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farmers, traders and a commodity exchange: institutional change in Ethiopian sesame markets

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Our imagination is stretched to the utmost,
not, as in fiction, to imagine things which are not really there,
but just to comprehend those things which are there.

Richard Feynman (1965) *The character of physical law*. MIT Press, Cambridge.

ACKNOWLEDGEMENTS

A quest is an appropriate metaphor for the "messy process that most students experience while they study for a PhD"[1]. As the poet W.H. Auden explains: "To go on quest means to look for something of which one has, as yet, no experience; one can imagine what it will be like but whether one's picture is true or false will be known only when one has found it" [2]. He defines six elements that characterise a quest:

1. A precious object and/or person to be found and possessed or married.
2. A long journey to find it, for its whereabouts are not originally known to the seekers.
3. A hero. The precious object cannot be found by anybody, but only by the one person who possesses the right qualities of breeding or character.
4. A Test or series of tests by which the unworthy are screened out, and the hero revealed.
5. The guardians of the object who must be overcome before it can be won. They may be simply a further test of the hero's arete, or they may be malignant in themselves.
6. The helpers who with their knowledge and magical powers assist the hero and but for whom he would never succeed. They may appear in human or in animal form.

With this thesis, I have achieved my quest and obtained my "precious object", a lifelong dream to one day get a PhD. Deciding to pursue a PhD was a heroic decision, especially because it meant I would need to combine going on this with a full-time job and a family. It certainly has been a long journey during which I waded through econometric swamps, got lost in forests of insignificant results, battling monster test statistics that told me my model was rubbish. But also I turned round corners that suddenly revealed new and beatiful vistas.

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[1] McCullock, A., 2013. The quest for the PhD. International Journal for Researcher Development 4(1) pp. 55-66

[2] Auden, W.H. 1969. The quest hero. Texas Quarterly, 4 (Winter 1961), 81-263

During a quest, a wise wizard with a white beard usually provides crucial guidance. Although my supervisor Erwin Bulte does not have a white beard yet, he fits the description of a wizard in all other ways, with his sense of humour, his vast knowledge on relevant literature, as well as what seem to be magical powers to get to the heart of a topic almost instantly, asking the necessary questions, pointing me to hidden pathways. Any remaining errors are therefore my own. Last but not least, he continued to have an unshakeable faith that I would finish this quest before he indeed started to grow a white beard.

Many friends have supported me by accepting that I would be busy with this quest and that they would not be seeing much of me. I hope I can make amends soon. Some deserve a special thanks. Adrie Huissoon for letting me use his wonderful inspiring atelier to work in peace. Janet Kamphorst was my "ervaringsdeskundige". Michele Wilks and Mark Speer provided coffee and sympathy on Tuesdays. Sandra, our "Haag treinâh", Alice, Annelies, Bert, Dorothe, Ellen, Elly, Fred, Gusta, Jacqueline, Martha, René, know that running has kept me sane and fit, but I would like to let them know that their interest in my PhD and help with the propositions has also meant a lot to me. Maaike Kempkes and Margaret Brugman, who know me since I started as a student in Wageningen, have continued to encourage me during this long journey.

I inherited the love for learning and research from my parents; they and my sister Marieke never doubted I would succeed.

The hero in the quest usually has a staunch supporter and loyal friend who makes the difference at certain crucial moments. I was fortunate to have Ken. He made my quest possible in so many ways, encouraging me to go out and combat the "friendly monster"; he is my hero, as are Ava and Julian.

I dedicate this PhD thesis to my two grandmothers, Willemien de Groot and Mensina van der Woude, who knew the value of education and who should have been born in a different age.

TABLE OF CONTENTS

CHAPTER 1

introduction

1.1   introduction

When one thinks of Ethiopia, it is probably not sesame that comes to mind first. For many it is a surprise to learn that Ethiopia is the world's second largest exporter of sesame, after India.

Ethiopia went through a period of rapid economic growth since the early 1990s. Its annual growth rate has averaged around 7% in the past two decades, raising the per capita GDP from US$164 (current dollars) in 1993 to US$470 in 2012 (World Bank 2013a). Sesame production and exports have increased as well; from 1993 to 2010, the value of sesame exports increased a thousandfold to almost US$294 million (FAO 2014). However, inefficient marketing is still hampering exports (Wijnands et al. 2009).

Markets are important to economic development (Stiglitz 1989). Although markets are extremely important in Africa, they are often characterised by high transaction risks and costs. Most African markets are governed by informal arrangements; but Fafchamps (2004) cautions that there has been a tendency to call "informal" everything that "is not of Western inspiration". The many different forms of African market arrangements and institutions have often been lumped together under the heading of "informal sector". Hadfield (2005) echoes this and argues that the complexity and multiplicity of the institutions that support contracting are still underappreciated in the literature. While many different forms of African market arrangements and institutions exist, they all aim to solve similar coordination and enforcement problems.

The past decade has seen a surge of interest in market development approaches amongst aid agencies, including the Dutch government. However, in his seminal work on African markets (Fafchamps 2004), Fafchamps was careful in his policy advice to improve markets, stating that "recommending policy in the absence of counterfactual evidence is dangerous" (Fafchamps 2004, p. 456). In the same year, Dixit (2004, p. 150) declared that despite a wealth of material "neither empirical not theoretical research has yet advanced to the point of offering clear or confident policy recommendations for the process of institution-building or reform". Gabre-Madhin, who collaborated with Fafchamps on many studies on markets in Africa, and who did an extensive analysis of grain markets in Ethiopia

(Gabre-Madhin 2001),[3] seemed to disagree as she believed that there were, in fact, various solutions for improving African markets, as elucidated in her TED talk of May 2007 (Gabre-Madhin 2007). She consequently switched her role as a researcher to that of practitioner, helping to establish the Ethiopian Commodity Exchange (ECX), becoming its first CEO in April 2008.

The ECX can be seen as a major institutional change in the sesame markets of Ethiopia. Institutions affect the distribution of assets, incomes, and costs as well as the incentives of market participants and efficiency of market transactions. Being the first of its kind in Africa, there is little understanding of how such a major institutional change impacts markets that are mostly governed by informal institutions and social network capital. Despite a "remarkably wide array of opinions about the ECX's impacts on traders and farmers", the ECX has not been evaluated, although "such a review is sorely needed" (Renkow & Slade 2013, p. 51). With many other African commodity exchanges languishing (Sitko & Jayne 2012), there is much interest in the ECX model from African policy makers and donors. A better understanding of commodity exchanges is therefore crucial to develop policies that aim to improve agricultural markets both for farmers and traders.

In many of the research and development programmes on agricultural markets in developing countries, the emphasis has usually been on improving (smallholder) farmers' access to markets. The crucial role of traders in making markets more efficient is often overlooked. Fafchamps (2004) argues that micro-economic theory has devoted a lot of attention to producers and consumers, but has failed to identify a separate role for the "economic agent par excellence", the trader. According to Shepherd (2005) a prevailing hostility to the trading sector results from a focus on trading margins taken rather than functions performed, leading to a reluctance to consult with traders or their representatives. Almost 10 years later, Sitko and Jayne (2014, p. 56) still note that "of all the private sector actors involved in African cereal markets, none has been more maligned or misunderstood than the private traders who assemble grain at the village-level". A paper published by the Ethiopian Commodity Exchange Authority (ECEA) describes (small) traders as "middlemen who do not add value but merely snatch the benefit which could have accrued to the producers", labeling them "usurers" in

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[3] She was the first head of the Ethiopia Strategy Support Program (ESSP) of IFPRI, which was set up in 2004 to provide direct support to the Government of Ethiopia in the design and implementation of its national agricultural development strategy. See Renkow and Slade (2013) for an extensive evaluation of the ESSP and its role in establishing the ECX.

the sesame value chain, and characterises the traditional sesame markets as "highly interwoven and manipulated by various brokers who are involved at each stage of sesame trading" (Abera 2011, p. 22). This illustrates that even the ECEA, which is supposed to support traders, regards them with suspicion. Better understanding is therefore also needed on the role of (small) traders in developing markets, as well as farmer–trader relationships.

1.2   markets, formal and informal institutions

1.2.1   market institutions

The fundamental role of market institutions in economic development has been increasingly recognised since the seminal work of North (1973; 1990; see also Acemoglu et al. 2005; Greif 2005). To understand economic development in Ethiopia, it is important to understand its markets and their development. In general, markets play a paramount role in Africa (Fafchamps 2004). Agricultural markets offer substantial opportunities for (small-scale) farmers to increase their production and incomes. They are also important for poor consumers who spend a significant proportion of their income on food. Finally, they provide (informal) employment opportunities.

The neo-Austrian school of economics (with Mises and Hayek) has emphasised that in complex modern societies, markets are much better as a coordinating mechanism (i.e. the "invisible hand" of Adam Smith) than a set of politically constructed rules (see Birner & Zijp 2002). As Bowles phrases it (2004, p. 57) "economists specialise in unintended consequences and, since Bernard Mandeville and David Hume, have studied the way the actions of many individuals acting on their own, produce aggregate outcomes that nobody intended", which has also been termed "spontaneous order". Adam Smith illustrates this with the example of a woollen coat: many people are involved in producing a woollen coat without a central planner being involved. Friedrich Hayek, one of the founders of the concept of spontaneous order,[4] argues that market economies are better in allocating societal resources because of the specifics of the information required. A

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[4] Hayek used the term catallaxy, "the order brought about by the mutual adjustment of many individual economies in a market"(Thompson 1991).

centralised planner using centralised statistical data cannot convey this information because the statistics are created by abstracting away from the particulars of the situation (von Hayek 1991). The economic failure of many communist, centrally-led countries seems to have proven this point. The debate about the role of the market mechanism, which has been ongoing for over a century (White 2012; Slater & Tonkiss 2013), was reignited after the financial markets crashed in 2007.[5] Indeed, the financial crisis has led people to critically re-examine the more laissez-faire view of markets again.

The debate about the role of the market indicates a gap between the theoretical concept of a (perfect) market or "perfect competition"[6] and the messy reality of real markets. The neo-classical view of a market embodies many buyers and sellers, no entry or exit barriers, perfect factor mobility, perfect information, no transaction costs, and rational market actors who strive to maximise profits. These assumptions facilitate mathematical modelling, which may explain the tenacity with which economists have clung on to these simplified assumptions.[7] In 1988, Ronald Coase complained that "although economists claim to study the working of the market, in modern economic theory the market itself has an even more shadowy role than the firm" (Coase 1988, p. 7). Furubotn and Richter (2010) point out that modern mainstream economics has given no more than "fleeting consideration" to the market as an institution, or the institutions that support a well-functioning market.

Markets cannot create the various prerequisites that are necessary for their implementation such as the existence of contracts, the institutions necessary for the enforcement of contract, and the physical and institutional organisations that are necessary for transactions to occur (Boyer & Hollingsworth 1998; Blaug 2002).

[5] The global financial crisis made Alan Greenspan, the Chairman of the Federal Reserve and proponent of deregulated markets, to concede that the near collapse of financial markets had exposed a "mistake" in free market ideology: "I made a mistake in presuming that the self-interests of organisations, specifically banks and others, were such that they were best capable of protecting their own shareholders and their equity in the firms", cited in *The Guardian* of 24 October 2008 (available at bit.ly/1uYLAAd; retrieved 4 December 2013).

[6] See Stigler (1957) for a historical overview of the development of the concept of perfect markets and perfect competition. Stigler also notes that the two concepts are often used interchangeably, but are, in fact, different.

[7] This has led to the comparison of neo-classical economics to a drunkard searching for his keys under a streetlight although he lost them some distance from the light. When asked why he is searching in the wrong place, the drunkard answers "because it is lighter here" (see also Kaplan 1973).

Bowles (2004, p. 57) states that the "invisible hand" is in fact directed by an "alchemy of good institutions [which] can transform base motives into valued outcomes". The New Institutional Economics (NIE) school, which has its roots in Coase's work, envisions a much less perfect world with transaction costs, imperfect foresight, and economic actors who are not always rational (but *boundedly* rational) (Furubotn & Richter 2010) and has greatly advanced the understanding about the market as an institution, as well as the institutions that support a well-functioning market.

Studying agricultural markets in Africa substantiates the fact that real markets hardly fit the neo-classical economists' assumptions of a market, compelling Fafchamps (2004, p. 4) to conclude that studying markets in Africa forces one to rethink the very nature of markets. What is taken for granted in rich economies is often absent in African markets. One of the most salient features of African markets is the high level of transaction risks and costs, which are related to missing or weak institutions. Gabre-Madhin (2006) suggests that to comprehend the role of market institutions, there are essentially two areas that must be understood. The first is the role and complexity of institutional arrangements; the second is the mechanism of institutional change over time (see also Aoki 2001). For the first area, two dimensions are important: coordination and enforcement. I will delve deeper into these two areas in the following sections and discuss how (a lack of) information and enforcement institutions lead to high transaction risks and costs.

1.2.2   coordination (information) and enforcement

Coordination can be primarily viewed as an information problem that emerges in all stages of a transaction (search, negotiation, monitoring, and enforcing contracts). In most African markets, formal information and enforcement mechanisms are missing or incomplete. The cost (in terms of money and time) of obtaining relevant and reliable information is often very high in Africa (World Bank 2002), which includes the transmission of information on prices, quantities supplied, quantities demanded, actors and their actions, product quality and attributes, and processes. An important body of economic literature has focused on the problems of imperfect, asymmetric, or incomplete information (Akerlof 1970; Stiglitz 1985; Stiglitz 1989).

Hadfield (2005) explains that the problem of enforcement (or contractual commitment) refers to the commitment necessary to support agreed-upon exchanges that take place over time. Enforcement comes down to the problem that one party invests in resources or gives up other opportunities, expecting the second party to take the actions agreed upon, such as paying the first party or providing a return service at a future point in time. Or in other words "seek to bring ex post incentives in line with ex ante agreements, to produce the outcome that the second party promised" (Hadfield 2005, p. 178).

An effective and efficient legal system is important for enforcement. Even when few disputes are actually pursued in court, it alters people's incentives to behave opportunistically and improves the efficacy of other forms of contract enforcement. In many countries, the legal system is too costly and unreliable (Rodrik 2008). In this case, self-enforcement mechanisms and reputation mechanisms are available (Dixit 2004). Self-enforcement mechanisms change the consequences of actions. For instance, the risk of losing a valuable trading relationship when an agreement is breached may be a sufficient deterrent. Reputation mechanisms alter the likelihood of future transactions with potential trading partners if an agent defaults on an agreement: when someone attains the reputation of being untrustworthy, others will not want to trade with this person. To function well, the reputation mechanism requires information about reputation to be captured and disseminated to potential trading partners. In some cases, the possible enforcement mechanisms are either not credible to all parties or have high costs. In such cases, otherwise lucrative transactions will not occur and economic performance will suffer. This is often the case in African markets, and exchanges remain cash transactions, with no time between the quid and the pro (Fafchamps 2004).

