LABOR ARRANGEMENTS AND FINANCIAL INCLUSION OF AGRICULTURAL WORKERS IN A DYNAMIC AGRICULTURAL REGION IN MEXICO: EXPLORING THE LINKAGES

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Paper submitted to the "6èmes Journées recherches en sciences sociales" – INRA – SFER – CIRAD – Toulouse School of Economics, December 13-14, 2012

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Abstract:

A Q-square approach is used to examine the linkages between labor markets and financial markets, at a micro level. We focus on contractual labor relationships of agricultural wage workers in Mexico and we try to assess whether, and to what degree, their status as agricultural workers translates into some forms of rationing with regards to their financial practices.

Results reveal a lower rate of formal financial inclusion and distinctive features of financial practices for agricultural wage workers. However, the interpretation of this in terms of exclusion is not straightforward. Rather, we suggest that income patterns associated with agricultural wage status generate needs and constraints that are less suited to the characteristics of the formal supply of financial services than informal ones. Social and family networks can also act as gateways, facilitating access to formal financial services.

Key words: agricultural workers, financial practices, financial inclusion, Q-square analysis, Mexico

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VERY PRELIMINARY DRAFT PAPER – PLEASE DO NOT CITE

1 Introduction

The paper focuses on the agricultural wage workers in a productive agricultural region of the State of Jalisco in Mexico. We describe their labor relationships, the array of their financial practices (formal and informal, including tied labor-credit arrangements), and we try to assess whether, and to what degree, their status as agricultural worker shapes their demand in terms of financial services, and whether it translates into some forms of rationing with regards to the different local financial service providers.

The paper is part of a broader research project[1] which was based on the assumption that the linkages between rural finance and rural employment go both ways. On the one hand, the features of the rural employment market contribute to shape the demand for financial services (which in turn, may, or may not be translated into, or match the corresponding supply). On the other hand, the conditions of access to and use of available financial services contribute to shape the rural employment market, through investment in productive agricultural and non agricultural activities, generating options of self-employment and possibly wage employment as well. In this paper, we focus on the first direction of causality (from employment conditions to financial services).

From a theoretical standpoint, the paper builds on an institutional economic framework, particularly through the concept of embeddedness of markets into social relationships and networks, and the exploration of the interlinkages between labor markets and financial markets, at a micro level (Bardhan 1980; Granovetter 1985; Bardhan 1989).

From a methodological standpoint, the paper gains from the insights of a combined quantitative and qualitative analysis, based on first-hand socio-economic data: a regionally representative quantitative household survey applied to 400 rural households (out of which

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[1] The Rural Microfinance and Employment project (http://www.rume-rural-microfinance.org/), funded by the Agence Nationale de la Recherche (ANR Les Suds, 2007-2011).

170 turned out to earn some share of their income through agricultural wage), and 40 in-depth interviews conducted with a sub-sample of households involved in agricultural wage employment. This Q-square approach enables us to uncover the nature and possible diversity of rationales and processes at work behind the statistical relationships.

Our study explores the linkages between agricultural labor contracts and financial practices, through two channels of causality : 1. The characteristics of income patterns and 2. The nature and interplay of social relationships that underlie economic interactions.

The study reveals a lower rate of formal financial inclusion and distinctive features of financial practices for agricultural wage households. We also explore some features of heterogeneity within the category of agricultural wage households and find that the results are more pronounced in the case of households that derive all their income from agricultural wage employment. However, the interpretation of this in terms of exclusion is not straightforward. Rather, we suggest that income patterns associated with agricultural wage status generate needs and constraints that are less suited to the characteristics of the formal supply of financial services than informal ones. Thus, informal devices, and particularly the shopkeeper, play a very important role in terms of consumption smoothing, and thus represent useful substitutes to the formal sector, up to a point. Beyond the mismatch between formal supply and demand, other non-economic parameters, including social and most of all family networks, also come into play. Social and family networks can also act as gateways, facilitating access to formal financial services through specific informal arrangements that inject flexibility within the formal rules and procedures.

2 Literature review

Agricultural wage workers are hardly visible in the development debates and literature. This is paradoxical if we consider that there are an estimated 450 million agricultural workers worldwide, accounting for over 40% of the total agricultural labour force (FAO, 2007). In Latin America, the share of wage farm workers in rural employment is above 20% (World Bank, 2008, p.205)..

Wage employment within agricultural value chains remains of enormous importance as a livelihood strategy, particularly for the poorest rural households. For landless households in particular, it is often the main source of income, while for those with small farms it may be a secondary, seasonal source. However, workers in agriculture generally suffer from adverse working conditions, get low and irregular incomes, and face multiple sources of vulnerability and exclusion (see Vanackere, 1988 Barron and Rello 2000, and Carton de Grammont and Lara 2010, for case studies in Mexico).

For those reasons, on-farm wage employment is hardly being considered to offer a way out of poverty (Winters et al 2009). This might be an explanation of why the topic has been under-addressed in the extensive literature on poverty reduction. Some recent work have started to challenge this view, however, examining empirically the livelihood conditions of agricultural wage workers in Senegal, and stressing the advantages of agricultural wage employment over uncertain small-scale agricultural production, under certain conditions (Maertens and Swinnen 2009). However, to our knowledge, there are few studies focusing exclusively on the livelihood and economic conditions of the agricultural wage workers as a category.

Non-farm rural activities (the definition of which usually include non agricultural business and wage employment, and exclude agricultural wage employment) have indeed received much more attention in the academic literature and policy debates. Arguably, their contribution to rural household income has been growing in the last decades, and they are generally considered as a promising pathway out of rural poverty (FAO, 1998; Reardon et al, 2001; Davis *et al.*, 2007, 2009; Ifad, 2011). The issue is usually framed in terms of the determinants and constraints in reducing agricultural activities (and particularly agricultural wage employment), and engaging in non-farm rural activities.

