\theta_C)$ , but the variance of  $\theta_C$  is greater than the variance of  $\theta_O$ . There is a tradeoff since coffee is a riskier crop but it also has higher value on average<sup>63</sup>. Farmer's allocation of capital and effort between the two crops represents the tradeoff between high payoff and security. Farmer's utility level is affected by effort and capital allocated to the production of the two crops in two ways: the total amount of effort and capital used in production affects the residual effort and capital ( $e$  and  $k$ ), while the specific allocations of effort and capital between the crop affects farmer's return.

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<sup>63</sup> Bui Quang Binh (p42) calculates that coffee on average the net profit of coffee production is roughly 3.4 times that of corn and 2.7 times that of pepper, which are popular alternatives.

In this setting, the negative impacts of coffee production on utility are the same as the impacts of the other crop. At any given level of residual effort and capital  $e$  and  $k$ , effort and capital would be allocated between the two crops so that their marginal productivity levels are the same. In case of actual losses due to low crop values, the cost is the same and is borne by the lender. In other words, farmer chooses  $(e_c, e_o), (k_c, k_o)$  to maximise  $U$ ; at any

given level of  $(e, k)$ , the problem is to maximise  $y$  subject to  $\begin{cases} e_c + e_o = \bar{e} - e = const_1 \\ k_c + k_o = \bar{k} - k = const_2 \end{cases}$  (12)

$$(13) \quad y = \theta_C F_c(e_c, k_c) + \theta_O F_o(const_1 - e_c, const_2 - k_c) - (1 + r^1) \bar{k}$$

The profit-maximising strategy for farmer would be to allocate all effort and capital to coffee production since it has higher expected value. As farmers made this choice repeatedly over the years, the coffee growing region became dominated by coffee.

The years 2000-2004 were a period of prolonged low prices unprecedented in the short history of coffee in Vietnam, which could change farmers' estimate of the profitability of coffee, specifically by lowering expected value ( $E(\theta_C) < 1$ ), or by changing their perception of the distribution of  $P(\theta_C)$ . Since the distributions of value and risk between coffee and the other crop are not related, more risk-averse farmers would switch crop. In response to crop-switching, private lenders would simply choose a different combination of  $(k, r^1)$  to maximise profits, as shown in scenario 2 of the first model. Crop-switching essentially makes land price independent of coffee prices.

<i>Response</i>	<i>Small farms (0–1.5 ha)</i>	<i>Large farms (1.5+ ha)</i>	<i>All farms</i>
No response	32.8	26.4	30.6
Reduced fertilizer	44.5	34.7	41.1
Eliminated fertilizer	10.9*	29.2*	17.2
Reduced irrigation	5.1	9.7	6.7
Eliminated irrigation	6.6*	22.2*	12.0
Planted new crops	10.2	8.3	9.6
Removed coffee	8.0*	2.8*	6.7
Borrowed money	3.6	4.2	3.8
Got a job	5.8	2.8	4.8
Sold livestock	2.2	0.0	1.4
Sold land	0.0	0.0	0.0
<i>N</i>	137	72	209

*Note:* multiple responses possible. An asterisk indicates the difference between means is statistically significant at a 90% confidence level.

*Source:* survey data.

Figure 2: Coffee farmers' response to price collapse, Source: Dang and Shively

The Shively data showed only less than 10% of surveyed farmers chose this option, most of them only cut down a small portion of their coffee land. The only farmers that switched out of coffee completely are also those with the smallest farms. This underwhelming response might partly be due to the regional effect of the data, since all of the farms surveyed are in two counties of Dak Lak provinces. In other parts of the Central Highlands, the effect of the price collapse was more pronounced. In some counties, 90% of the coffee growing area was lost by 2004<sup>64</sup>. That no farmers sold any land and only a low percentage of farmers switched crops might also mean that most farmers did not change their belief about coffee's profitability. As to why certain areas abandoned coffee faster than did others, there are a few explanation. Luong and Tauer hypothesize that the least cost-efficient farms would drop out of production first. Shively and Dang focus on size and show that small farms are most likely to switch crop. It remains to be tested whether geography and community had any impact on crop-switching likelihood.

<sup>64</sup> [http://www.dongnai.gov.vn/cong-dan/tin\\_nongnghiep-nongthon/mlnews.2006-11-30.6688894856/view](http://www.dongnai.gov.vn/cong-dan/tin_nongnghiep-nongthon/mlnews.2006-11-30.6688894856/view)

## CONCLUSION

Why are the small Vietnamese coffee farms so small? This question goes further than its immediate subject. Small farms, like motorbikes and street vendors, are tiny agents in the string of anomalies and inefficiencies that is the everyday life of Vietnam, a developing country in transition. Often, starting with one small question on such specific issue, one gets into layers of problems deeply woven into the socio-economic fabrics of the country.

Coffee farms, it turns out, are small because the big farms failed to produce. The small farm emerged as Vietnamese agriculture moved away from collectivisation towards more private ownership. This movement was part of a more comprehensive reform which aimed to help the country transition into a more open market system. Small coffee farms represented the economy's first, tiny, and crucial steps away from a stifling centralised system. Although the farmers who cultivate them have almost complete freedom over production and output, the farms remain state-owned.