1.2.3   transaction risks and costs

When buyers and sellers in African markets deal with a lack of information and/or a lack of enforcement mechanisms, they face several transaction risks. These entail for instance, the risk that the other party will provide misinformation about current market prices or that the other trading party will renege on the agreement. Such transaction risks are an important, but often neglected, element of marketing (Shepherd 2005). Dorward et al. (2003) state that policies have paid insufficient

attention to the problems of transaction risk in poor rural areas. Contrary to Williamson (1979), who argues that institutional arrangements aim to minimise transaction costs, Dorward and Kydd (2004) propose that the purpose of institutional arrangements is to minimise transaction risks. Parties in an exchange need to incur costs to protect themselves against transaction risks, and Dorward and Kydd (ibid) therefore view transaction costs as necessary investments. Their focus is therefore not on reducing transaction costs but on reducing transaction risks, and on finding the most appropriate institutional arrangement that will reduce these risks. This thesis adopts the reasoning of Dorward and Kydd.

In general, there are three types of transaction costs related to risks present in exchanges (North 1990; Furubotn & Richter 2005):

1.   Search and information costs: someone considering a certain transaction must search for a suitable and reliable party with whom to trade, and this search process involves costs, especially when the risk of trading with an opportunistic partner is present. These costs may consist of visits to possible traders (in different markets), communication (e.g. telephone calls), looking up prices, testing quality, and measuring quantity, etc. Acquiring this kind of information plays an important role in most African markets, especially when market information systems are lacking.

2.   Bargaining and decision costs: these costs relate to time and (legal) advice that is put into bargaining and negotiating the agreement between parties. This agreement can be put into a formal (written) contract or an informal (verbal) deal. Again, information plays an important role as some parties may have information that they do not disclose (called asymmetric information). Without fixed prices and quality standards, bargaining may be a difficult issue, fraught with transaction risks.

3.   Supervision and enforcement costs: these costs are related to the input of time and costs to monitor whether the agreement is implemented, to avoid opportunistic behaviour by parties, and to enforce agreements. Information again plays a role in monitoring, which may be costly, especially when parties have an incentive to conceal that they are not complying with the agreement (i.e. increasing risks).

Williamson (1979) recognises the inherent risk underlying any transaction because of bounded rationality and opportunism. Bounded rationality implies that

agents experience limits in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information. As a result of these behavioural assumptions for economic organisation, all (complex) contracts are unavoidably incomplete, thereby hindering the implementation of complex incentive alignment processes: relying on "contract-as-promised" is fraught with transaction risks (Williamson 1981; Williamson 1991). Opportunism can be defined as acting out of self-interest with deceit. Asymmetric information makes it costly to distinguish opportunistic from non-opportunistic behaviour ex ante; one does not know whether the other party is telling the truth (about prices or quality) when one is not privy to the other party's information.

In addition to behavioural aspects, there are also specific attributes of a product that may increase transaction risks and thus increase transaction costs (Williamson 1979; Milgrom & Roberts 1992; Dorward et al. 2009), which Masten (2000) applied to agricultural products:

1. Asset specificity (specific investments which may not have an alternative use. If the sale fails, the producer is left with costly investments)
2. Uncertainty
3. Frequency of transactions (e.g. once per year or continuous)
4. Difficulty of measuring performance in fulfilling the terms of an agreed transaction
5. The need to coordinate other transactions with other actors

Not all are relevant for sesame production in Ethiopia. Asset specificity is not really applicable, as the investment made for sesame production consists of inputs (land, fertiliser, and labour) that may also be used for other crops. Uncertainty is important though, in several ways. There is inherent uncertainty due to varying climatic conditions (onset of rains and temperature, etc.), which affects sesame production (in terms of quantity and quality). Uncertainty also arises from market conditions: prices are not known in advance. Frequency of transactions also applies. Sesame is harvested only once a year. Because of the characteristics of sesame (see chapter two), it must be harvested and sold fairly quickly, as it cannot be stored for long. This increases the risks of price failure (sales cannot be spread out over a longer period). It also puts pressure on the relationship between farmers and traders. A lack of quality standards and reliable measurement equipment (especially prior to the ECX) makes it difficult to measure performance (how much

sesame of which quality is being sold). Even after the ECX, measuring performance in terms of quality remains an issue (see chapter two). Before sesame can be sold, farmers need to obtain the necessary inputs (labour, fertilisers, and tractors), which is often difficult as the market for these inputs does not always function well (Tefera 2010; Gelalcha 2009). Also, traders need to purchase sesame from farmers and traders before they can sell; the number of intermediaries involved in trade is a result of the difficulty of coordinating sales and purchases.

1.2.4   formal and informal institutions

The problems of coordination, information, and enforcement and the resulting transaction risks and costs may be solved by market institutions. The well-known definition by North (1990) of an institution is that it consists of the rules of the game in a society. Aoki (2001; 2007) and Greif (2006) elaborate this definition by defining institutions as collectively recognised rules and symbols plus behavioural beliefs (i.e. expectations) of agents about other players' choices and intentions. "Meaningful rules" are those that are generally respected and obeyed. Institutions are formed to reduce uncertainty (i.e. risk) in human exchange. Together with the technology employed, they determine the transaction (and production) costs (North 1995). Davies and North (1971) distinguish between institutional environment and institutional arrangements. These may be formal or informal.

An institutional arrangement is a set of rules or agreements governing the activities of a specific group of people pursuing a certain objective, such as market transactions (agreements to exchange goods and services), or organisations[8] (formal groups involving individuals working towards a common purpose). These activities involve the exchange or coordination of goods or services (such as labour). The arrangement may be either a formal or an informal one, and it may be temporary or long-lived. It provides a structure within which its members can cooperate, or provides a mechanism that can effect a change in laws or property rights.

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[8] North (1990) emphasises that organisations are not part of institutions, but are like players in a game. North et al., (2006, p. 3) emphasise the importance of organisations: "while institutions frame all human behavior, it is through organisations that people carry out complex social interactions. Understanding human development requires understanding how institutions shape the kind of organisations available for sustainable human cooperation".

The institutional environment consists of the broader socio-economic framework; the set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution. The different institutional arrangements take place within the institutional framework. A "framework of law" is a necessary condition for a market economy to succeed. Rules governing elections, property rights, and the right of contract are examples of the type of ground rules that make up the economic environment. However, social rules (culture and norms) are equally important. Although the institutional environment is often equated with formal rules, this is not necessarily always the case. Figure 1 shows the distinction.

Figure 1: Relation between formal and informal institutional environments and arrangements

	Formal	**Informal**
Institutional environment	Government rules and policy, state law	Culture, norms (e.g. corruption), social capital
Institutional arrangement	Ethiopian Commodity Exchange, producers' organisation, traders' association	Informal farmers' or traders' groups, savings associations, social capital
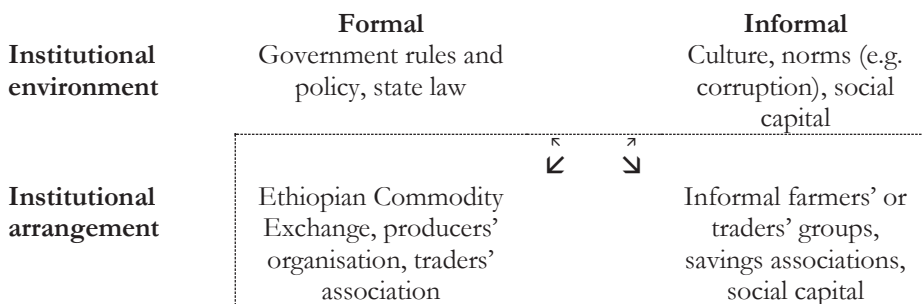
Note: arrows depict effects; dotted lines depict the focus of this thesis.

Each quadrant influences another quadrant. For instance, culture and norms may influence how a producers' organisation is managed. Formal government rules may impinge on how informal farmers' saving associations are run. The institutional environment has a larger effect on institutional arrangements than vice versa, as its reach is much broader (depicted by larger arrows). However, this does not mean that an institutional arrangement has no influence on the environment; a producers' organisation may successfully lobby for changes in a specific government rule, for instance. The focus of this thesis is on the interaction between formal and informal institutional arrangements; i.e. the bottom two quadrants.

How these four quadrants interact; i.e. whether they are substitutes or complements is a much debated topic, usually discussed in terms such as social capital versus formal contracts, or trust versus law (Woolthuis et al. 2005; Zasu 2007; Lazzarini et al. 2004; Williamson 2009; Mellewigt et al. 2007; Zenger et al.

2002; Poppo & Zenger 2002; Ahlerup et al. 2009). Whether these are substitutes or complements depends on their specific function in solving problems of coordination (or information) and enforcement.

Social capital is an important element of the informal environment and informal institutional arrangements (see figure 1). Although trust is often mentioned in this respect, it is not strictly an institution. Trust may be defined as one's expectations regarding others' choice of actions that have a bearing on one's own choice of action (Dasgupta 2000). Norms and trust form the cognitive of social capital; whereas formal and informal networks form the structural social capital (Uphoff & Wijayaratna 2000; Van Rijn 2014). A thick network of interpersonal relations (e.g. social network capital) characterised by trust may function to resolve the problems of coordination and enforcement. Social capital reduces transaction risks by facilitating collective action (Olson 1965). The literature on social capital and trust is extensive. Braithwaite and Levi (1998), Das and Teng (2004), and Kramer (2006) provide detailed overviews.

1.2.5   institutional change

How institutions change is an age-old question (Bowles 2004), but one that is still very much on the research agenda (Mahoney & Thelen 2010; Ostrom & Basurto 2011), as the process is still often poorly understood. Little is known, for instance, about the interactions between new formal rules (i.e. a designed institution) and pre-existing social norms (Eggertsson 2005, pp. 30–31), or how the four quadrants in figure 1 influence each other. The question of why and how institutions can change has hardly been satisfactorily dealt with in economics or in the other social sciences (Aoki 2001).

Aoki (2001, p. 231) defines institutional change as "a situation where agents' beliefs on the ways a game is played are altered in critical mass". For example, if the traffic rule "riding on the left-hand side" is imposed, there will be institutional change only if a sufficient number of people adhere to this rule. Institutional change therefore does not include "mere changes in statutory laws and marginal changes in agents' strategic choices in response to mildly changing environments according to chosen rules" according to Aoki (ibid). A newly imposed rule may become a "paper tiger" if no one adheres to it, or if only few people change their behaviour. However, North (1990, p. 89) stresses that "the single most important

point about institutional change (…) is that institutional change is overwhelmingly incremental". Although most institutional change is incremental, as North suggests, one can only identify that institutions have, in fact, changed when a majority of people have changed their mindset (beliefs) and behaviour (strategic choices).

Bowles (2004) distinguishes two traditions of institutional change, constitutional and evolutionary. The first, "constitutional" tradition, sees institutions as (social) rules that can be designed to solve a certain problem. The second tradition, "spontaneous order", sees institutions as the product of countless interactions, the aggregate consequences of which are often unintended. There are parallels between the constitutional and spontaneous order tradition and formal and informal institutions. Formal institutions are usually designed to solve a certain problem. Informal institutions are the product of social interactions, evolving by trial and error, building on old institutions, a process also termed "bricolage" (Campbell 2004; Brousseau et al. 2011). The constitutional tradition may have contributed to the notion shared by some economists that "getting institutions right" is the way to develop economies (Rodrik 2008), and that optimal institutions may be designed, a notion debunked by various institutional economists (Eggertsson 2005; North 1990; Bardhan 2004).

Eggertsson (2005) makes a distinction between social and physical or production technologies and explains that while technical change is an engine that drives sustained economic growth, its transfer is not effective unless it is complemented by social technologies (or institutions). The successful transfer or introduction of new social technologies is more complex than the transfer of production technologies because pre-existing institutional arrangements often undermine the effect. Fafchamps (2006) adds that in markets in developing countries, reliance on informal networks is likely to be optimal for the actors involved. Successful institutional reforms therefore depend on active support from a large portion of relevant actors (i.e. critical mass), which may not be automatic. Eggertsson (ibid) cites Williamson (1985) to explain that expected transaction costs (fears of opportunistic behaviour by the other side) create powerful incentives to abandon promising projects. This illustrates the interplay between the constitutional tradition (designed institutional change) and the spontaneous order tradition (spontaneous institutional change). Despite apparent differences between the two, Aoki (2001, p. 236) argues that there is a common condition involved in bringing about a change, which is that the critical mass of agents needs to begin,

even if gradually, to modify their beliefs and actions to form a new equilibrium, intended or unintended. The two mechanisms of institutional change become intertwined in this manner.

Stiglitz (2001) proposes a useful framework to understand the interaction between social capital (informal institutions) and the development of (formal) institutions within institutional change. He proposes that the nature of social capital changes with the level of institutional development (with more formal institutions). Early on in the development of market economies, markets are thin and market institutions are underdeveloped. In addition, many governments, especially in developing countries, cannot provide an adequate underpinning of law; the apparatus of state law is often costly, slow, unreliable, biased, corrupt, weak, or simply absent (Dixit 2004)[9]. A lack of formal market and government institutions does not mean that economic activity grinds to a halt. Groups create informal, alternative institutions to provide the necessary economic governance (Dixit 2004).

As market economies and institutions develop, several functions of the social network capital become less useful, and some of the network of interpersonal relations gets dispensed with. The value of social network capital with its personal relations declines, replaced by contracts embedded in a reasonably well-functioning legal framework. Social capital does not disappear, but is "restructured and deepened, not in the form of 'rules and regulation' to substitute or complement the market and the state, but in the form of tacit knowledge" (Stiglitz 2001, p. 65). Tacit knowledge was introduced by Polanyi (1967) to distinguish between formal, codified and explicit knowledge. Hodgson (1998) cites Commons (1934) to explain the link between tacit knowledge and institutions. Institutions are formed as durable and integrated complexes of habits, customs, and routines, which echo the definition of institutions by Aoki (see above). These preserve knowledge, particularly tacit knowledge in relation to skills, "with institutions acting through

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[9] According to Dorward et al. (2006, p. 11), there are various reasons why many governments in developing countries are unable to offer information and enforcement. In general, governments in developing countries face a number of difficulties in defining and implementing their roles in marketing systems. These arise in (a) defining public goods and wider social interests, (b) identifying the best means of pursuing these interests (which may at times be conflicting), and (c) their ability to pursue these interests. These difficulties result from the limited capacity of the state (for example in information, finance, and skills), limited competitive and incentive processes to promote innovation and risk taking, and conflicts between wider social interests and the interests of specific groups and individuals within government. These difficulties are especially manifest in many African countries (World Bank 2002).

time as their transmission belt" (Hodgson, ibid, p. 180). The collection of habits, customs, routines, and tacit knowledge makes it easier for groups and individuals to work together, especially in complex market settings; knowing what to expect from others and what other expect from you lowers enforcement and coordination (and information) costs. It may be compared to a game with a complex set of rules, whereby the players know the rules well, and can start playing immediately, instead of first reading the manual, learning the rules, and getting to know the other players.