Policy efforts to support the creation and expansion of non agricultural business and promote rural income diversification usually heavily rely on rural microfinance instruments, facilitating access of marginalized populations to formal financial services. However, rural microfinance still faces major challenges both in term of outreach and in terms of adequation of financial products and procedures (Adams et Vogel 1986, Morvant-Roux *et al.*, 2011). Moreover, even rural microfinance institutions tend to target non-agricultural independent activities and diversification of income sources through providing credit for off-farm activities (Morduch, 2009; Morvant-Roux, 2009).

Again, agricultural wage workers are hardly visible in the recent literature on financial inclusion and diversification. They are assumed to lack the basic assets (land in the first place) skills and networks to run their own productive activities and therefore are not being considered as a priority target of financial inclusion policies that intend to induce diversification of activities through small-businesses creation out of agriculture. Research and policy efforts regarding agricultural workers have indeed focused more on their working and living conditions, concentrating efforts on labor safety, fighting child labor, promoting children schooling and training, or providing additional forms of livelihood supports.

However, recent work on financial practices in poor urban and rural settings demonstrate how even the poorest of the poor, including casual wage laborers, do exhibit a wide range of financial practices, combining formal and informal, credit-oriented and savings-oriented features (Collins *et al*. 2009; Guérin *et al*., 2011). Yet, for this category, there is a shift in the rationale of financial services use that still needs to be more widely acknowledged by the microfinance industry and policymakers alike. The productive and income-generating dimensions of financial services, albeit present, tend to be less prevalent than consumption smoothing or vulnerability coping mechanisms. Furthermore, the financial needs should be considered not only through the lense of credit but also (and sometimes primarily) through its savings counterpart. This literature thus promotes a new approach in terms of financial inclusion (Jonhson and Nino-Zarazua 2011), meaning giving access to an appropriate range of financial tools rather than focusing exclusively on productive credit.

From a theoretical standpoint, the paper builds on an institutional economic framework, particularly through the concept of market failures, the embeddedness of markets into social relationships and networks, and the exploration of the interlinkages between labor markets and financial markets, at a micro level (Bardhan 1980; Granovetter 1985; Bardhan 1989). The concept of market failure applied to financial markets has given way to an extensive theoretical and empirical literature, following the seminal work of Stiglitz and Weiss (1981), and Braverman and Guasch (1986) for the rural sector. Major empirical contributions include Kochar (1997), Guirkinger (1998), Boucher et al. (1999), Jonhson and Nino Zarazua (2011). They focus on issues such as the socioeconomic determinants of access to (and exclusion from) formal credit, the relationships between formal and informal finance, at a village, regional, or national level, using household-level data.

Our own work builds on this previous research fields, in that it focuses on the determinants of the use of specific financial services by a specific social group at the local level. We also try to go further, in two ways : first, by examining in a systematical manner the linkages between labor contracts and financial practices (through interlinked transactions but also through more indirect channels), thus bringing empirical insights into the theoretical field of institutional theory of rural markets and market linkages; second, by taking advantage of the qualitative data, by intending to disentangle the cognitive and social processes that underlie such practices. To our knowledge, such endeavor have rarely been the focus of analysis, and this paper thus provides a contribution in this direction.

3 Methodology: a combination of quantitative and qualitative data collection and analysis

The paper relies on original data gathered by the authors in a dynamic agricultural region of Mexico. Data were collected through both qualitative (in-depth interviews) and quantitative tools (household survey). The combination of quantitative and qualitative tools was implemented through the following strategy.

In the early stage of the research process, qualitative interviews conducted by a sociologist allowed to better focus the quantitative survey questionnaire, thus improving the relevance and the reliability of collected data. The questionnaire included detailed modules on financial practices and labor contracts. Particular attention was paid on the possible interlinkages between financial and labor arrangements, as well as on the social nature of the relationships underlying economic arrangements.

The survey was and implemented in 14 villages of Valle de Autlan, Jalisco State, Mexico. In each village 40[2] households were selected at random. The quantitative dataset thus includes 400 households, allowing drawing statistics that are representative at the regional level. General contextual information was also gathered through interviews with local authorities. From a qualitative perspective, this region can also be considered as a case study illustrative of the processes at play in a dynamic agricultural region in a developing country.

Following a first analysis of the quantitative dataset, we undertook a complementary set of in-depth interviews with a subsample of 40 households involved in agricultural wage. The subsample was elaborated according to different criteria such as: clients vs. non-client of any financial intermediary; loan taker or not; livelihood portfolio; locality of origin; and gender of the household head. As opposed to the quantitative survey, the goal was not to get a random subsample but rather to address and inform the diversity within the category of agricultural wage workers.

[2] Due to the small population size of 4 out of the 14 villages, 20 households instead of 40 were selected.

The interviews were conducted by our sociologist colleague, using a semi-directive discussion guide. The discussion tool used was life stories, in order to establish the main stages of interviewees' lives, and their financial and economic implications.

Beyond these life and family stories, our goal was to:

- uncover the diversity of contractual relations ;
- get insights into how agricultural wage labor is inserted within the household's portfolio of activities ;
- get insights regarding (1) the financial practices (savings and borrowing), (2) the conditions (and/or barriers) of access and use of formal and informal financial services, in order to identify the mechanisms of financial inclusion / exclusion ;
- Investigate the links between agricultural labor and financial practices, through two channels of causality: (1) the characteristics of labor contracts and corresponding income patterns and (2) the nature and interplay of social relationships that underlie economic interactions.

4 The context: Local financial and labor markets in the Autlan region

The region where our research was implemented is the Valle de Autlan-Grullo, in the western state of Jalisco. The region is not characterized by a high degree of marginalisation as defined by the Mexican administration (CONAPO). Infrastructure such as roads and public services are relatively well developed. Agriculture is relatively dynamic, thanks to irrigation and insertion into national and export value chains such as sugarcane and fresh vegetables. Agrarian structure is heterogeneous however, combining small subsistence producers, small commercial producers, and agro-business firms either producing under an integrated scheme (with own or rented land and wage labour) or under contractual schemes with local producers. There are few formal job options outside agriculture, and many households rely on petty business or informal non agricultural jobs. The region also benefits from high flows of remittances from migrants in the US.