Limited as they are in terms of production capacity and technical innovations, these initial small coffee farms triggered an large wave of private farms that sprang up in the coffee regions in the late 1980s. Thousands unofficial immigrants moved to the Central Highlands, often following the footsteps of their friends and relatives. Unofficial immigrants had strong communal ties and often consolidated themselves in groups. The small farm as a mode of production was copied and spread along these communities well into the 1990s. They then multiplied even faster thanks to events at the other end of the world: a drought in Brazil in 1994 cut world supply of Robusta coffee, raised prices and profits to all time peaks, and helped even more farms to be established in Vietnam. The 59% annual expansion rate of total coffee growing area during the second half of the 1990s reflected the overly

enthusiastic response of Vietnamese farmers who were exposed for the first time to the favourable terms of a global market.

Coffee farms, it turns out, were small also because their owners face credit constraints. Coffee farms, in contrast, are costly, and get costlier as farm size increases. Poverty and the subsequent lack of capital among poor farmers put a limit on the size and the organisational structure of the farms. Neither the formal market nor the informal lender is willing to supply the farmer with the capital required for expanding the farm. Loans of such size increase the risk of default, especially in the absence of collateral. Besides, both formal and informal sources are disincentivised to provide for anything beyond the farmers' immediate production needs. Formal credit institutions must fulfill their role as an instrument of social policies; they prefer giving out small loans to a large number of poor recipients to giving out large loans to a few. Private lenders' preference for small loans is especially pronounced if the lenders also serve as traders who buy the crop and resell it to exporters. Lenders in their double role help transforming commercial loans that banks give to exporters into production loans for farmers, but they have no incentive to help farmers expand their farms.

The coexistence of formal and informal credit markets even held up prices of farms, making farm expansion less feasible. The price of coffee farms often varies with coffee prices, but when the price of coffee collapsed the price of farms did not fall accordingly. When coffee price collapsed, coffee land prices diverged from it and remained relatively high because the financial markets helped farmers afford to hold on to their land. Formal institutions which extended credit to farmers during the price collapse helped sustain



production. Informal lenders have the same incentive to lend for the production of alternative crops as for the production of coffee.

The complementary role of the informal market to the formal market is not purely beneficial. If and when the banks fail to monitor the effort of its borrowers, the borrowers' incentive to underperform and default on bank loans is strengthened by their relationship with informal lenders. Most of the problems with the financial markets would be curbed if farmers could put up assets to back up their loans and banks could credibly threaten to seize collateral. However, collateral as a risk-minimising device does not apply since the legal development of property rights is incomplete. Property rights do exist and are effective but mostly informally; they are defined and enforced by communities' recognition rather than by the law's.

A banking system that struggles to meet both its political obligations and its economic motives in the presence of an informal market showcases the problem that defines the economy as a whole: the struggle between the state's attempts to create a new economic order and the markets' emerging orders. Informal land and credit markets are the private sector's spontaneous responses to the shortcomings of the de jure economic framework, but their impacts on the overall economic outcomes are not entirely positive. Small farms as an institution are not an evolutionary success, but one that emerged and persisted due to the inherent problems in its history and in other institutions surrounding it. Social and cultural capital did contribute to the establishment of small farms, but there is no cultural belief that predicted the farm's specific form and size. Political institutions and political rules did shape the farms, but they also failed in many respects to regulate its development and are responsible for many of its limitations. The case of the small coffee farm shows that there is

no simple answer to the question of *“Why do certain societies choose different policies, different institutions, and radically different ways of organizing their lives?”* Though the problems can be easily identified, a solution is often elusive because it has to address root causes that are individually complex, and collectively interlaced. The absolute goals of economic development can be universal, but the trajectory of development is unique to every country and region.

There are areas in the history of Vietnamese coffee that need further studies. Data on land sales and agricultural banks’ performance are extremely scarce. The role of communities in the coffee expansion is largely ignored. Current understanding of the role of communal support in the development of coffee farm is very limited. How only few among many people with relatively equal endowments became lenders, for example, is a question unexplored. Existing data roughly divide communities according to ethnicity, though anecdotal evidence suggests more peculiar divisions along provincial lines. Given the visible impacts of ethnic divisions on the economic disparity between ethnic majority and minority villages, one would expect provincial/ county divisions to have similar effects. The communal organisation of coffee production would be a potential topic for further research.

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APPENDIX 1: The difference between Vietnamese and world coffee price

	Vietnam's FOB price (USD/ton)	ICO Price (USD/ton)	Difference	Percentage loss
1999	1213.6	1482.1	-268.5	22.12426
2000	658.4	889.8	-231.4	35.14581
2001	400.4	606	-205.6	51.34865
2002	427.8	656.1	-228.3	53.36606
2003	643.6	804.7	-161.1	25.03108
2004	647.5	785.9	-138.4	21.37452
2005	788.8	1099.4	-310.6	39.37627
2006	1188	1476.6	-288.6	24.29293
2007	1529.2	1902.3	-373.1	24.39838
2008	1980	2465.8	-485.8	24.53535

Source: Doan Trieu Nhan

APPENDIX 2: Daklak province's coffee growing area and total output

Years	Area (hectare)	Total output (tons)
1995	107,735	136,155
1996	122,601	137,751
1997	130,583	183,039
1998	134,008	212,898
1999	180,299	245,382
2000	183,329	300,677
2001	180,992	348,289
2002	167,214	325,408
2003	166,619	284,349
2004	165,126	360,880
2005	170,403	330,660
2006	174,740	435,025
2007	178,050	325,069

Source: Daklak Accounting Archives, Daklak Accounting Department