A note of caution is provided by North et al. (2013), who argue that no simple or linear relationship exists between institutional and economic development. They observe that many developing countries are not ready to adopt institutions that function well in Western Europe or North America. If they do, these institutions often function very differently. They criticise the neoclassical assumptions that growth will occur whenever profitable opportunities present themselves, and markets will work if not impeded by political or social interventions. They argue that this is because many developing countries are fundamentally different from developed countries. This difference lies in the ways that different societies tackle the ubiquitous problem of violence. In an earlier work, North et al. (2009) present a conceptual framework that emphasises the fact that developing societies need to limit the problem of potential violence by various groups in society. In societies they term "limited access orders",[10] the elite restrains violence through rent creation from limiting entry to the economic and political system. Because of these rents it is in the interest of powerful groups and individuals to refrain from using violence, thus achieving social stability and order. These societies are characterised by a de-facto non-democratic political system, few organisations (predominantly associated with the state), a small and centralised government, as well as a "predominance of social relationships organized along personal lines, including privileges, social hierarchies, laws that are enforced unequally, insecure property rights, and a pervasive sense that not all individuals are equal" (North et al. 2009, p. 12). Limited access orders preclude thriving markets and long-term economic development. As we will see in chapter two, Ethiopia fits well the description of a Limited Access Order.

By contrast, many developed countries are what North et al. (ibid) term "Open Access Orders", with systematic competition, entry, and mobility; they also

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[10] Or natural states, because most societies fall into this category.

foster thriving markets and long-term economic development. The source of development is the transition from a limited access to an open access society. Three doorstep conditions are preconditions for the start of the transitioning process: (1) the rule of law for the elites (2) existence of perpetually lived organisations, independent from the ruling government, and (3) consolidated political control of the military. However, transition is neither automatic nor irreversible; all steps in the transition will take place within the logic of the natural state (i.e. with the consent of the elites); shifts in economic and political access are deeply connected at all times.

The literature discussed above has highlighted that the interactions between designed formal institutions and informal institutions, as well as how these institutions change, are still poorly understood. The question how formal institutions and informal institutions interact brings us back to the different viewpoints of Fafchamps and Gabre-Madhin sketched earlier. A designed formal institution has intended and unintended consequences on informal institutions. While Gabre-Madhin focused on the intended consequences, Fafchamps warned of unintended consequences. Stiglitz (2001, p. 67) cautions that formal institutions are not always a good substitute or complement for an informal institution: "A real disaster may happen when states are powerful enough to disrupt an existing local cooperative status but not capable enough to replace it with anything functional and less arbitrary. Examples here abound and they are powerful reminders of the potentially destructive role of otherwise well-intended development projects". It is interesting to note that Gabre-Madhin was careful to point out that the ECX would "not aim to eliminate traditional markets around the country, but rather to build up these informal markets by adding technology and systems to bring more transparent, more efficient, and more reliable trading to all concerned" (Gabre-Madhin 2012, p. 6). This is in line with Fafchamps' careful suggestion that interventions should focus on fostering social capital, i.e. on a smoother and more accurate dissemination of information through informal networks and business associations. He anticipates that technologies that improve information enable a switch from informal to formal institutions, solving information and coordination problems (Fafchamps 2006, pp. 1182–1183).

1.3   objectives and research questions

The overarching objective of this thesis is to improve the understanding of institutional change, in particular the question how the establishment of a formal market institution (the ECX) affects informal market institutions (i.e. the beliefs and behaviour of sesame farmers and traders) in Ethiopia. Based on the literature reviewed, I argue that if the ECX resulted in institutional change, it means that a critical mass of agents (i.e. traders and farmers) needs to have begun, even if gradually, to modify their beliefs and behaviour. To understand institutional change, therefore, the thesis must first analyse the pre-existing informal institutions, and how these have changed. I unpack the 'how' question by analysing whether the formal institution of the ECX complemented or substituted informal market institutions. I argue that the ECX will be successful if it can complement existing informal institutions where necessary and substitute less effective informal institutions in terms of coordination and enforcement. Based on the literature, this thesis takes trust perceptions (beliefs) and social capital as important ingredients of informal institutions. Market transparency (information on prices, standard grades, and standardised weighing equipment) is taken as an important ingredient of formal institutions (ECX); these should lead to lower transaction costs. More or less implicit is the issue of intended and unintended consequences of the ECX. This thesis does not present a comprehensive exposition of these, but aims to highlight certain aspects in the chapters. The chapters consist of independent academic papers, each intended as a stand-alone contribution to the literature.

I formulate two main research questions:
1. How did the formal, designed institution of the ECX impact informal institutional arrangements?
2. To what extent did the ECX achieve what it intended: bring more market transparency and reduce transaction costs?

These questions are analysed for farmers in chapters three and four and for traders in chapters five and six. Figure 1 may be used to depict how the chapters are organised according to the research questions (figure 2). Chapter two provides a background on the formal and informal institutional environment as well as the formal institutional arrangement of the ECX.

Figure 2: : relationship between the different concepts, research questions, and chapters

Institutional environment	**Formal** ② ② **Informal**
	Governance and government policy Culture, norms

Institutional arrangement	Ethiopian Commodity Exchange ④ Social capital between farmers ③
	② traders ⑥
	⑤
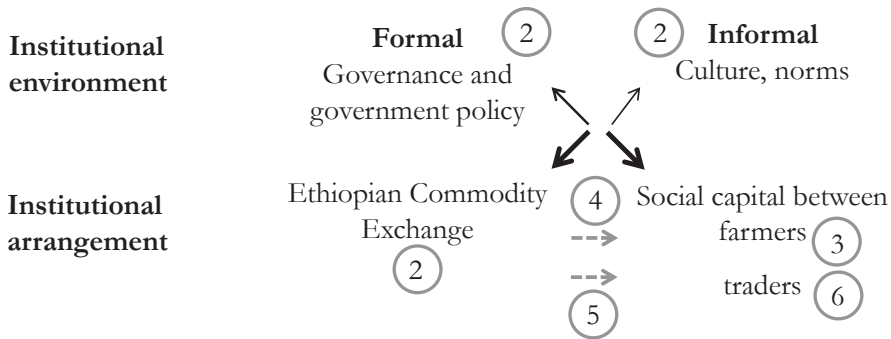
1.4   research design

This thesis analyses four data sets collected between 2008 and 2012. Two were collected by interviewing farmers in 2008 and 2012 in two main sesame growing areas in Ethiopia: East Wellega and West Tigray. Another two data sets were collected by interviewing sesame traders in 2009 and 2012. The questionnaires used for this thesis were based on questionnaires developed earlier by IFPRI for the Ethiopia Strategy Support Program. The research is not, and was never intended as, a rigorous impact evaluation using difference-in-difference methods. The lack of a control group makes this impossible. However, the research design has tried as much as possible to approach a difference-in-difference evaluation by (i) interviewing farmers and traders in two different periods, with the ECX becoming mandatory between these two periods; (ii) interviewing farmers in two different areas of Ethiopia, to analyse the variety and extent of influence of the ECX; and (iii) interviewing different traders to gauge the degree of impact the ECX has had on them.

1.4.1   farmers' survey

In 2008, four woredas (sub-districts) in the East Wellega Region and one woreda in the West Tigray Region were selected on the basis of amount of sesame grown (see figure 5); on the fact that the agro-ecological circumstances differ; and on the importance of the ECX presence in the two areas. In East Wellega farmers grow a variety of crops, of which sesame is just one. Farmers are also less affected by the

ECX. By contrast, farmers in West Tigray usually specialise in sesame as their main cash crop. Also, the ECX has an active presence in Humera town, close to the selected kebeles (municipalities). More woredas in East Wellega were selected because there are fewer farmers who cultivate sesame. After selecting the woredas, a number of villages or kebeles were randomly selected in East Wellega (12) and West Tigray (4). In these villages, farmers were randomly selected and interviewed, using a standard questionnaire. In 2012, the same villages were revisited, but because the enumerators were unable to interview the same farmers, farmers were randomly selected instead.

1.4.2 traders' survey

Selecting traders at random is not feasible in practice (Porter 1995; Barrett 1988). First, it is not known how many traders are engaged in the sesame trade. Second, traders travel between markets, and there is no way of knowing which traders will show up at a given market. I have followed the strategy used by Porter (1995): where possible, every trader selling in the market was interviewed. In large markets this was not feasible, and an on-the-spot sampling strategy had to be devised to obtain as representative a sample for the market as possible with different types of traders being selected.

The intention was to interview the same traders in 2009 and 2012. However, because traders usually move between markets, this was no easy task. Traders who participated in the 2009 and the 2012 surveys were later identified by matching unique combinations of age, education, start-up capital, and age of firm. The difficulties of sampling in markets have been observed by others; in the Gambia, for example. Barrett (1988, p. 4) writes that "a rigorous sampling procedure" was "impractical". In rural markets, which are frequently set up on open ground with numerous entry and exit points, the problems are particularly great, especially where stalls are few and most traders simply arrange their goods on makeshift places. In another example, Bromley (1980:154) describes a sampling technique he used in Ecuadorian urban markets. Loveridge (1995) argues that sampling error is likely to be smaller when interviewing traders than when interviewing consumers or producers. The number of traders in a market is usually substantially smaller than the number of consumers or producers, so a small number of respondents translates into a high proportion of the population.

Figure 8 shows the locations of the traders who were interviewed in 2009 and 2012. Markets in 50 woredas were selected (in the regions of Addis Ababa, Benishangul Gumez, Amhara, Oromiya, and Tigray), where sesame trade is an important activity. In these markets, available traders were asked to be interviewed. As can be seen in the table below, the enumerators occasionally had to travel to different woredas because trade would shift depending on market days. Figure 8 shows that traders were interviewed along the main routes that sesame travels from the major production areas in the north-western regions.

1.5   outline of the thesis

Chapter one introduces this thesis. It presents the conceptual framework that underlies the different chapters, based on a review of the literature on informal and formal institutions. It also describes the data that is used for the different analyses.

Chapter two provides background on sesame markets in Ethiopia and its main actors (farmers and traders). It explains the Ethiopian Commodity Exchange, provides information on sesame prices and describes Ethiopia's institutional environment.

In chapter three, I focus on the factors associated with informal institutional arrangements. I use farmers' perceptions of opportunistic behaviour by traders, which can be used to measure trust. I find that most farmers in Ethiopia's sesame markets view traders as opportunistic and only very few engage in long-term relational trading with trusted traders. Based on data collected in Ethiopia in 2009, I find that the lack of market information is linked to negative perceptions of traders' trustworthiness; without information, farmers find it difficult to verify traders' trustworthiness. Further analysis reveals that farmers who have a more negative perception of traders tend to participate less in markets, selling to fewer market outlets and more often to cooperatives.

Chapter four builds on the findings of chapter three and examines whether the newly established Ethiopian Commodity Exchange through its affiliated Primary Transaction Centres (PTCs) has led to improved market transparency. I argue that market transparency will lead to reduced transaction costs for farmers and increased trust in traders. This chapter shows that the ECX has been successful in increasing market transparency and decreasing transaction costs. It argues that traders are behaving less opportunistically as a result of market transparency, and

this has improved farmers' trust perceptions about traders and even slightly increased relational contracting and significantly increased credit relations.

Chapter five explores whether the creation of the ECX and its formal monitoring and enforcement institutions has affected the role of social capital and trust. Consistent with a simple theoretical marketing model, the panel data suggest that this is indeed the case. Trade in sesame is increasingly governed by formal rather than informal institutions, and in response traders appear to have broadened their trading network, rely more frequently on traders with whom they do not have social relations, and have reduced the provision of credit that cements personalised relationships. They also have lower levels of trust in the intentions and capabilities of their trading partners, and attach less weight to trust.

Chapter six investigates the nexus between performance, credit, and social capital of traders. Social capital is found to be important for obtaining credit, but may constrain a trader to a few trusted trade partners, restricting his ability to purchase from others, thus limiting performance. Trade credit increases working capital and enhances the amount a trader can purchase, improving performance. This chapter shows that it is the small traders at the upstream end of the trade network who are most constrained by social capital, because they need to assemble small amounts of sesame from a large number of trade contacts. The Ethiopian Commodity Exchange, which became mandatory for all sesame trade after 2010, has made trade credit less common although its importance did not decrease. The policy implications are that better credit facilities should be available to small traders, who are typically overlooked in microcredit schemes and are usually cash-constrained.

Finally, chapter seven concludes by providing a discussion of the main findings of this thesis and offering recommendations for both policy and future research.
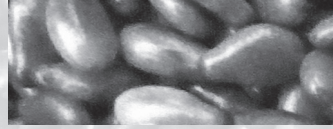
2.1   informal institutional environment

To understand the current sesame markets, and how traders and farmers interact, it is important to understand the history of agricultural trade, traders, and farmers in Ethiopia, which is different from other countries in the region. Sesame (figure 3) has played an important role.

Figure 3: *Sesamum indicum* L
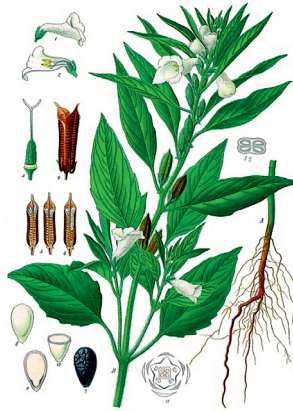
Source: Wikicommons

Ethiopia has long been known as a country that produces various agricultural crops and trade. One of the earliest accounts, by Marco Polo in the 13th century, notes that it produces rice, wheat, flesh, milk, and sesame and that the country abounded in "all the necessaries of life" (cited in Pankhurst 1961, p. 200). Marco Polo also describes the flourishing markets and trade claiming that there was a "class of merchants" in Ethiopia "living by trade". Two centuries later, accounts by various Portuguese travellers corroborated this, and reported that there were weekly markets all over the country where people could buy everything they wished: cows and mules, fowls, capons, salt, incense, pepper, myrrh, camphor, and various small articles. However, trade was generally not based on cash sales but on barter, with salt, gold, and bread often used as currency (Pankhurst 1961, p. 307).

For centuries, Ethiopia was also part of a well-travelled trading route using caravans from North Africa, Greece, and India. Lefebure observed in 1840 that it was "extremely remarkable" that "amid the anarchy which reigned for several centuries ... commerce was not interrupted, and that the caravans could cross the country freely without being disturbed by the soldiers" (cited in Pankhurst 1968, p.