4.1 The local financial Market

Contrasting with the general picture of the rural sector at the national level, the financial market in our region of study is relatively well developed and there is a variety of financial intermediaries either formal or informal.

On the informal side, there is a range of credit providers such as moneylenders, mobile retailers, shopkeepers, rotating savings and credit associations (roscas), and finally close social networks such as family members and “friends” (*compadres*). Moneylenders charge an interest rate of about 5% per month[3] whereas loans granted by family and friends are usually interest-free. Informal providers are mainly used to face health problems, daily consumption (in the case of purchase tied credit from the shopkeeper) or other goods such as clothes and houseware in the case of mobile retailers and roscas. Finally informal financial services can also be provided through interlinked transactions either tied to agricultural production or tied to labor. Examples of the latter are described below.

On the formal side, apart from banks, several savings and credit cooperatives have been providing credit and savings services in the Valle de Autlan for a long time (more than 40 years for some of them). The main financial cooperatives established in the region are: Caja Popular Santa Maria Guadalupe; Caja Popular Cristobal Colon; Caja Agustin Iturbide and Caja Solidaria. There are some development projects that include a microfinance component, but the leading Mexican microfinance institutions (e.g. Compartamos) are not operating in the area. Direct provision of public credit has almost stopped after the structural adjustment decades of 90s and 00s[4]. All the financial cooperatives offer a variety of savings and credit products, including productive credit and interestingly, agricultural credit. Consumption credit tied to purchases is also available through houseware retailers such as Elektra. Several pawnbrokers also provide formal credit, usually for consumption or emergency purposes. Productive credits for sugarcane farmers are also provided through farmers unions (CNC & CNPR), who themselves refinance through formal banks. However, since access to these loans does not imply being a member of a savings and credit cooperative or a client of a bank,

[3] this is a lower figure than in other regions where formal supply is more scarce.

[4] For most of the savings and credit cooperatives, the origins can be linked to specific social movements (religious or political), and their operations have always been disconnected from the State and public programs. The Cajas Solidarias are specific in that they are more recent (they were founded in the 90s) and they are strongly linked to the State. They were originally the product of a public program (that allowed small-holders famers to reuse the funds from another credit program “Crédito a la palabra” to build financial intermediaries), and they have long received public subsidies and support. There is still an agricultural public bank (Banrural), but it mostly operates as a second-tier credit institution.

they are treated as non formal loans in the remainder of the paper[5]. Given that the cooperatives are by far the main providers of formal financial services in the area, we will focus on them in the remainder of this section.

Table 1 : average loan amount according to main loan type

	N	Average loan amount (USD)
Formal loans	145	2100
Informal loans		
Shopkeeper	203	40
Mobile retailer	32	250
Other (not purchase-tied)	82	400

Source : RUME Mexico survey database

Since there are no microfinance institutions as such, there is no explicit focus to target specific excluded categories of the population (such as “the poor”, “the migrants”, or “the agricultural wage workers”, etc.). Conversely, there is not either any explicit policy to exclude some socioeconomic categories. Officially, each institution offers its products to “the public in general”. The interest rates vary but are quite low (around 30% a year) compared to the levels usually found in the microfinance sector, and even more compared with the informal sector. This provides an undeniable comparative advantage to the formal sector.

However, access to formal financial products and more specifically to credit services by savings and credit cooperatives is restricted to people who are able to comply with the following requirements:

- membership fees : they range from 43 US$ in the case of Caja Solidaria to 100 US$ (which include the purchase of a life insurance) for the Caja Popular Santa Maria Guadalupe. Although not very high, they can represent a first barrier.
- savings capacity : the maximum loan amount is calculated on the basis of the amount saved by the borrower.
- collateral requirements : depending on the loan product, one or two guarantors are needed in addition to the compulsory savings.

[5] It could be argued that these loans are “formal”, since there is a formal contract involved. However, we follow another definition here. Furthermore, there are very few such credits reported in our database (N=21), thus their treatment either as “formal” or “informal” does not affect the overall results.

The nature of the requirements suggests that barriers to formal financial inclusion and formal credit can be twofold :

- economic barriers : the capacity to pay for upfront membership fees and, most of all, to reach and sustain the required balance on the savings account; and
- social barriers, related to :
    - the capacity to step into a cooperative branch to ask for information, to file a membership and credit application, on the one hand, and
    - the capacity to mobilize social and family network to comply with the guarantor requirement.

4.2 The labor market in agriculture

The region is characterized by different crops involving wage labor, the main ones being sugarcane, horticulture (e.g. tomato, chile), fresh corn, and agave for tequila production. Agricultural wage workers are engaged in various agricultural value chains: from main agro-food chains led by big companies (horticulture) or by structured peasant organizations (sugarcane) to informal employers such as small-holders farmers. Labor contracts greatly differ according to crop types, employer and type of job within the same value chain.

Employers can be individual farmers, producer organizations (in the case of sugarcane), or agrobusiness companies (in the case of agave for tequila, horticulture such as tomato). Contracting can be bilateral between worker and employer or mediated through middlemen (particularly in the case of sugarcane and individual production of fresh vegetables). The duration of contracts (with direct implications in terms of certainty of future income and transaction costs in job search) also vary widely. While some laborers rely on day-to-day jobs with one or several individual farmers, others are employed for a longer period (6 to 10 months depending on the agricultural cycle) , e.g. for sugarcane cutting, or agribusiness tomato and other fresh vegetable production.

> “We go and ask for a job directly at people’s place, farmers that we know and who know us […] we go from one to another depending who is willing to help us […] during the rainy season (from july to September) there is more work to do such as removing the grass, cleaning the maize field […] and less work from now (march) till may […] in this period we sometimes spend one or two weeks without working and

earning anything" (Elias, 19 years old, 02-05).

> "Since [my husband] started working in Bonanza [a tomato producing company], we stopped working in other places, because it is a stable job, he did not wand to work anymore in the coast because there he works the whole day and also by night for the same salary, without any limit in the working time. Here (in Bonanza) they start at eight in the morning and they stop at five or six. When they work extra-hours, they are paid for those extra hours, they come home, get some rest and go back working early in the morning, therefore we don't go anymore to the coast" (Maria Elena, 31 years old, whose husband is employed 10 months a year in Bonanza 11-06).

Agricultural weekly wages amount to 60 USD on average. This is 30% lower than weekly non-agricultural wage, even before considering the very low probability attached to obtaining a full time agricultural job every week of the year. But agricultural wage also vary within agricultural wage contracts, both in levels and calculation. Wages are either fixed according to time spent at work (agave for tequila, cucumber cutters), specific task to be executed (seedling production, planting out cuttings, cultivation, cleaning, harvestings, etc.) or to productivity/quality criteria (sugarcane, fresh corn).

Side benefits also induce differences: they can include in-kind benefits such as food, shelter[6] and schooling for migrants families, and access to social security for the duration of contract. Sugarcane cutters in particular cumulate the four kinds of in-kind benefits previously mentioned.

As expected, bilateral labour arrangements between laborers and individual farmers or middlemen are always informal, in the sense that there is no written contract, no official paycheck, and no registration to (supposedly) compulsory social security. Conversely, labour arrangements with agro-business companies or sugarcane unions, while more "formal" according to the previous criteria, do not always comply with all the requirements of the Mexicain labour laws, particularly with regards to social security.

[6] Arguably, accomodation by employer is usually very cheap and precarious (see also Barron and Rello, 2000), and can hardly be considered as a " benefit". Still, it is part of the labour contract.

In summary, even if seasonality, casual work and low wages are clearly important features of rural labor markets, agricultural wage labour encompasses a wide variety of situations. These differences induce some degree of socio-economic differentiation among agricultural workers. Hierarchy among the variety of jobs in agriculture not only includes wages and side benefits but also working conditions and thus the social stigma associated to specific jobs. For example, work as sugarcane cutter is not well valued not so much because of wage level (actually, the social security provided in the contract can be highly valued) but rather because of the hard working conditions and social stigma of this job. This explains why most sugarcane cutters are migrant workers coming from some of the poorest states of Mexico such as Guerrero and Oaxaca.

Qualitative examination of agricultural labor contracts allowed to identify some tied labor-credit arrangements and interlinked financial practices. Tied labor-credit arrangements include cash advance on the weekly wage, and cash credit that will be paid later in work (this arrangement also allows the worker to insure that the employer will call him when he needs laborer).

> His sons often ask for a cash advance of 100 or 200 mexican pesos (8-15 USD), when money urges to pay for the electricity bill before the deadline or because they are running out of cooking gas. The employer then discounts this amount when the labor contract comes to an end, without charging interest nor asking for extra hours. (Gabriel 03-09)

> They always go and ask their employer, they can ask for an advance on wage, or they can ask for a loan, stating that they will repay with work, not with money. They go with the farmers for which they are used to work, telling them to call them when they need laborers, so that they can repay with labor. Those are loans for 200 or 300 mexicain pesos (15-25 USD). (Elias 02-05)

Another tied arrangement is forced savings out of the weekly wage amount (for sugarcane cutters). In the latter case, the credit relationship is thus inverted from the laborer to the employer. A share of the weekly wage is retained by the employer and paid upfront at the end of the harvest period. This serves as an incentive device for the employer to ensure that the sugarcane cutter will not leave before the end of the 6-months harvest period.

Interlinked financial arrangements also include payments on bank account (agave workers) and access to social security for the duration of the contract (sugarcane cutters).

4.3 The agricultural wage households in our quantitative sample

Table 2 assesses the differences between households with and without agricultural wage with regards to some characteristics of the households, their income portfolio, and their asset holdings. We included variables that we expect play an important role in describing and discriminating livelihoods such as land property, receiving remittances and/or public transfers, ownership and sanitary equipment of the family house. Data on inheritance and remittances are also considered as proxies for the economic capacity within the broader family network.

Table 2 indicates that households with a share of agricultural wage among their income sources have a specific profile: the head of the household is younger; there are more migrants (people coming from other states than Jalisco) and indigenous people; less farmers (which is linked to less land ownership); less households with an independent business, less non-agricultural labor and less access to remittances. More households with agricultural wage are recipients of the public program "*oportunidades*", that support health and schooling for the children. The later can be interpreted as a proxy of poverty but may also be the result of demographic profile, since they also exhibit of lower share of recipients of the program "*70 y mas*", which supports the elderly.

Information about assets such as house, boiler and land ownership indicate that households with agricultural wage are poorer. They also seem to come from poor families since inherited land is significantly lower.

Because agricultural wage workers are on average poorer, because their income flows are low and fluctuating, and because they seem to exhibit a lower capacity to rely on a economically strong family network, they can be expected to face the two kinds of barriers (economic and social) more strongly than other categories of the rural population, and thus to exhibit lower levels of formal financial inclusion.

Table 2 : Household indicators and income portfolio of agricultural wage hh

	total	no agr wage	agr wage
Household indicators			
age of hh head	53.5	56.4	49.5***
gender of hh head (1=female)	16.0	19.6	11.2**
migrant hh	4.0	2.2	6.5**
indigenous hh	1.3	0.4	2.4*
Household income portfolio			
agriculture hh	22.5	31.3	10.6***
Sugarcane	7.8	13.0	0.6***
Agricultural wage employment	42.5	-	-
business hh	25.5	32.2	16.5***
Non agricultural wage employment	36.5	43.5	27.1***
hh receives remittances	28.3	32.2	22.9**
hh receives *oportunidades*	20.0	13.5	28.8***
hh receives *70 y mas*	18.5	26.1	8.2***
Household assets			
hh owns land		33.5	8.2***
irrigated land (sugarcane)		20	1.8***
inherited land		27.4	5.9***
house owned		80.9	65.9***
house or housing plot inherited		33.9	27.6
house lent		9.1	18.8***
toilets inside the house		90.4	85.9
Boiler		37.8	19.4***
Observations	400	230	170