346). The international trade was dominated by Muslim merchants from North African countries. Because of this, many domestic merchants were Ethiopian Muslims.[11] Muslim merchants were treated with contempt by Ethiopian Christians, both for their religion and for their occupation, which was regarded as undignified (Messing 1965). Also, craftsmen (blacksmiths, butchers, tanners, potters, and weavers), who were also often traders (or artisanal traders as Watson (2006) calls them), were at the bottom of the hierarchical order in northern Ethiopia (Amhara and Tigray) (Amborn 2009) and south-west Ethiopia[12] (Freeman & Pankhurst 2003).[13] Messing (1965, p. 402) describes Amhara trading practices in the 1960s as driven "not so much by the desire to drive a good monetary bargain as by the desire to carry out the transaction without being mocked". He gives the example of Amhara basket makers on the Gondar market who would refuse to admit that their wares on display were for sale. Watson (2006, p. 77) describes a village in south-west Ethiopia where farmers, on the one hand, and artisanal traders, on the other, peddled negative stereotypes about the other, with farmers believing that the artisanal traders were untrustworthy "because they are always trying to cheat someone the market in order the secure a more advantageous deal".

The only "respectable" occupations were considered to be farming, husbandry, warfare, government, and the church in Amhara (Messing 1965; Baker 1992), and the same holds true for south-west Ethiopia (Watson 2006). The positions of authority were connected to holding land, and (artisanal) traders were therefore excluded from these positions. The (artisanal) traders found various mechanisms to cope, forming social networks with other (artisanal) traders such as the *fuld'o* network which connected traders in the region around Konso[14] in south-west Ethiopia, up to the Kenyan border and Addis Ababa (Tadesse 2002). Domestic Muslim traders formed their own social networks with foreign Muslim traders. Such networks would help secure passage for its members, providing support for traders in times of misfortune, and have their own code of practice

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[11] Gabre-Madhin notes that the Ethiopian word for brokers (delala) is derived from Arabic, resembling the terms used in Nigeria (dillali) and India (dalal), indicating that the practice of brokerage may have originated in Muslim commercial practices.

[12] Farmers in South-west Ethiopia (*etenta*) were strictly divided from artisanal craftsmen (*xawuda or xawd'a*) and did not intermarry.

[13] Amborn (2009) estimates that the division of work into agriculture and full-time crafts and trade has existed since the 17th century.

[14] Several ethnographic studies have been carried out in Konso in the South-west (see collected articles in James et al. 2002; and in Schlee & Watson 2009; Watson 2006).

with sanctions and fines. The traders and middlemen in and around the major towns of Addis Ababa were dominated by Gurage. The Gurage are an ethnic group from Gurageland that was defeated by Amhara in 1889, after which many Gurage were enslaved and brought to Addis Ababa. Others migrated to Addis Ababa as free labourers in the early 20th century, which was facilitated by the fact that their agricultural production system of enset allowed male members to migrate to Addis for several months a year. The Gurage took up low-status occupations such as trade. Their expansion of trade activities to other towns was facilitated by the closely-knit character of Gurage social and cultural organisation. Their reputation as being astute in business matters and shrewd entrepreneurs has become legendary (Baker 1992).

The brief Italian occupation (1935–1941) changed little in Ethiopia; in 1941 Haile Selassie was back on the throne as emperor. Some 40 years later, in 1974, Ethiopia experienced an enormous upheaval with the overthrow of emperor Haile Selassie and his feudal rule by the Marxist regime called the *Derg*.[15] All banks and major industries were nationalised, a sweeping land reform programme was implemented that declared all land as the property of the state, and landholdings of more than 10 hectares were outlawed. Not a great deal is known about how the traders fared under the Derg (Watson 2006). According to Tadesse, institutions such as the *fuld'o* network went underground during Derg rule. The policies implemented by the Derg regime undermined the land-based power of indigenous elites in several ways. The land policies took away resources and power from wealthy and powerful landholding farmers. The traditional positions of authority were undermined by the arrest of those who had served in the empire, many traditional institutions were dismantled, and traditional local governance was replaced by peasant associations. The Derg regime also aimed to end discrimination against craftsmen.

Although the Derg period was full of conflict and chaos, the fortunes of the craftsmen and traders reversed during and after the Derg regime. Freeman and Pankhurst (2003) show how the arrival in the country of new rulers (from the Italian period to the Derg), new religions (Protestantism in particular), and the new market and economic facilities induced by 20th-century urbanisation allowed marginalised groups such as craftsmen and traders to escape conditions that for centuries appeared unchangeable. Amborn (2009) explains how traders in the

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[15] Which signifies "committee" in Amharic.

south-west also changed their own customs and traditions. As many artisanal traders became richer, several farmers wanted to join the artisanal trader's class and its organisations. While this was previously difficult, the artisanal trader class started to open up for the farmer class not only professionally but also socially (intermarriages between the two classes even became frequent).

The Derg regime came to an end when its power and influence weakened and the Tigrayan People's Liberation Front (TPLF) led by Meles Zenawe took over in in 1991. Since 1991, the Ethiopian People's Revolutionary Democratic Front (EPRDF) has governed Ethiopia, dominated by the TPLF with Zenawe as Ethiopia's Prime Minister (until his death in 2012). Although the TPLF movement was inspired by Marxism and Leninism, the Zenawe government has been highly pragmatic, adopting a global neo-liberal agenda: private investment has been encouraged and markets have been liberalised. The fortunes of traders have improved accordingly (Watson 2006).

There have been very few recent studies on traders' ethnic roots and related social networks in current Ethiopian markets. Gabre-Madhin (2001) finds that in the Ethiopian grain markets there is a "striking" absence of ethnicity as a basis of agency relations. In her sample of traders, the proportion of traders with the same ethnic origin as their broker ranged between regions from 8% to 54%. Overall, only 26% of traders were from the same region as their brokers. As further confirmation, only 4% of traders revealed that they had "kinship" ties with their brokers. Informal discussions with oilseed traders (in 2008–2012) revealed a similar picture for sesame markets. Trade in sesame is relatively recent compared to grains. The data that was collected for this study in 2008–2012 on sesame traders in West Tigray and East Wellega shows that, on average, traders started their sesame trade business in 1999 (with standard deviation of 7.28 years). This may have opened up opportunities for new entrants into the trade profession.

2.2   formal institutional environment

2.2.1   ethiopia as a limited access order

With a population of about 84 million people who inhabit a total land area of 1.1 million km², Ethiopia is the second most populous country in Africa (CSA 2011). It is characterised by a diverse cultural and linguistic population, who belong to over

70 ethnic groups. Ethiopia's multi-ethnic character is reflected in its constitution, which provides a form of government characterised by ethnic federalism on the part of formally self-governing regional states. The ruling political coalition, the EPRDF (Ethiopian People's Revolutionary Democratic Front)[16] has consolidated control since 2010 with the EPRDF officially winning 99.6% of the votes in the 2010 parliamentary elections (Hagmann 2010). Abegaz (2011) therefore concludes that despite the form of a federal state structure and a multiparty system, post-1991 Ethiopia remains a de facto centralised one-party state. A Chatham House report (Hagmann 2010) describes the structural aspects of the Ethiopian polity as:

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- top-down policy making from the federal level to the regions down to the level of woreda
- state control of rural lands
- absence of free media and public sphere limited to the capital and major cities
- a monopolisation of development initiatives by the government
- state control or oversight of civil society organisations
  Human Rights Watch has observed that:

"since the promulgation in 2009 of the Charities and Societies Proclamation (CSO Law), which regulates nongovernmental organizations, and the Anti-Terrorism Proclamation, freedom of expression, assembly, and association have been increasingly restricted in Ethiopia. The effect of these two laws, coupled with the government's widespread and persistent harassment, threats, and intimidation of civil society activists, journalists, and others who comment on sensitive issues or express views critical of government policy, has been severe". (HRW 2013).

Ethiopia scores relatively low on governance indicators, collected by the World Bank (2013b; see Kaufmann et al. 2010 for methodology used) as illustrated in figure 4. It scores well below average for many of the six indicators (with the average being zero).

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[16] The EPRDF is an alliance of four parties: the OPDO, which is based in the Oromia Region; the ANDM based in the Amhara Region; the SEPDF based in the Southern Nations, Nationalities and Peoples Region; and the TPLF based in the Tigray Region. A total of about 4 million people are together members of the allied parties.[1] The EPRDF is led by a central committee as well as a Politbureau, whose members are selected every three years by a congress of the party.

Figure 4: World Bank governance indicators for Ethiopia (2012)
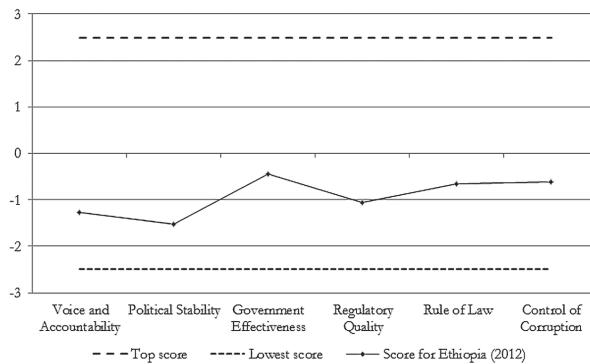
Source: World Bank 2013b; see Kaufmann et al. 2010 for methodology used.

These World Bank indicators characterise Ethiopia's governance as rather weak, although it approaches the average for all countries for government effectiveness. Other authors have used governance indicators to classify countries into limited or open access orders (see section 1.1.5 for a discussion of these). For instance, Levy (2013) uses two indicators for quality of state institutions: bureaucratic capability and quality of checks and balances. Ethiopia falls into the group with relatively strong bureaucracy but weak checks and balances institutions, which, according to Levy, aligns well with the definition of a basic limited access order. Gollwitzer Franke & Quintyn (2012) construct three composite indicators to quantify the three doorstep conditions discussed in section 1.1.5, which allow societies to transition from a limited to an open access order. I refer to their paper for the methodology and results, and only use their overall, combined doorstep indicator for Ethiopia. This indicator ranks the bottom 10 countries, which means that Ethiopia can be characterised as a limited access order society.

2.2.2 agricultural policies

Ethiopia has made considerable progress toward food security. Thirty years after the 1984 famine, per capita income has increased, poverty has fallen, and food security has improved. The agricultural sector has been a major contributor to Ethiopia's overall growth performance, with the Ethiopian government investing in the agricultural sector to address economic problems and to promote growth in the country. Accordingly, the sector accounts for more than two-fifths of GDP and three-fourths of merchandise export earnings (Dorosh & Rashid 2012). Minten et

al. (2012a) identify five important changes that have affected the functioning of Ethiopian agricultural markets. First, there has been considerable economic and income growth, which has led to changes in food demand with higher consumption levels and a shift to more preferred cereals and high-value products (e.g. meat, dairy products, and fruits). Second, increased urbanisation has led to larger rural–urban food marketing flows. Third, the Ethiopian government has invested in road infrastructure and a better organised transport sector, which have led to better logistics and significant declines in transportation costs. However, it should be noted that Ethiopia still has one of the lowest road densities in the world. Fourth, the increase of mobile phones has improved access to price information in commerce. Fifth, cooperatives, but especially private commercial farms (often privatised state farms), have started to emerge.

Behind much of this structural transformation of agricultural markets is the Ethiopian's government active policy to improve the agricultural sector and markets (Engida et al. 2010). The Ethiopian government formulated the Agriculture-Led Development Industrialization (ADLI) Strategy in the mid-1990s, which aimed to modernise traditional smallholder agricultural production. ADLI was linked to the Plan for Accelerated and Sustained Development Programme (PASDEP), which was implemented between 2005 and 2010 and aimed to achieve most of the targets in the Millennium Development Goals (MDGs). The Growth and Transformation Plan (GTP) for 2010–2011 to 2014–2015, Ethiopia's new five-year plan, sets even higher growth and investment targets.

However, given Ethiopia's poor record in lifting its people out of poverty, especially its farmers, and the fact that the country's prevailing farming situation is characterised by low input productivity and scarce surpluses, it is questionable whether the government's Agriculture Development-Led Industrialisation (ADLI) Policy has managed to yield sufficient surpluses to enable households to build their assets and improve resilience (Haile 2013).

2.3   the ethiopian commodity exchange

2.3.1   brief overview of commodity exchanges

A commodity exchange is an open and organised market in which contracts of standardised quantities of certain commodities are traded by its members. Samples

of these commodities are physically examined and graded beforehand. The commodity-linked contracts are traded on the basis of rules and procedures laid down by the exchange. In developed countries, such exchanges typically act as a platform for trade in futures contracts, or standardised contracts for future delivery. By contrast, commodity exchanges in developing countries usually do not use future contracts but focus on cash or "spot" trade for immediate delivery, forward contracts on the basis of warehouse receipts, or the trade of farmers' repurchase agreements (repos) (UNCTAD 2009).

Historically, commodity exchanges were established as private organisations to regulate and manage contractual relations between market participants. Their functions have included commodity measurement, contract enforcement, the policing of theft and fraud, and the mitigation of information asymmetries (Pirrong 1995a). Because a commodity exchange regulates in great detail the activities of traders (what can be traded, when it can be traded, the terms of settlement, and so on), which are all laid down by the authorities of the exchange, it constitutes private law (Coase 1991). Commodity exchanges serve to decrease transaction costs and risks of traders.

The most well-known agricultural commodity exchange is the Chicago Board of Trade (CBOT), which was established in 1848 as a voluntary association of prominent Chicago grain merchants. After more than a century of trading exclusively in agricultural products such as corn and wheat, the CBOT broadened its transactions to include financial contracts (1975), futures contracts (1982), and futures-options contracts (1997) (Britannica 2014).

There are few successful commodity exchanges in Africa, with the exception of The SAFEX Agricultural Products Division of the JSE Exchange, South Africa. Established in 1988, it is the continent's only commodity exchange trading in futures. The other commodity exchanges promoted and developed in Zambia, Malawi, Kenya, Uganda, and the regional internet-based exchange Agricultural Commodity Exchange for Africa (ACE) have been less successful (Robbins 2011). Rashid et al. (2010) provide a framework for understanding the impediments to the development of commodity exchanges in Africa. These include (i) limited size of formalised food markets, (ii) weak infrastructure and underdeveloped financial services to support the development of an exchange, and (iii) a general lack of or weak supportive legal and regulatory frameworks. However, Sitko and Jayne (2012) point out that understanding the full set of impediments hindering the

development of commodity exchanges (and reasons for variations across countries) are more likely to emerge from country-specific analyses. This is in line with the review of commodity exchanges across the world by UNCTAD (2009) in which they find that commodity exchanges in emerging markets differ substantially due to differences in the market contexts they operate in.

The relative lack of success of African commodity exchanges did not discourage the Ethiopian government. On January 18, 2008, the exchange was officially opened by launching its first membership registration. The Ethiopian Commodity Exchange (first ECEX then ECX) became operational in April 2008. The exchange included a trading floor in Addis Ababa, six warehouse delivery locations, and 20 electronic price tickers in major market towns. It opened for five commodities: coffee, sesame, maize, wheat, and pea beans. In January 2014, mung beans were introduced on the ECX as an optional commodity, with plans to make trade through the ECX mandatory later on.