Source : RUME Mexico database

In the remainder of the paper, we also divide the category of agricultural wage households according to three criteria, in order to explore the heterogeneity within this broad category. We distinguish 3 subcategories :

- Exclusively agricultural wage households : refers to households whose only source of income is from agricultural wage employment
- Formal agricultural wage households : refers to households who have at least one formal agricultural wage contract as a source of income. Since “formality” is a somehow blurry concept in the context of local agricultural wage employment, this dummy is constructed on the basis of several features of the contract, taking advantage of our qualitative understanding of the context : it takes the value “true” is one of the following criteria is met :
    - The contract involves a written paycheck
    - There is a suscription to social security
    - There is a middleman which is on the payroll of the employer
    - A share of the wage is retained by the employer until the end of the contract

- Precarious agricultural wage households : refers to households whose agricultural wage contracts are all dubbed as “precarious”. The corresponding dummy is constructed on the basis of the contract status (casual or part time versus full time), and the duration of contract over the recall period.

There are some limits to this endeavor however. Indeed, we were not always able to perfectly match the the heterogeneity features uncovered by the qualitative analysis with the quantitative variables available. For example, the “precarious” category reflects the result in terms of part time devoted to agricultural wage employment, which is only a coarse proxy for precariousness which is rather connected to the processes and uncertainty linked to job searching. It might be the case that part time agricultural wage workers did not actually intend to work more in the agricultural sector. The “formal” subcategory also proved ambivalent (see below).

5 A quantitative inquiry into the financial practices of agricultural wage households : levels and structure of financial inclusion

5.1 Variables and hypotheses

The following variables are used in the remainder of the paper :

- **formal sector access** : refers to households that are either members of (at least) one savings and credit cooperative, or are a client (i.e. hold a savings account) at a formal bank. The former does not imply necessarily that there is a formal credit uptake during the recall period, but it means that there is a readily accessible gateway to apply for one if needed.
- **credit uptake** : variables include the nature of the credit source, amounts, and use of the loans.
    - Formal credit uptake refers to households who have an ongoing loan during the recall period with either a formal savings and credit cooperative or a bank.
    - Informal credit uptake: refers to households who have an ongoing loan during the recall period with an informal lender.

- Credit strand[7] : it refers to the combination of credit uptaken by the housheold during the recall period
  - No credit
  - Informal credit only
  - Combination of formal and informal credit
  - Formal credit only

There is some degree of ordering in this "credit strand" variable, at least for the three last modalities (indeed, when there is no credit, it could be due to a lack of demand, and not necessarily reflect exclusion). We assume that formal financial inclusion is higher when it is exclusive, i.e. when there is formal credit only.

- **Savings uptake**
  - Formal savings : refers to households that hold at least one savings account in a formal financial institution. Our data unfortunately do not allow us to distinguish across savings account that are mostly used as a requirement to obtain a loan from those whose main purpose is precisely to save.
  - Informal savings : refers to household that have at least one form of informal savings, namely, roscas and savings in gold.
- **Interlinked labour-finance arrangements** : the quantitative database allows to report in-cash advances by agricultural employer, and wages deposited on a formal savings account[8].
- **Self-restriction from formal financial practices** : this set of variables is intended to capture household that self-restrain from opening a savings account or apply for a loan[9], no matter what their effective demand may be. It is based on subjective assessment by the respondents in the survey, and was meant to quantitatively capture the rationales that we heard very often in the qualitative interviews, as the following quotes show.

"We don't have any savings, it is impossible for us to save" (Maria Elena 11-06)

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[7] This variable is inspired by the concep of financial access strand by Johnson and Nino-Zarazua (2011).

[8] No compulsory wage retention by the employer was reported during the survey, although there were probably some cases, maybe because of some misspefication in the way the question was asked. Thus, the variable was excluded from the analysis. Similarly, reports of in-cash advances on wages by agricultural employers appear to be much lower in the quantitative survey than in the qualitative interviews. For the purpose of analysis, we make the assumption that there is no systematical bias in this under reporting.

[9] In the case of credit, self-restriction is a combination of self assessment of lack of creditworthiness and risk aversion.

They have been invited to open a savings account in a cooperative but they cannot make it to save the required amount to become members (Olga, 08-17)

They have been invited to join a cooperative but they are scared to do so, since they have been told that "it is hard to repay, really hard" (Julian, 05-38)

- **Household guarantor for others** : dummy that takes the value 1 if at least one member of the household has been a guarantor for someone outside the household during the recall period. Since qualitative research has shown that there are reciprocity processes underlying the fact of serving as a guarantor (see also Angulo 2011), this variable is assumed to capture some of the capacity of the household to access guarantors for their own credit applications.

Our main hypothesis is that because of the low, seasonal and fluctuating nature of their income flow, agricultural wage workers are less included in formal financial institutions, and incur in less formal financial practices, both credit and savings. This situation can be due both to a lower demand for financial services and to exclusion processes that prevent this category from accessing formal financial services. Since we assume that every household does have financial needs, a corrolary hypothesis to lower formal financial inclusion is that there is a spillover effect towards informal financial services.

The paper also relies on secondary hypothesis relating to the heterogeneity of the category of agricultural wage households. We assume that for exclusively agricultural wage households, the expected trends above are more pronounced. At a first glance it could be expected that the trends would also be more pronounced for the "precarious" subcategory, precisely because of the precariousness feature, and less pronounced for the "formal" category, since it can be expected that the formal nature of wage contract might translate into more formal financial inclusion, e.g. through more stable income flows, or through interlinked connexions, e.g. wage directly paid on a savings account. However, preliminary descriptive statistics (see Annex 1) suggests that the situation might be more ambiguous. First, the "precarious agricultural wage" households appear to be more engaged in other income generating activities[10], which might mitigate the exclusion processes with regards formal financial practices. With regard the “formal agricultural wage” households, triangulation with qualitative data shows that it is itself a quite heteregenous category, combining relatively higher level agricultural wage status (thus with a higher expected inclusion level in formal financial services), and very low agricultural wage status – typically migrant sugarcane cutters – (thus with a lower expected inclusion level in formal financial services). Unfortunately, our quantitative database does not allow us to more finely distinguish across this “formal” category. In the remainder of the quantitative analysis, we thus focus on the category of agricultural wage households and on the subcategory of “exclusive agricultural wage” households only.

5.2 Main results

Table 3 displays descriptive statistics of the variables presented above, as well as the results of t-tests for differences in means across categories.

Results show evidence that households with agricultural wage have a significant lower access to formal financial sources than households without agricultural wage: the figures are 45% versus 67%. This result is confirmed by a lower uptake of formal savings (given the context, having access to a formal financial institution is almost synonymous to having a formal savings account). Agricultural wage households also state a higher rate of self-restriction for formal credit (41% versus 30%), and a lower rate of being guarantors for others – a proxy, as already mentioned, for the capacity to get a guarantor for themselves (17% versus 30%). However, indicators of formal financial services uptake are more mixed. Indeed, formal loan amounts are significantly lower as well (863 USD against 1910 USD). But the share of household with an ongoing formal credit shows no significant difference across categories.

[10] The independence Khi2 test between the “exclusive agricultural wage” and “precarious agricultural wage” category is rejected at the 5% level.

Table 3

	Total	no agr wage	agr wage	exclusively agr wage
Formal sector access (%)	57.8	67.0	45.3---	35.6---
Credit uptake				
Formal credit (%)	37.3	40	33.5	28.9
total formal amount	1499	1910	863--	684
total formal amount zero excluded	2012	2498	1207--	948
Informal credit (shopkeeper excluded) (%)	18.3	17.0	20	14.4-
total informal amount	132	122	149	67-
total informal amount zero excluded	393	412	370	184-
Shopkeeper (%)	50.5	43.5	60+++	61.1
amount shopkeeper	17	14	20+	20
Credit strand (shopkeeper included) (%)				
no credit	26.5	28.3	24.1	23.3
informal credit only	36.3	31.7	42.4++	47.8
formal and informal credit	19.5	17.4	22.4	17.8
formal credit only	17.8	22.6	11.2---	11.1
Credit use (shopkeeper excluded) (%)				
productive	31.1	39.7	18.2---	0
non productive	79.8	72.4	90.9+++	100
Savings uptakes (%)				
formal savings account	60.3	69.1	48.2---	41.1--
debit card	8.8	12.6	3.5---	2.2
Informal savings				
Roscas	21.5	21.7	21.2	18.9
savings in gold	7.6	10.5	3.6---	1.1-
Interlinked labour-finance arrangements (%)				
Advance by employer	4.8	3.0	7.2+	6.7
wage deposited on savings account	5.5	6.5	4.1	2.2
Self-restriction statements (%)				
self exclusion from credit	34.5	29.6	41.2++	46.7
no formal savings account because lack of means	73.6	70.4	76.1	75.5
household guarantor for others (%)	24.5	30	17.1---	20
N	400	230	170	90

Source : RUME Mexico Database. The signs indicate the direction of the difference based on t-tests with the reference categories. The numbers of sign indicate the level of significativty e.g. +++ : 1%, ++ : 5%, + :10%. The reference category for the agricultural wage households is the non agricultural wage households. The reference category for the exclusively agricultural wage households is their counterpart within the category of agricultural wage households. Amounts in USD.

If we look at informal credit (excluding the shopkeeper), results show differences only for the exclusively agricultural wage households, and the sign is negative. This goes against what we initially expected, that is a lower use of formal credit (because of exclusion), compensated by a relatively higher use of informal credit (used as a spillover, second-best option). It suggests that at least some of the households with agricultural wage are able to find ways to overcome institutional and socioeconomic barriers to formal finance. This will be developed in another section below. It might also be the case for some households, particularly those who exclusively rely on agricultural wage, that they refrain both from formal and informal credit.

If we consider the shopkeeper, however, the picture changes. Agricultural wage households show a higher use of this informal option, both in terms of percentage (60% versus 44%) and in terms of amounts (20 USD against 14), although it should be noted that in the case of the shopkeeper, average amounts are considerably lower than for the other categories of formal as well as informal loans. The rationale of incurring into debt for consumption purposes (including basic household needs, and coping with shocks) is further confirmed by data on the use of formal and informal credit (shopkeeper excluded) : only 18% of the loans taken by the agricultural wage household were (totally or partially) used for productive purposes, against 40% for non agricultural wage households. This result is intuitive since more than half of the agricultural wage household rely exclusively on agricultural wage employement and as a consequence have no productive options for loan use. However, it also suggests the potential importance of credit as a device for income and consumption smoothing for this category.

Although there are no strong differences in terms of credit uptake from any sector (formal and informal) taken separately, there is some segmentation if we consider combinations within the household loan portfolio : according to “credit strand variable”, the households with agricultural wage make more use of exclusively informal credit and less of exclusively formal credit than households without agricultural wage. Going informal or combining formal and informal loans is a practice suggesting that (partial) ofsetting of the limitations of the formal sector can be reached through informal arrangements.

Finally, if we look at the interlinked labour-finance arrangements, there is a significantly higher incidence of advances by the employer for the agricultural wage household (even though the figure is probably underreported).

The main result of this section is that agricultural employment at the household level is associated with lower levels of formal financial inclusion, which are accentuated for the households with exclusively agricultural wage employement. However, not all indicators are straightforward, and all in all, agricultural wage household do incur significantly in formal financial practices, which suggests that there might be some mitigating factors to formal exclusion. In the next section, we examine qualitatively the causality channels which induce lower formal financial inclusion, and how this trend can be mitigated, mostly thanks to social and family networks.