Despite the fact that commodity exchanges are in general private law institutions, the ECX is a public–private enterprise with government ownership. The government of Ethiopia has been heavily involved in the regulation of the ECX. In 2010, it decreed that "any person involved in sesame transactions shall effect sesame transaction only at primary transaction centres (PTCs) and the Ethiopian Commodity Exchange" (The Council of Ministers Regulation No. 178/2010). Buying or selling sesame directly from producers became illegal.

One of the problems the ECX encountered early on was the lack of trade. When the first survey of sesame traders was conducted in 2009 for this thesis, it quickly became apparent that traders hardly used the ECX. Most traders preferred to continue business as usual. Table 1 shows how little sesame was traded in the first year(s), before the ECX became mandatory. Informal interviews with traders conducted for this thesis, as well as those by Abera (2009), revealed that a major bottleneck was the tax levy of VAT imposed by the Revenue and Customs Authority, to be paid immediately after a transaction is performed in the ECX platform. Although the tax is expected to be repaid to the exporter, it would take a long time to refund this. Moreover, the 15% VAT payment during transaction is said to be massively tying up working capital that could have been used for expanding trading activity. Therefore, both the opportunity cost of capital, as well as the direct cost in the form of interest paid to the banks might have discouraged traders to use the ECX. The fact that the ECX enables the Ethiopian government

to tax traders (and exports) more easily was never made explicit, and Ethiopia's government has always stressed that the ECX should lead to lower transaction costs, increased market transparency, and better price information for producers and traders.

Table 1: Traded volume, value, and prices for sesame in the ECX's early days

	2008–2009	2009–2010	2010–2011
Volume traded (tonnes)	230	250	178,853
Lot size	46	50	37,838
Average price (birr)	1,426	1,636	1,888.50
(US$)	137	128	117
Total value traded (mln birr)	3	4	3,698
(mln US$)	0.315	0.320	228

Note: 2008–2009 is the Ethiopian year 2001; a quintal is 100 kg.
Exchange rate to dollar: 10.4 (2008–2009); 12.8 (2009–2010) 16.2 (2010–2011).
(Source: ECX annual reports cited in Abéra 2011)

Table 1 also shows how volumes of sesame traded via the ECX exploded once it became mandatory. In its fourth year of operation (2011–2012), the total traded volume for all crops reached 601,000 tonnes, consisting of coffee (39%), sesame (50%), and pea beans (11%) (ECX, 2012; Rashid and Negassa, 2011). In its fifth year (2012–2013), traded volume decreased to 552,000 tonnes (coffee (45%), sesame (40%), and haricot white beans (15%) with a value of 20 billion birr (or US$1.05 billion) (Press Release ECX, 9 August 2013[17]). Trading maize via the ECX is not mandatory, and volumes of maize traded on the ECX have dwindled to almost zero.

A commodity exchange can only achieve its aims of market transparency, price discovery, and decreased transaction costs when most trade occurs via the exchange. Many African commodity exchanges are languishing because of a lack of trade (Sitko & Jayne 2012). This in contrast to the beginnings of, for instance, the CBOT, which was established by traders themselves. Making trade through the ECX mandatory was the only solution for the Ethiopian government. Although this decision to make the ECX mandatory was denunciated by many, including

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[17] Available at http://www.ertagov.com/news/index.php/component/k2/item/1202-ethiopias-commodity-exchange-traded-20-billion-birr-of-commodities-last-year Accessed 30 April 2014.

traders who, in private, complained that the ECX was a costly affair, it probably saved the ECX from the slow death of other African commodity exchanges.

2.3.2   nuts and bolts of the ecx

Eleni Gabre-Madhin, one of the founders of the ECX, explains that the ECX aims to "build the needed institutions from the ground up for grading and certifying quality, issuing warehouse receipts, trading, relaying market information to all actors, enforcing contracts, and ensuring payment and delivery" (Gabre-Madhin 2012, p. 6). The ECX was designed specifically to address the needs of smallholder farmers and small traders and would improve traditional informal agricultural markets by "adding technology and systems to bring more transparent, more efficient, and more reliable trading" (Gabre-Madhin, ibid).

The ECX is an open-outcry trading floor, resembling a standard 'spot market' exchange. An electronic database at ECX head office is connected to all ECX warehouses, and based on requests sent to the central depository, the ECX transfers ownership titles, issues delivery notices, and regularly makes position reports. Sesame is not physically traded at the ECX, but contracts are traded; the bought and sold sesame is stored in regional warehouses managed by the ECX (in Addis Ababa, Nazareth, Shashemene, Nekemte, Bure, and Humera). The ECX has specified seven different standard contracts for sesame, including grades based on foreign matter (maximum per cent by weight) and on colour (maximum per cent by weight).

The ECX consists of member traders, trading systems with central trading platforms (open outcry), a clearing and settlement system (warehouses and banks), and a grades and standard certification system. The overall functioning of the exchange is regulated by the Ethiopia Commodity Exchange Authority (ECEA).

ECX has two types of members who are allowed to trade on the ECX: Trading Members, who trade on their accounts, and Intermediary Members, who trade either on their own accounts or for clients (usually brokers). Membership may be "full" or "limited", with limited membership restricting trade in certain commodities on either the buying or selling side. By the end of 2013, the ECX had 325 full members, of which 24 were trading members and 301 were intermediary members (ECX website, April 2014). Memberships are auctioned, and the price of membership increased from 50,000 birr (US$5,100) in 2008 to 392,500 birr

(coffee), 191,300 birr (sesame) and 178,600 birr (pea bean) respectively in 2013 (or US$10,406, US$9,946, US$9,285) (Addis Fortune 2013; PCI 2014; ECX 2012).

The ECX has not (yet) introduced future contracts and forwards, and limiting the services only to spot exchange rules out speculation or (price) risk hedging; however, it now serves as a platform for price discovery and quality assurance (Woldehanna et al. 2010). Because it is usual for exporters to sell and sign a contract with foreign buyers before acquiring the crop from the local commodity market, traders run a high price risk. To avoid large financial losses, exporters will default on their contract when prices decrease. Several newspaper articles observed that default "is what Ethiopian exporters are becoming famous for" and "their hard-earned market credibility is at risk for the international sesame market" (Seyoum 2013; Seyoum 2014). A futures market would probably be a solution.

In 2012, the ECX was linked to 55 warehouses for coffee, sesame and pea beans, based in 17 regional locations that are main production areas. For sesame there are seven delivery locations: Humera, Metema, Gonder, Assossa, Bure, Nekemte, and Addis Ababa (ECX website October 2012). After classifying and grading, traders can deposit their commodities in these warehouses in return for a warehouse receipt. In the early days of the ECX, these receipts were used as a delivery instrument. In March 2011, the Warehouse Receipt Financing scheme was launched, allowing farmers, producers, and traders to access bank loans by pledging their warehouse receipts issued against commodities deposited in warehouses. The ECX uses electronic Warehouse Receipts (e-WRs) issued by the ECX Central Depository, facilitating both the transfer of title on the ECX and pledging the commodity as collateral for loans. Although the ECX reported in 2011 that farmers use the WRS, only a few large sesame traders use this system (Coulter 2012; ECX 2011). Especially small farmers still face several hurdles, including the lack of involvement of local banks (IFC and ECX 2012).

Warehouse receipting is limited by the short expiry dates on e-WRs, which is two months from issue for sesame. This expiry date enables loans for up to 50 days, discouraging stockpiling and speculation. The reason for the short expiry date is limited storage space at the warehouses, and the ongoing need for export revenues by the government. Sesame exporters also believe that a quick turnover is advantageous because demand is high in the winter months, when production takes place (Coulter 2012). In 2012, ECX warehouses still faced several capacity problems. Limited storage weighting capacity caused long delays with long queues

of trucks waiting in front of warehouses. Because the sesame season is short (November–January), the strain on the delivery infrastructure for sesame is particularly large.

Modern storage facilities are established in and around Humera (Tigray Region), Metema, Gondar, Gendawuha, and Bure towns (Amhara Region), owned by private exporters, wholesalers, commercial farms, cooperatives, and unions, as well as public enterprises. However, no adequate storage facilities or seed cleaning plants are available in the sesame producing areas of Oromia and Benishangul Gumuz. Those without proper storage facilities use wood and mud houses (without cemented floors) to store the seeds. After the inclusion of sesame in the ECX market, warehouses of reasonable quality standards were rented by ECX in Addis Ababa Humera (Tigray Region), Metema, Gondar, Gendawuha and Bure towns (Amhara) (Abera 2011). The warehouses are insured against loss and damage of deposits. An Electronic Goods Received Note is issued for deposited commodities, which is electronically transmitted to the central depository. On the basis of this, an (electronic) warehouse receipt is created. With this receipt, traders may apply for a loan, which they can settle once the sesame has been sold. When the sesame is sold, the ECX central depository debits the seller's account and automatically transfers title of ownership of the commodity to the buyer by issuing a Delivery Notice. This is called the warehouse receipt system or WRS.

Because of poor infrastructure (limited internet connectivity and inadequate road access, power failures, limited number of entrances, weighbridges, and parking space for trucks), the warehouse management system has encountered several problems, observed in a recent unpublished report (Coulter 2012). Traders encounter long delays and much paperwork, and there are reports of long tail-backs of trucks with delays of up to 10 days for sesame in Humera. Buyers of sesame complained of sub-standard produce: the quality of the sesame often bore little resemblance to the grades accorded by ECX, reflecting corruption in the sampling or grading process. In theory, buyers can request sampling at dispatch, but most go unreported. Two reasons were given for this. First, the buyers' need to secure supplies quickly, which limits time for sampling and testing, and the opinion of buyers that they will not be able to challenge the ECX successfully as it means dealing with an all-powerful government institution. The ECX staff acknowledges that buyers are usually too busy to have their product re-graded upon dispatch.

All farmers and traders are required to trade at a Primary Transaction Centre. A PTC is a fenced location with certified scales, a market information board, and local inspectors certifying goods traded at the PTC. Traders buying from PTCs (usually *acrabis*) must obtain a (woreda-specific)[18] certificate of competence, and demonstrate that they own a warehouse within the woreda, a weighing scale, and a certain level of capital. The trader receives a certificate that allows him to deliver the sesame to an ECX warehouse to sell. This certificate is effectively a certificate of origin, which makes sense for coffee since its origin is important for its classification and pricing. However, because sesame has minimal or no woreda-specific characteristics to justify this form of certification, it appears to constitute an unnecessary control, which may encourage rent-seeking without any offsetting advantage (Coulter 2012). Coulter (ibid) describes a case where the inspector failed to arrive for two days; from which it was surmised that he was seeking a bribe. It is not known to what extent PTC regulation is enforced, or whether some traders still bulk sesame by buying from small producers and sell this at a PTC "in the name of a producer". The 2012 survey suggests that some traders still buy directly from producers.

Cooperatives are required to follow the same procedure. This led to some disagreement between cooperatives and the civil administration, as the cooperatives market the product directly on behalf of their members, while these same members are required to sell their crops through the market centres, making the cooperatives compete with private traders for the same supplies (Coulter 2012). Only 15 cooperatives have become a member of the ECX, and they are even less significant in their trading participation, accounting for just 2.2% of the 601,000 tonnes traded in 2012. Recently, the cooperatives have been permitted to bypass the ECX in exporting their products. Additionally, most of them happen to have limited financial capacity to compete with businesses for auctioned seats (Addis Fortune 2013).

The ECX provides market information in various ways: through its website, electronic billboards in 250 markets ("price tickers"), media (radio, television, and newspapers), and mobile phones (through SMS and IVM services) (David-Benz et al. 2011; Tadesse 2010). However, it was reported that none of the price billboards (or tickers) installed functioned, even when electricity was present (Abera 2011). Given the low rate of telephone (fixed lines and mobile) and internet connections

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[18] A woreda is a district or third-level administrative division in Ethiopia.

(CSA 2012), and especially electricity in rural areas, the market information provided through these media are not reaching (poor) farmers. Traders have benefited though, as most of them own mobile phones.

2.4   sesame production and trade

2.4.1   producing sesame: farmers

Sesame (*Sesamum indicum* L.) is one of the oldest oilseed crops known, domesticated well over 3,000 years ago in Africa (Ram et al. 1990). The characteristics of sesame make it ideal for growing in the poor areas of Ethiopia (figure 5): "Sesame is a survivor crop. For 5,000 years it has been planted by subsistence farmers in areas that will not support the growth of other crops or under very difficult conditions with drought and/or high heat" (Langham 2007, p. 144). Sesame has been successfully produced on most soil types. Although yields improve dramatically as inputs increase, currently very little sesame is grown under high input conditions. Most of the sesame grown in the world is still harvested manually because traditional sesame capsules shatter during the drying stage before harvest (SESACO 2012; Langham 2007).

Figure 5: Proportion of cropped area with sesame and farmers' survey areas
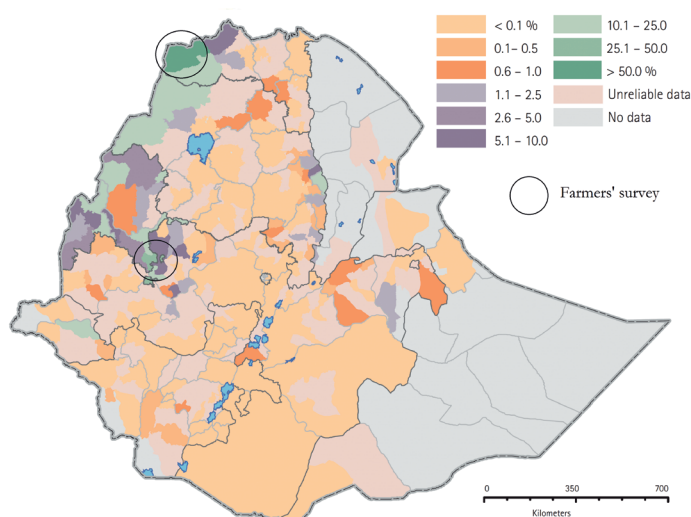
Note: woredas with "no data" usually have insignificant or no production.
(Adapted from CSA et al. 2006)

Although sesame was mentioned as being grown in Ethiopia by Marco Polo in the 13th century, it seems to have disappeared from Ethiopian agriculture until recently. Sesame production has become a significant crop again in the early 1990s. It first shows up in the FAO database in 1993 with almost 30,000 hectares of sesame harvested and little over 19,000 tonnes of sesame production. Some 20 years later, the area harvested has grown more than tenfold to around 337,500 hectares. Farmers all over Ethiopia grow sesame (figure 5), but most sesame is grown in the north-east, which is where the two farmers' surveys were held. By 2010, sesame production had increased to over 350,000 tonnes (figure 6). Production fell in 2011 and 2012 due to adverse climate conditions.