6 Discussion and qualitative complements

6.1 The role of agricultural wage income in shaping financial practices

Agricultural wage contributes to the shaping of financial practices in several ways. Typically low and, most of all, irregular, agricultural wage incomes are a constraint to save the required amount to become a member of a cooperative and to apply for a loan. As being an agricultural wage household is generally associated with being poorer and less connected to a social and family network in condition to provide assistance, it is also harder to meet the guarantor requirement and get formal loans from the financial cooperatives. The nature of agricultural wage incomes is also a source of self-restriction for the corresponding households, who do not want to take the risks associated to getting a formal loan. Actually, both quantitative results and qualitative data suggest that the same processes are at play for part of the informal credit providers (moneylenders and retailers).

> "We never tried to open an account [with a cooperative] because my sons do not work every day therefore it is impossible for us to deal with the burden of a loan. There are also some people who come home to sell things on credit, I don't like it either since we don't have a [regular] salary, sometimes they have work and sometimes they don't" (Emilia, 70 who lives with her two sons, both of them agricultural wage workers)

> Even though her husband manages to get hired the most of the year for harvesting maize, since it is not a full time job or a stable position, they don't want to expose themselves with any kind of debts or savings schemes with fixed payment schedule. It is for that reason that they have never even tried to become members, not even asked for information. (Ana, 11-05)

The shaping processes can also be considered in a more positive way, in terms of financial needs rather than in terms of barriers and constraints. Consumption-smoothing here appears as a key rationale, particularly for the households relying exclusively on agricultural wage employment. The characteristics of the formal supply of financial services seem poorly adapted to this consumption smoothing objective. Conversely, the informal financial services provided through the shopkeeper, advances from the employer and family loans appear to play a fundamental role.

> Casual jobs in agriculture are for a short period no longer than two weeks, sometimes only for one week or even a few days. My husband is constantly looking for a job but most of the time he works for four different farmers, one of them being his father. Problems arise when one contract is over and he doesn't find other jobs, this is when we get indebted with family members or with shopkeeper to make our living. (Raquel, 04-15).

Several recent case studies in other countries have shown similar evidence of the importance of credit use for domestic spending related to housing, health, schooling, assets (Collins et al. 2009; Guérin et al. 2011; Morvant-Roux). This implies that participation to the formal financial market is less determined by the availability of economic opportunities than by the households' capacity to have regular incomes that enable them to make repayments. This induces self-exclusion from the households themselves both because they feel they won't be able to pay back and because the supply doesn't perfectly fit their needs.

6.2 Formal and informal sector : complementarity and substitution effects

There is a growing consensus that formal finance is often too standardised, rigid and does not adequately account for the diversity of financial needs. As a result formal finance can only be a partial substitute for informal financial services, who still enjoy comparative advantages.

Many studies on how people compare financial services have highlighted the importance of 'negotiability' and flexibility of credit services (Rutherford 2001; Johnson 2004; Guirkinger 2008 Collins et al. 2009). Negotiability is important for two reasons. The possibility to adapt repayments to irregular incomes and expenses is a key advantage, particularly if income fluxes are seasonal and uncertain. Negotiability also applies to the loan amount. In our context, cash-flow management to face daily consumption needs call for highly flexible supply as well as small amounts. This is why shopkeepers play an important role for households relying on casual agricultural work, whereas savings and credit cooperatives' supply poorly matches their needs as their immediate cash needs are little compatible with the process of loan application filing, and irregular incomes are hardly compatible with the regular instalments required in the repayment schedule. Other studies have pointed out how the risk of sanctions for defaulting can influence demand for credit. Drawing on empirical data from Peru, Guirkinger (2008), for instance, shows that anticipation of a sanction for repayment default reduces demand for formal credit. Our qualitative data also show examples of how people rely on their informal credit sources and take advantage of their flexibility, but up to a point, since the quality of the relationship needs to be preserved to keep options open for future access.

> During the rainy season nobody is working neither in chile or anything else […]. Since the shopkeeper allows us to buy grocery and pay later, we get on credit what we need for our daily consumption, from there we adjust and in the case we have no money to pay back a week later, we just give notice to the shopkeeper and he gives us the opportunity to pay later” (Hilaria, 07-27)

> They are kind to us because they are part of my family and they don’t charge us, but as soon as I can, when my husband gives me, then I pay them back, but it is not a lot of money […].With regards to the grocery store, well the shopkeeper is aware that as soon as I can, I pay what I owe her. If I don’t pay at the end of the week, then she will stop selling me on credit, but I do pay back. (Ana, 11-05).

> We don’t have any savings, it is impossible for us to save. When we cannot anymore and we face too much financial needs, then we ask the shopkeeper. The maximum amount of debt we reached with the shopkeeper was 80 US$. From the beginning the shopkeeper tells us : “I give you credit, but you have to pay each week for me to keep giving you credit”. They tell you this because they tell you that they need their money for their business. We try to keep track of what we get [on credit] so that it does not amount to too much, we more or less know how much we are owing. (Maria Elena, 11-06)

> “I have heard that if you don’t pay [the cooperative] and you are ten days late, then you have to pay more, but really more ... and from there everybody is in deep trouble” (Elias, 02-05)

In that context, formal supply doesn’t fit the financial needs and households characterized by a high level of uncertainty and irregularities in their incomes may prefer to rely on other financial services, such as the shopkeeper. In-cash advances are another important source that helps to face irregular cash-flows, and that households feel more confortable with since the repayment capacity is ensured by their own labor force. In-cash advances are taken for a short period and from our information (and contrary to what has been highlighted in other contexts such as India by Breman et al., 2010) there is no cost associated to this form of loan. However, it has to be stressed that both shopkeeper and employer credit arrangements do not allow to cope with shocks (e.g. disease, accident etc.) that require higher amounts of money. For this kind of needs, being able to rely on a solid family network (often including migrants in the US) makes a huge difference.

6.3 The role of family networks and informal arrangements in overcoming barriers to formal financial inclusion

Beyond the mismatch between formal supply and demand, other non-economic parameters, including social and most of all family networks, also come into play. We have seen that they can act as barriers (when the housheold lacks capacity to mobilize its social and family network to get a guarantor, for example). However, in some cases they can also work as gateways to formal financial services.