Figure 6: Production of major oilseeds (in tonnes) in Ethiopia 2001–2012
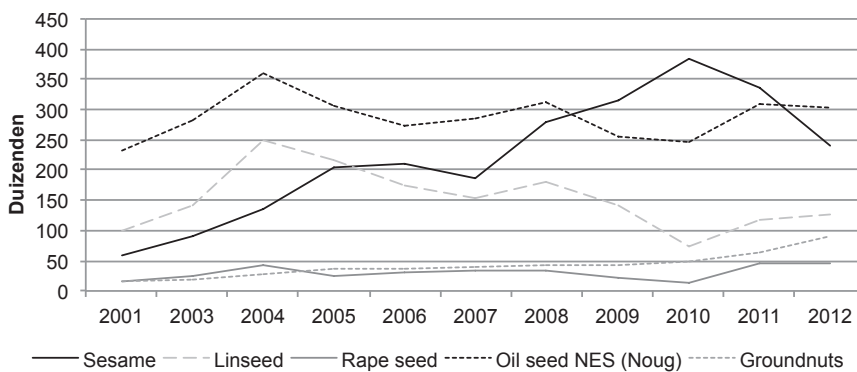
Source: Central Statistical Agency (CSA). Available from http://countrystat.csa.gov.et/ (accessed 23 April 2014).

Most current sesame cultivars have been farmer selected or bred to retain the survivor qualities (Langham 2007). The three commonly used sesame commercial varieties are Humera, Metema, and Wellega, their names derived from the areas in which they are produced (all in the north-east of Ethiopia; see figure 5). The Humera and Metema types have a white to golden colour and are preferred mainly for confectionery purposes while the Wellega type (yellow to dark-brown seeds) is used for oil extraction due to its high oil content (Zerihun 2012). The Humera and Metema types are priced higher than the Wellega seeds, which are generally crushed into oil. Hulled seeds and bleached hulled seeds have a higher market value than untreated seeds (Wijnands et al. 2009).

Planting sesame is the most critical phase of sesame production. The availability of moisture, length of the rainy season, and temperature are the three

major factors determining time of planting. Therefore, planting dates virtually depend on the onset of rainfall and length of the growing season. Recommended dates of planting for rain-grown sesame is mostly between mid-June to mid-July. Flowering starts 35 to 45 days after planting and continues for 75 to 85 days for early types, and some varieties take 150 days to mature (SESACO 2012). The length of the growing season for sesame cultivars planted in Ethiopia varies and depends on the length of the rainy season. Humera has a short season, and sesame is ready to be harvested within 100 days. Because Wellega, Benishangul Gumuz, and Gambella have long seasons, and sesame usually matures within 150 days, late-maturing varieties are grown in these regions (Terefe et al. 2012). Sesame is harvested from mid-October onwards. As almost all sesame cultivars in Ethiopia are of the shattering type (the seedpods crack open from top to bottom, releasing all seeds) timely harvesting and stacking is essential. When sesame is harvested, the mature plants are cut, bundled, and shocked to dry, either on a thrashing floor or in the field. On a thrashing floor the shocks can be moved every few days to collect the seeds. However, in the field, the fallen seed is lost.

When the seeds are sufficiently dry (below 7% moisture content), the sesame can be thrashed. If the seed is too moist, it can quickly heat up and become rancid. Seed above 7% moisture content has a risk of spoilage, for instance when it is left sitting on a truck for a long time. Sesame should be stored in a dark place at low temperatures (below 18°C) and low relative humidity. Under these storage conditions, sesame seeds can be stored for up to one year, though farmers and small traders usually do not have such storage facilities. There is the risk of sesame losing its quality during transport, for instance, when trucks are trapped on a hot day (Terefe et al. 2012). One of the main complaints heard in Ethiopia is the lack of quality of sesame. It is estimated that a significant share of the produce (6%) is lost because of quality problems. Sesame is mixed with impurities such as dirt, branches, and stones. The percentage of these foreign bodies is estimated to be 7%–9%, whereas the internationally agreed standard is 2% for first grade, 4% for second, and 6% for third grade sesame (Abera 2009).

2.4.2   trading sesame: traders, intermediaries, and cooperatives

In 2006, Kindie (2007) mapped how 167,702 quintals of sesame in the Metema woreda was traded through a network of various traders (figure 8). The figure is illustrative of the fact that the sesame value chain by no means represents a neat chain, but resembles more an intricate network of various traders.

Although sesame trading required a formal license, sesame traders usually had a general trading license, as they would trade also in other oil crops. In addition, due to the absence of enforcement or controlling institutions, many traders preferred to operate without licensing. It is therefore not known how many traders trade in sesame.

The figure shows that sesame markets do not represent a neat value chain, but resemble more a network as defined by Easton (1992, see also Ghauri et al. 2003). A network may be defined in three ways: (1) the exchange dimensions in two or more connected relationships and the bond; or (2) social relationships that link loosely connected organisations; or (3) a total pattern of relationships within a group of organisations. The sesame network fits all three definitions. These definitions also fit nicely into the concept of social network capital (see section 1.1.4).

Figure 7: Example of value chain of 167,702 quintals of sesame in Metema woreda
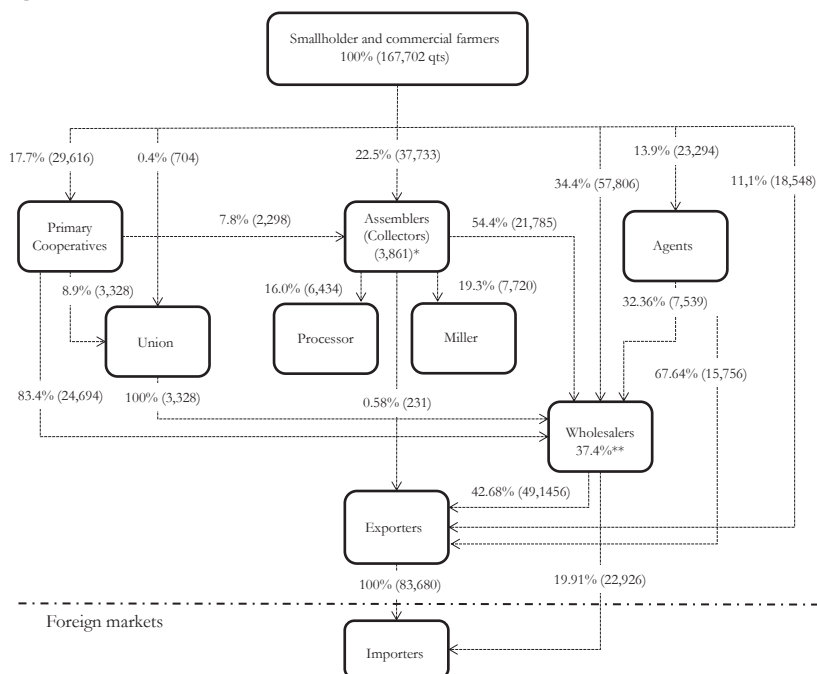
Figures in parenthesis are volumes in quintals handled by each market participant.
Note * sesame circulation among assemblers, 14,154 quintals retained at processors & miller. **
Sesame circulation among wholesalers.
(Adapted from Kindie 2007)

Figure 7 does not show how sesame is traded at various geographically dispersed locations. Figure 8 shows the main sesame market locations as well as market access in Ethiopia in terms of hours of travel to the nearest market, illustrating the vast distances traders travel to bring sesame from remote areas to the main markets. The orange dots indicate the markets where traders were interviewed for this thesis, which are the main markets where these farmers bring their produce (see figure 8). The different markets are visited by different traders (village collectors, wholesalers, exporters and intermediaries, brokers, and selling and buying agents). Together, these traders make it possible for sesame to be transported from remote areas in Ethiopia (with over 20 hours of travel time) to Addis Ababa, as well as to export destinations such as China, Israel, and Turkey.

Figure 8: Major sesame market towns and travel time to nearest market
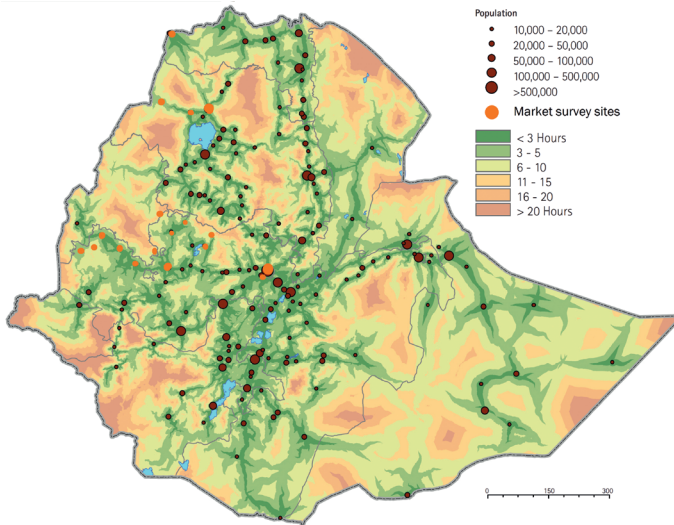
(Adapted from CSA et al. 2006)

Note: travel times shown in this map are based on a model that considers the average time it takes by motor vehicle on roads of different types, considering terrain steepness as a modifying factor. Off-road travel is considered to be by foot or mule and is modelled on the basis of dominant land cover type, as well as local terrain steepness. Because of varying local conditions and changes in the road network, the estimated travel times may differ from actual travel times in some locations but, on average, will offer a good approximation.

Assemblers or (village) collectors are the first link between farmers and other traders. These traders buy small amounts from a large number of farmers, either directly or at village markets. They are usually found in remote markets, where sesame production areas are found (see figure 8). Other traders travel to those village markets after sesame is harvested (October to mid-January; generally, trade decreases by February, when traders return home). Wholesale markets are located at regional (capital) cities (Humera, Gondar, and Nekemte) and Addis Ababa. This is also where exporters are located, although most are in Addis Ababa. Sesame exporters are the last marketing chain link in the domestic trade. They are relatively well equipped with the necessary capital, facilities and knowledge. Exporters usually buy from wholesalers, but some also buy from assemblers or even (large-scale) farmers. Exporters sell to foreign importers. The bulk (98%) of international sesame trade is shipped through Djibouti or Sudan, which have, unlike Ethiopia, a port.

Transport of sesame from the producing regions to the port of export, port Sudan and Djibouti, is mainly done by truck. The distance between the producing

regions and Djibouti is about 1,000–1,500 kilometres (Abera 2011). As figure 8 shows, several sesame growing areas are located over 10 hours of travel from nearby markets. These distances illustrate the difficulties that traders face in terms of crossing large distances, with associated information problems and risks.

Due to the small quantities to be sold and the lack of an efficient market information system, middlemen play an important role. The short season of a producer's supply of sesame to the market also leads to the involvement of many intermediaries in sesame marketing (Kindie 2007).

Brokers are intermediaries who bring together potential buyers and sellers and play an important role in the process of arbitrage sesame markets, in particular for non-resident wholesalers, agents, and exporters trying to gain a foothold in the sesame market (Kindie 2007). Brokers do not trade and therefore take no price risks; they mainly provide market information, as they are well informed on the functioning of the local markets and the stocks available. Brokers work for a commission, either a flat rate or percentage of the selling price commission. Brokers usually do not specialise solely in the sesame trade; rather, they combine sesame with other commercial activities. Commission agents operate on behalf of large traders (wholesalers and exporters) who provide them with required capital and a predetermined commission. Like brokers, they know the local markets well and usually combine different commissions, as well as engage in other commercial activities. Buying and selling agents are intermediaries who have specific orders from larger traders (wholesalers or exporters), but who differ from brokers and consignment agents because their remuneration depends on price margins; they may run a price risk.

Several cooperatives are also involved in sesame marketing. The Ethiopian government has been actively promoting the establishment of new cooperatives in recent years. Cooperatives have existed for a long time in Ethiopia but still face a number of difficulties. The main problem is that by being tied to the government, cooperatives are managed in a top-down manner, do not have an independent voice, are not able to serve their members adequately, and cannot speak on behalf of the wider interests of their constituencies (Francesconi & Heerink 2011; Rahmato 2002; Spielman et al. 2009), which may explain why participation rates are relatively low in Ethiopia (Bernard et al. 2008). However, cooperatives do provide a variety of services, related to agricultural production (e.g. supplying agricultural inputs and credit) and commercialisation (aggregating and selling sesame). Farmers

do not have to be a member to access these services. When cooperatives buy from farmers, they do so against prices that have been decided upon by the cooperative management for a certain period. Cooperatives offer on average slightly higher prices (Bernard et al. 2008) and more stable prices (Francesconi 2009) that lag behind market prices, which means that if prices increase, farmers might be better of selling to traders in the market. Cooperatives usually sell to traders including wholesalers (see figure 7).

2.4.3 sesame prices

Producer prices are difficult to come by. The Central Statistical Agency of Ethiopia (CSA) publishes producer price indices for oilseeds, but the producer prices for sesame are published irregularly (only a few months for 2012 and 2013 were available when checked). The different data compiled from various sources by the author are shown in figure 9. It shows that sesame prices have increased substantially over the past years. However, consumer price inflation was also high in Ethiopia: 33% in 2011 and in 23% in 2012 (World Bank 2014). Before the ECX, price discovery was not based on forces of demand and supply and did not reflect current international market prices (Abera 2009).

Figure 9: Producer and retail prices for sesame 2000–2013 (nominal prices in birr per kilogram)
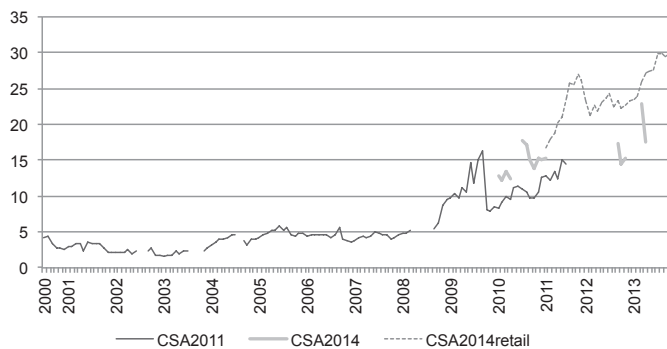
Note: CSA2011 are producer prices provided by CSA in 2011; CSA2014 are producer prices provided by CSA in 2014; CSA2014retail are retail prices provided by CSA in 2014. CSA price data compiled by author from CSA data, available at CSA website http://www.csa.gov.et/ Accessed 28 April 2014.

Retail prices (for brown sesame) are better recorded (shown in figure 10 by market). The retail prices follow the producer prices and may serve as a close

enough proxy. The figure shows that prices vary between locations: prices may be twice as high in the same month, depending on the location, which means there are opportunities for arbitrage. One would expect the market price information system of the ECX to facilitate arbitrage. However, this might not always be the case. Bassolet and Lutz (1999) find that the market information system introduced in Burkina Faso in 1992 did not lead to significant arbitration. The figure also reveals that prices show considerable fluctuation, with prices dropping at the end of the year during harvesting and increasing mid-year. Prices are highest in Addis Ababa, which is to be expected as this is not a production area but a final destination. Prices generally increased in 2013, but so did consumer price inflation in Ethiopia.