6.3.1 Facilitating access to formal financial institutions

Family and social network often prove to be instrumental at the moment of becoming a member of a given cooperative. They provide information, give advice, and sometimes help to gather the initial upfront payment required to become a member, as the following examples illustrate.

> After a bad experience with informal loans that were used to face a health emergency, they decided to save in order to access a credit cooperative. Thanks to good references provided by relatives who were already members of the caja [....] they chose the Caja Popular Cristobal Colon because Gabriel's mother and other relatives and friends living in the region had told them that this one was good. (Gabriel, 03-09)

> “What happened is that my sister and my brother in law helped me to get the savings to become a member”. (Maria Elena 11-06)

> They chose the Caja Popular Santa Maria Guadalupe because they had good records from Adalberto’s mother, who has been a member for a long time. The account is Adalberto’s, they have tried to open other accounts for their two sons, but they have not been able to meet the savings requirement. (Adalberto, 03-07)

6.3.2 Facilitating access to formal loans

As we already mentioned most of the formal financial intermediaries in the region of the study require the members who wish to borrow money one or two guarantors and loans are granted according to the amount saved as compulsory savings. We have seen that households with agricultural wage experience face significant obstacles since they often struggle either to find a guarantor or to save money. However, informal arrangement through family networks prove determinant in overcoming some of these barriers.

> Another aspect underlined by Gabriel [to explain why he became a member of the Caja Popular Cristobal Colon] is that his mother and nephews are also members of the Caja : this ensures that they will be able to get a guarantor : "we reciprocate our signatures among ourselves " without the need to look for other people willing to act as a guarantor. (Gabriel, 03-09)

> Husband and wife used to be guarantors for each other, until the rule changed and being a guarantor among spouses was banned. However, children can still be their parents' guarantors, thus they are considering to have one of their son becoming a member of the Caja Santa Maria Guadalupe. (11-07)

> ... my sister and my brother in law helped me to become a member ... also in order to allow me to be a guarantor for them (Maria Elena, 11-06)

7 Conclusion and policy implications

To be completed.

ANNEXES

Annex 1 : Households indicators and income portfolio

	no agr wage	agr wage	exclusively agr wage	formal agr wage	precarious agr wage
Household indicators					
age of hh head	56.4	49.5---	48.2	42.9---	52.9++
gender of hh head (1=female)	19.6	11.2--	11.1	6.5	16.7+
migrant hh	2.2	6.5++	6.7	13.0++	3.0
indigenous hh	0.4	2.4+	4.4+	4.3	0
Household income portfolio					
agriculture hh	31.3	10.6---	-	8.7	10.6
Sugarcane	13.0	0.6---	-	0	1.5
Agricultural wage employment	-	-	-	-	-
business hh	32.2	16.5---	-	15.2	22.7+
Non agricultural wage employment	43.5	27.1---	-	23.9	36.4++
hh receives remittances	32.2	22.9--	22.2	8.7---	27.3
hh receives *oportunidades*	13.5	28.8+++	30	21.7	27.3
hh receives *70 y mas*	26.1	8.2---	6.7	2.2-	16.7+++
Household assets					
hh owns land	33.5	8.2---	2.2---	4.3	3.0--
irrigated land (sugarcane)	20	1.8---	0-	2.2	1.5
inherited land	27.4	5.9---	1.1---	4.3	1.5-
house owned	80.9	65.9---	57.---	50---	72.7
house or housing plot inherited	33.9	27.6	24.4	15.2--	30.3
house lent	9.1	18.8+++	24.4++	19.6	16.7
toilets inside the house	90.4	85.9	87.8	73.9---	90.9
Boiler	37.8	19.4---	14.4-	19.6	25.8+
Observations	230	170	90	46	66

Source : RUME Mexico Database. The signs indicate the direction of the difference based on t-tests with the reference categories. The numbers of sign indicate the level of significativty e.g. +++ : 1%, ++ : 5%, + :10%. The reference category for the agricultural wage household is the non agricultural wage households. The reference categories for the three last columns are their counterpart within the category of agricultural wage households.

Annex 2 : Households financial practices

	no agr wage	agr wage	exclusively agr wage	formal agr wage	precarious agr wage
FI membership hh	67.0	45.3---	35.6---	54.3	36.4-
Credit	51.7	45.3	40	52.2	43.9
Formal credit	40	33.5	28.9	37.0	27.3
Informal credit	17.0	20	14.4-	19.6	24.2
social network credit	12.2	15.3	11.1	15.2	18.2
employer credit	0.4	0.6	0	0	0
Advance by employer	3.0	7.2+	6.7	13.3+	3.1
Advance by agricultural employer	-	7.1	6.7	13.3+	3.0-
productive credit use	39.7	18.2---	0---	20.8	17.2
non productive credit use	72.4	90.9+++	100+++	83.3	93.1
number of formal loans	0.5	0.4	0.3--	0.5	0.3
number of formal loans zero excluded	1.2	1.2	1.0-	1.2	1.3
total formal amount	1348.1	608.7--	482.9	533.8	643.3
total formal amount zero excluded	1762.9	852.2--	668.6	753.6	1097.5
total informal amount	85.7	105.0	46.8-	115.8	164.1
total informal amount zero excluded	291.4	260.7	129.7-	308.9	340.0
total informal amount including fiado	97.8	123.7	65.6-	128.6	187.8+
total informal amount including fiado zero excluded	181.9	170.1	90.8--	162.5	236.8
shopkeeper	43.5	60+++	61.1	60.9	62.1
amount shopkeeper	10.3	13.9+	13.6	10.8	15.9
Abono	8.3	5.9	4.4	4.3	7.6
self exclusion from credit	29.6	41.2++	46.7	45.7	40.9
hh guarantor for others	30	17.1---	20	15.2	13.6
N	230	170	90	46	66

Source : RUME Mexico Database. The signs indicate the direction of the difference based on t-tests with the reference categories. The numbers of sign indicate the level of significativty e.g. +++ : 1%, ++ : 5%, + :10%. The reference category for the agricultural wage household is the non agricultural wage households. The reference categories for the three last columns are their counterpart within the category of agricultural wage households.

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