Figure 10: Retail prices for sesame in main markets (2008–2013) in birr per kilogram
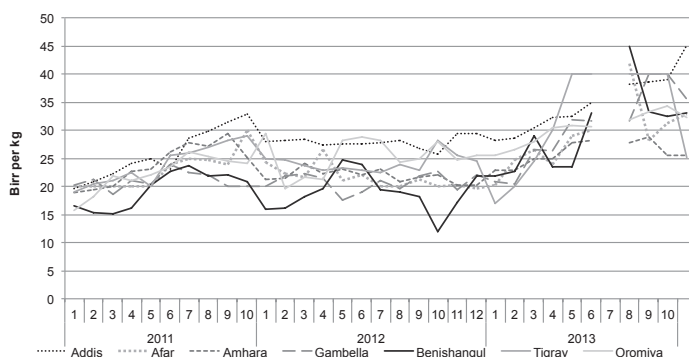
Source: Compiled by author from CSA data, available at CSA website http://www.csa.gov.et/. Accessed 28 April 2014. June and July of 2013 are missing.

Figure 11 shows the prices sesame exporters received (free on board or FOB value). In terms of Ethiopian birr as well as US dollars, the prices steadily increased from 2004 to 2014. However, there are reports that the Ethiopian price of sesame is losing its competitive edge. Exporters are reported to buy at high prices from the local market, expecting the prices to rise in the future. Exports slipped in 2013 (figure 12) because exporters were storing sesame, waiting for prices to rise (Seyoum 2014). In addition, with the stringent government policy on foreign exchange (Coulter 2012), many exporters trade in sesame to earn foreign exchange that allows them to import and sell goods in Ethiopia (such as tractors). Their import business makes up for potential losses on sesame export.[19]

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[19] Personal comment by Francesco Cecchi, 2010.

Figure 11: Export prices (FOB) of sesame 2004–2010 and 2012–2013 in birr (left) and US$
(right) per kilogram
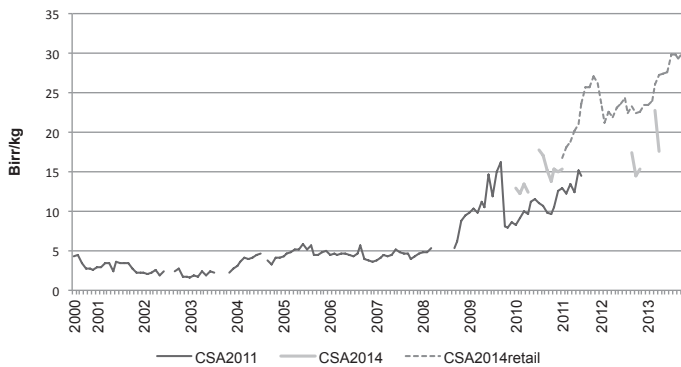
Note: 2011 not available.
Source: Compiled by author from Ethiopian Revenues and Customs Authority. Data available
from http://www.erca.gov.et/ (accessed 22 April 2014).

The top three export destinations in 2013 were China, Israel, and Turkey.
Greece and the Netherlands are the two most important European destinations
(numbers 7 and 10 respectively)[20]. Sesame exports have almost doubled from 2008
to 2009, from 131 million kg to 256 million kg (figure 12). This may be due to
better accounting practices, as production did increase though it did not double
(see figure 6).

Figure 12: Export of sesame 2008–2013 (in kilograms)
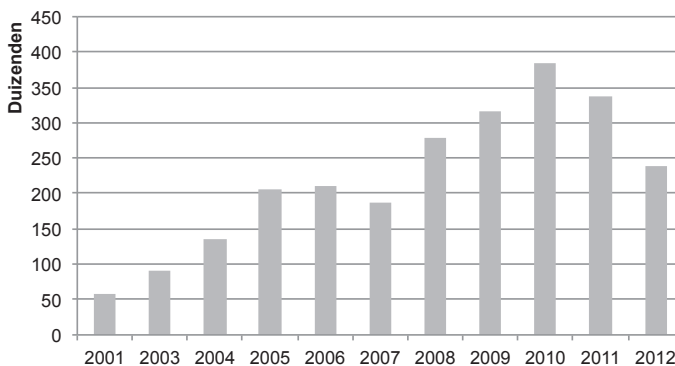
Source: SITA database (until 2010) and data compiled by author from Ethiopian Revenues and
Customs Authority. Data available from http://www.erca.gov.et/ (accessed 22 April 2014).

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[20] Ethiopian Revenues and Customs Authority. Data available from
http://www.erca.gov.et/ (accessed 22 April 2014).

When the export prices are compared to the national retail prices for the past two years (figure 13), it seems as if the gap between the two is increasing, although price data is too scant to draw firm conclusions.

Figure 13: Export price compared to national retail price of sesame 2012–2013 (in birr per kg)
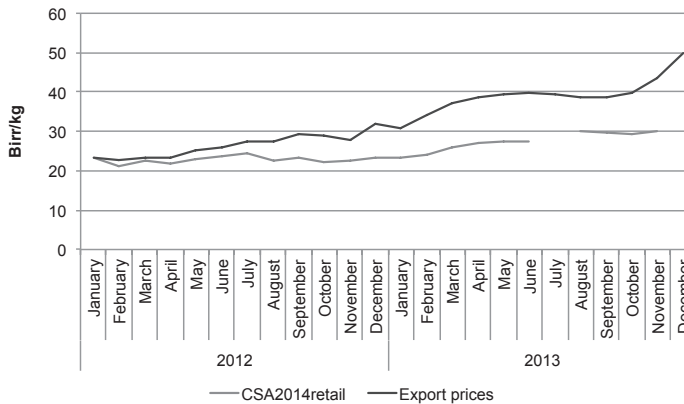
Source: Export prices: data compiled by author from Ethiopian Revenues and Customs Authority. Data available from http://www.erca.gov.et/ (accessed 22 April 2014); Retail prices: 2011–2013 Compiled by author from CSA data, available at CSA website http://www.csa.gov.et/ (accessed 28 April 2014).

2.5   conclusion

This chapter sets the stage for the following chapters by describing the formal and informal institutional environment, as well as the formal institutional arrangement of the ECX. Figure 1 shows why these elements are important for understanding how the ECX has influenced the informal institutional arrangements between farmers and traders, which is analysed in the following chapters. This chapter also provides basic information on how and where sesame is grown and traded in Ethiopia, which enables a better understanding of farmers and traders' marketing behaviour.

The informal institutional environment consists of the norms, culture, and social capital in a society, which are shaped by history. The brief historical overview of markets, traders, and farmers in Ethiopia reveals that the occupation of trader has carried little respect in traditional Ethiopian society. By contrast, farming was seen as a highly valued occupation. During the Marxist era, trade was again disdained, albeit for different reasons. Although the liberal course taken by the

Ethiopian government in the past decades has stimulated markets and trade, traders are still often regarded with suspicion. This has repercussions on the relationship between farmers and traders, as is detailed in chapter 3.

With respect to the formal institutional environment, it is important to note that although Ethiopia officially became a democracy in 1991, it has remained a de facto centralised one-party state. It fits the description of a "limited access order" society, as outlined in chapter one: it has a de-facto non-democratic political system, few organisations (predominantly associated with the state), a small and centralised government, as well as a "predominance of social relationships organized along personal lines, including privileges, social hierarchies, laws that are enforced unequally, insecure property rights, and a pervasive sense that not all individuals are equal" (North et al. 2009, p. 12). This context is important when assessing the functioning of the ECX, which is basically under government control. Ethiopia has pursued an active policy of stimulating the agricultural sector, of which the ECX has become an important element.

The formal institutional arrangement of the ECX was modelled on the Chicago Board of Trade (CBOT), established in the United States in the 19th century. An important difference is that the CBOT was established by the traders themselves, while the ECX was established by the government. Just as other commodity exchanges in Africa have languished, the ECX did not get off to a good start; few traders brought their goods to the exchange, compelling the Ethiopian government to make the ECX mandatory for important cash crops (coffee and sesame). The ECX does provide important services to the sesame market, which is the aim of all commodity exchanges: improving commodity measurement, contract enforcement, the policing of theft and fraud, and the mitigation of information asymmetries. Increased transparency may, however, not be in the interest of traders, which may be why they "voted with their feet" and chose to use their customary social networks instead of the ECX to trade sesame. This is further explored in chapters five and six. The ECX consists of more than a centralised trading place; it also includes primary transaction centres and warehouses linked to major markets. These decentralised elements of the ECX provide important services not only to traders but also to farmers, who stand to benefit from increased transparency. This is further explored in chapters three and four.

Sesame has enjoyed a long history in Ethiopia. It is a profitable crop that can be grown in areas where there are limited possibilities for other cash crops.

This means it is a suitable as well as profitable crop for many poor small-scale farmers. It has become more profitable over the years, with sesame prices rising steeply since 2000, although price data is somewhat patchy. This has induced even more farmers to start growing sesame, resulting in a rise in production. In the past few years sesame production has declined, the reasons for which are not very clear. Although adverse climate conditions are usually mentioned, it could also be that sesame production in Ethiopia has run out of steam. The increase in sesame production also led to an increase in various types of traders buying and selling sesame, with several providing intermediary services (such as brokers, and selling and buying agents). Sesame is bulked by small traders who operate upstream, buying small amounts from farmers. There is no neat "chain", but more of a network of traders, who traverse large distances from remote village markets to regional wholesale markets and Addis Ababa.

The mandatory nature of ECX has had a profound logistical effect on sesame, forcing it to be traded at primary transaction centres and stored in warehouses, before it is transported to its final overseas destinations. But the nature of the ECX has also had a profound effect on the way sesame is traded between farmers and traders and among traders. The following chapters will explore how in more detail.

C H A P T E R 3

trust but verify:
observable information, relational
contracting, and market participation in
rural markets in ethiopia

abstract

Trust is a prerequisite for well-functioning markets. In Ethiopia's sesame markets, this trust is lacking: most farmers view traders as opportunistic and only few engage in long-term relational trading with trusted traders. This chapter addresses the question why. Based on data collected in Ethiopia in 2009, I find that a lack of market information is linked to negative perceptions of traders' trustworthiness; without information, farmers find it difficult to verify traders' trustworthiness. I proceed by analysing the relationship between these negative perceptions and market participation, finding tentative evidence that farmers who have a more negative perception of traders tend to participate less in markets, selling to fewer market outlets. The policy implications are that by investing in market information and increasing transparency through certifying weighing equipment and setting quality grades and standards, trust between farmers and traders can be fostered.

key words
Market participation, market information, small-scale farmers, transaction risks, perceptions, opportunistic behaviour, traders, relational trading.

3.1   introduction

Small-scale farmers in Ethiopia, as in other developing countries, operate in markets characterised by large price fluctuations, poor communications and transport, cash-and-carry exchange, lack of standards, small transactions, weak institutions, and limited access to supporting services (e.g. finance). Transaction costs are typically high in such markets because farmers expend time and incur costs in searching for information and trade partners. Moreover, transaction costs are further increased by large distances to markets (Fafchamps & Minten 2001a; Gabre-Madhin 2001). Traders are usually better informed about market conditions than farmers, introducing asymmetric information and the possibility of opportunistic behaviour by traders (Williamson 1998). Such opportunistic behaviour may manifest itself as traders offering low prices, misrepresenting the weight of produce, or misinforming farmers about quality standards, all of which introduce an element of risk for farmers in transacting with traders (Pokhrel & Thapa 2007; Porter et al. 2007; Poulton et al. 2006; Svensson & Yanagizawa 2010). Such transaction risks are an important, but often neglected, element of marketing (Shepherd 2005).

Marketing by small-scale farmers in developing countries is a widely studied topic of research. To date, only a small part of literature has examined the role of transaction risks emanating from possible opportunistic behaviour by traders. Most studies on such transaction risks are in the strand of literature that explains why and how long-term relational trading develops between two trading parties, by developing theoretical models or applying these models to various agricultural markets (Fafchamps 2004; Haji 2010; Hayami & Kawagoe 2001; Porter et al. 2007; Tadesse & Shively 2013). This literature finds that by selling to a trustworthy trader, farmers are able to reduce the transaction costs of searching for trading partners or for market information. In addition, farmers may reduce transaction risks such as obtaining a low price or being cheated otherwise by opportunistic traders. Through repeated interaction, farmers learn whether a trader is trustworthy or not. Reputation effects arise when farmers share information about the trustworthiness of traders (Greif 2006).

However, long-term relationships between farmers and traders are rare in Ethiopia's sesame markets: in the 2009 survey, only 8% of farmers stated they always sold to the same trader. The majority of respondents indicated that they sold sesame in parts and to different market outlets: to traders who visit them, on

nearby and faraway markets, and to cooperatives. One would expect that selling all of one's sesame quickly to a trusted trader would offer various benefits. It would enable the farmer to generate cash quickly, reduce the transaction costs of obtaining price information, find and negotiate with a trader, and reduce the transaction risk of selling to an untrustworthy trader.

Especially for a crop such as sesame, which is a particular crop in several ways, there are potential benefits to selling to one trusted trader. Sesame has one growing season and at the end needs to be harvested in a very short time span; at some point in the ripening process sesame capsules will split and disperse the sesame seeds, at which point harvesting is no longer possible. Having little or no storage, most farmers need to sell the harvested sesame fairly quickly. In addition, farmers are usually cash constrained and wish to sell at least part of their harvested produce as quickly as possible to generate some cash.

Why then, did relational contracting not occur more often in Ethiopia? Dixit (2004) postulates that this type of contracting, or self-governance in stable groups, requires a good information network as well as credible multilateral punishment strategies. In this chapter I focus on the first requirement by examining an important assumption in the relational contracting literature, which is that by repeatedly selling to one trader, a farmer learns about the trustworthiness of the trading partner, gradually building up trust. However, if farmers do not have reliable market information, which Dixit (ibid) terms "observable information", with which they can assess truthfulness of the information provided by traders, farmers cannot not determine accurately the trustworthiness of traders. Although market information is crucial to marketing (Vaidya et al. 2013), little research has been done on how market information, or a lack thereof, affects relations between market agents, as most literature has focused on the effect of market information on prices (arbitrage), and farmer agricultural practices (Aker 2011; Myers et al. 2010).

The aim of this chapter is to examine how (a lack of) market information influences the perceptions of farmers about opportunistic behaviour of traders. I hypothesise that a lack of information may inhibit relational contracting. This chapter also investigates how the perceived risk of dealing with traders who might not provide truthful information influences farmers' marketing behaviour, taking into account other factors that may influence marketing behaviour.

The results show that there is a link between the lack of market information, negative perceptions of farmers about the possible opportunistic behaviour and market participation. Farmers who lacked market information were more likely to have a negative perception of the trustworthiness of traders. Farmers who had a negative perception about traders' trustworthiness were more likely to limit the number of market outlets. Although market diversification may reduce price risk, it seems that the perceived transaction risk of dealing with opportunistic traders negates this advantage. These results provide a deeper understanding of why informal institutions such as long-term trust relationships may *not* develop.

The policy implications of the findings are that by investing in market information and transparency (improved measuring equipment, standards, and grades), policy makers and donors can improve trust relations and increase market participation by farmers. This finding also substantiates Ethiopia's recent establishment of the ECX. The ECX aims to improve farmers' access to market information, which should enable them to make a more accurate assessment of the transaction risks they face, thereby helping them to reduce the transaction costs linked to marketing diversification.

After the introduction, this chapter reviews the literature and provides a conceptual framework. Section 3.3 provides an overview of the survey data, highlighting marketing decisions of farmers. Section 3.4 discusses the methods used and section 3.5 provides the results. The final section presents conclusions.

3.2   literature review and conceptual framework

As explained above, this chapter analyses two issues. First, whether market information affects the perceptions of farmers about the opportunistic behaviour of traders and what other factors are associated with these perceptions, and second, whether trust perceptions and market information affect farmers' market participation and what other what factors are associated with market participation. I discuss these in separate sections.

3.2.1   perceptions about opportunistic behaviour

Many studies have highlighted the importance of trust in trade relations in trade and cooperation (Arrow 1972; Dasgupta 2009; Gambetta 2000b). Das and Teng

(2004) provide an extensive overview. Trust plays an important role in coordination, information, and enforcement (see chapter one). One problem in the literature is that trust is often not defined, or in terms that are "vague, abstract, and hard to interpret" (Glaeser et al. 2000). Das and Teng (2004) find that the literature has generally not differentiated between trust as various personal and situational characteristics, trust as a perception, or trust as behaviour that results from the previous two. In addition, trust perceptions can refer to the individual's "responsibility" (goodwill or intentions) and or "competence" (ability to do so) (Barber 1983; Creed & Miles 1996; Nooteboom 1996). The literature on trust has also been criticised for neglecting to link trust perceptions to behaviour (Putnam 1997, p. 53; Glaeser et al. 2000). This has led to a growing body of literature that uses experiments to analyse trust and respondents' behaviour outside the experiment (see Qin & Bulte 2010; Bouma et al. 2008). A useful framework is one proposed by Das and Teng (2004), which distinguishes between the various types of trust. According to them, trust consists of several elements:

1. **Trust propensity**: or "trust antecedent", personality characteristics that make a person "trusting" and "trustworthy".

2. **Subjective trust**: a belief, attitude, or expectation concerning the likelihood that the actions or outcomes of another individual, group, or organisation will be acceptable or will serve the actor's interest. This can be defined in terms of the assessment of probability that the other party will perform as expected. There are two subcategories:
   a) Goodwill trust: intention to perform according to agreement
   b) Competence trust: ability to perform according to agreement

3. **Behavioural trust**: or the behavioural manifestation of trust, defined as the behavioural results of having subjective trust in someone (i.e. as relying on, or being vulnerable to, another party).

This paper focuses on goodwill trust: the intention of traders to perform according to agreement.[21] Part of behavioural trust is also accounted for by analysing how trust perception influences traders' marketing behaviour (see section 3.2.2).

Several authors have also highlighted the fact that measuring trust is fraught with difficulties (Ashraf et al. 2006; Gambetta 2000a; Glaeser et al. 2000; Goudge &

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[21] The survey also included questions about competence trust perceptions, but when these were analysed, they did not provide in any meaningful results.

Gilson 2005; Miller & Mitamura 2003; Sapienza et al. 2013). Most empirical research on trust has used attitudinal survey questions (e.g. from the General Social Survey (GSS) or the World Values Survey (WVS)), or has used experiments such as trust games (Glaeser et al. 2000). The attitudinal survey questions on trust have been criticised as being too general to be useful (Glaeser et al. 2000). Experimental measures of trust do not measure expectations or perceptions, but behaviour. It is somewhat surprising therefore that, as far as I know, little empirical trust research in the economics literature has used measured perceptions (with the exception of Kostov & Davidova 2012), despite the ubiquitous use of, for instance, Likert scales to measure perceptions and attitudes in social science research (Maeda 2014).

Perceptions do play a central role in the theoretical literature. In game theory as well as in New Institutional Economics, perceptions, or beliefs of economic agents, are key to explaining behaviour. The importance of beliefs in institutional arrangements is emphasised by Aoki (2001; 2007) and Greif (2006), who define institutions as collectively recognised rules and symbols plus behavioural beliefs (or expectations) of agents about other players' choices and intentions. Agents base their behaviour on these beliefs, which may be updated by short-term experience (i.e. observing the behaviour of other players) and information (Rasmusen 2007; North et al. 2009).

Information is thus key to forming beliefs about other players' intentions. This brings us back to the main question of this chapter: how (a lack of) market information influences the perceptions of farmers about the opportunistic behaviour of traders. The literature on information is extensive and includes several seminal papers that focus on the problems of incomplete and asymmetric information (Akerlof 1970; Stigler 1961; Stiglitz 1985). Information is incomplete and asymmetric when one party has more information that another party does not possess. For instance, traders usually have better information about the supply, demand, and price of a product, while farmers may have better information about the availability and characteristics of the product they are offering for sale.

However, other factors that may also influence perceptions also need to be taken into account. As mentioned above, short-term experiences may also influence beliefs. In a way, short-term experiences are a form of information on other players' behaviour. Studies in behavioural economics have highlighted the fact that long-term experiences, in the form of exposure to certain environments or institutions, may create framing and priming effects that also influence the

perception, interpretation, and hence, the meaning of facts (Fehr & Hoff 2011; but see also North et al. 2009 on beliefs). Finally, studies have found that personal characteristics (such as gender or age) may also play a role in shaping beliefs (Palmeira et al. 2012; Riedl et al. 2010). This may link up with "trust propensity" in Das and Teng's (2004) framework.

This provides me with four categories of factors that influence farmers' perceptions: (i) information, (ii) short-term experiences with traders, (iii) exposure to certain environments or institutions, and (iv) personal characteristics. I do note, though, that perceptions of farmers (or their beliefs) may not necessarily represent an accurate assessment of a particular situation. The fact that many farmers have a negative perception about traders' behaviour does not mean that traders behave, in fact, opportunistically. Various studies have shown that traders do not make excessive profits, or seek to misinform farmers, of which they are often accused (Batt 2003; Lyon 2000; Pokhrel & Thapa 2007; Porter et al. 2007; Sitko & Jayne 2014). In Ethiopia, sesame prices offered to farmers in 2009 were quite high relative to sesame export prices.[22] It should therefore not be assumed that farmers are always able to correctly assess economic factors, such as prices, or transaction costs and social factors, such as the trustworthiness of traders. Williamson (1979) emphasises that it is costly to distinguish opportunistic from non-opportunistic behaviour ex ante when there is incomplete and asymmetric information in combination with bounded rationality; this complicates the assessment of trustworthiness, and increases the transaction risks involved in any transaction between farmers and traders.

3.2.2   market participation

Although the literature on marketing participation by small-scale farmers is extensive, most research is on what factors determine whether and how much surplus a farmer sells (e.g. Barrett 2008; Bellemare & Barrett 2006; Renkow et al. 2004). These studies usually do not specify the different types of market outlets

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[22] Prices peaked during the survey, and were at some point 1.3 times higher than export prices (obtained from the Customs Office). Investigation showed that a shortage of foreign exchange induced exporters to pay a premium on export commodities to earn foreign exchange, which they needed to import goods such as tractors. They were willing to make less profit on export commodities because they earned substantially on imported commodities. After this peak, local prices remained high compared to export prices.

farmers sell to, and in general tend to ignore small-scale traders who buy directly from farmers (assemblers) (Sitko & Jayne 2014). Little research has been done on market participation in terms of the diversification of market outlets (but see Bathfield et al. 2013; Fletcher & Terza 1986; Hodina 1970).

Increasing the number of different market outlets may be seen as a *diversification strategy*, which could be rational when daily fluctuating sesame prices and different prices are being offered in different markets.[23] Typically, farmers are exposed to various risks, emanating from the nature of the agricultural production process, weather variability, and typical price inelastic short-run supply and demand responses (Myers et al. 2010). Farmers have devised various strategies to minimise these risks. The diversification of assets, income, or activities is a well-known strategy to reduce risk in many African economies (Barrett et al. 2001; Diao et al. 2010) and most studies on diversification have focused on livelihood diversification, such as non-farm employment or crop diversification (Chavas & Di Falco 2012; Twine 2013; Woldenhanna & Oskam 2001), while little attention has been given to diversification strategies in marketing. Marketing diversification may reduce price risk, but will increase transport and transaction costs.

Lutz (1994) describes a similar situation for Burkina Faso, where in 1990, no market information system existed and farmers had to search for information about market conditions. Farmers could gather information on local markets which they visited regularly, or travel to markets further away, which were visited less regularly by members of the household or other inhabitants of the village. Because quantities handled were often small and of small value, the costs of a journey to visit these outlets and gather information constituted an entry barrier. Traders faced the same type of problem. For both farmers and traders information costs consisted mainly of transport costs (taxi) and the opportunity cost of labour. Transport costs could be significant, especially when only small quantities were traded daily. Fluctuating prices posed a problem in Burkina Faso as well, as they often led to missed profitable exchange. In such a case information costs became a loss that had to be recovered from future transactions. For most traders surveyed by Lutz, gathering

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[23] In forestry, the reservation price strategy is recommended when prices fluctuate (Brazee & Mendelsohn 1988). The seller determines a reservation price each day (which decreases over time), and when a trader offers a price higher than this reservation price, the seller sells all produce to this buyer. This assumes that the farmers can store their produce and wait until their reservation price is met. This assumption is not applicable in the Ethiopian sesame case, as sesame farmers cannot store their sesame for a long period of time.

information on alternative outlets was costly, because of limited turnover and because of the risk of such a loss.

Farmers therefore make a trade-off between transaction risks and transaction costs. Dorward (2001) argues that actors are willing to incur transaction costs to reduce transaction risks. Farmers, for instance, will incur transaction costs by searching for and obtaining information about prices offered by different traders to reduce transaction risks. However, not at all costs; there is a point where marginal transaction costs are equal to the marginal utility of risk reduction (Kirsten et al. 2009). If farmers face price risks but also the transaction risk of dealing with many opportunistic traders, the transaction costs needed to lower both risks may become too high. In this case, the farmer may decide increasing market outlets is not worth the transaction costs involved. I expect therefore that the negative perceptions of farmers about traders' behaviour are associated with decreased market participation. Several studies have found that trust fosters market participation (Georgarakos & Pasini 2011; Guiso et al. 2008 for stock markets; Qin & Bulte 2010 for labour markets), but market participation may also foster trust (Henrich et al. 2004); which way the causal relationship goes is thus subject to debate. There may be a virtuous circle relationship, whereby market participation and trust are mutually reinforcing forces.

Various studies that analyse what motivates farmers to choose a *particular* market outlet (such as contract farming and cooperatives) find that various economic factors play a role, such as transaction costs (Alene et al. 2008; Barrett 2008; Blandon et al. 2009; Escobal & Cavero 2012; Jari et al. 2011; Omamo 1998; Shiimi et al. 2012), prices (Wollni & Zeller 2007), uncertainties associated with local markets, such as price instability (Guo et al. 2007; Masakure & Henson 2005), or a lack of market information (Wollni & Zeller 2007). Studies also show that personal characteristics such as age, education, or wealth play a role (Barham & Chitemi 2008; Barrett 2008; Bernard et al. 2007). Finally, research highlights the importance of social factors such as stable farmer–trader relationships characterised by trust (Abebe et al. 2013; Batt & Rexha 2000; Ganesan 1994; Ganesan & Hess 1997; Masuku & Kirsten 2004; Morgan & Hunt 1994; Nicholson et al. 2001; Schipmann & Qaim 2011; Qin & Bulte 2010). As was outlined in the introduction, these social factors explain why farmers may choose to sell to one preferred supplier: instead of selling to various different traders or outlets: long-term, tied relationships may reduce transaction costs and risks (Fafchamps 2010; Tadesse & Shively 2013).

Based on this literature, I include four categories of variables to explain market participation. First, personal factors such as age, gender, education, and wealth. Second, I include typical economic factors such as prices, revenues, transport and transactions costs, as well as market information. Third, I include social factors. Finally, I include the perceptions held by farmers about the opportunistic behaviour of traders, which is an addition to the existing literature on marketing decisions by farmers. To my knowledge, the analysis by Kostov and Davidova (2012) is the only one that takes into account farmers' perceptions in their participation in output markets, although their analysis focuses on different perceptions than farmers' perceptions of traders. Because perceptions (or beliefs) inform behaviour, the variables included in the two analyses (on perceptions and on marketing decisions) are similar. To consistently link up with the analysis on perception, I use the same variables.

3.3   data: market transactions in ethiopian sesame markets

I examine the Ethiopian sesame markets because they are characterised by a high degree of transaction risk. In addition, sesame is one of the main export sectors in Ethiopia and a key provider of income and employment (Wijnands et al. 2009; 2011). Sesame is produced in several areas in Ethiopia but West Tigray, North Gondar, and East Wellega are predominant. Two main but different sesame growing areas of Ethiopia were selected (West Tigray and East Wellega) to have sufficient variety in the data. The agro-ecological conditions in East Wellega allow farmers to grow a larger variety of crops in East Wellega; by contrast in West Tigray, farmers grow predominantly sesame, alongside a limited number of staple crops for home consumption. East Wellega is relatively close to Addis Ababa, while West Tigray is located at a considerable distance from Addis Ababa in the far north-west corner of Ethiopia. Finally, farmers in West Tigray have experienced hardships, such as ethnic conflicts and drought, more often than their colleagues in East Wellega.

The fieldwork for this study was done in January 2009, before all sesame was transacted through the Ethiopian Commodity Exchange (or ECX), which became obligatory by law in 2010. Although the ECX already existed in 2009, it was barely functioning at the time: only a few large traders used it and there was no market information system in place. From December 2008 to January 2009, 1,382

farmers were interviewed: 891 farmers in 5 villages in West Tigray and 491 farmers in 12 villages in East Wellega. The chosen villages were randomly selected, after which farmers were randomly chosen. The number of East Wellega villages included in the survey is higher and the number of farmers lower, because fewer farmers cultivate sesame in this region. The survey questionnaire used may be found online, see appendix 3.

Sesame is Ethiopia's second main agricultural export commodity (after coffee), in terms of earnings and a key provider of income and employment (Wijnands et al. 2009; 2011). Ethiopia's exports constitute around a fifth of world sesame exports. Sesame is grown mainly for export markets and little value is added in Ethiopia (Wijnands et al. 2009). In the past decade, the area under production has grown eightfold to 316,000 ha (FAO 2014). Opportunities for sesame export have not been fully exploited yet because of inefficient marketing (Wijnands et al. 2009). Sesame markets at the time of the survey were mostly characterised by cash-and-carry exchange: goods were inspected and weighed on the spot and delivery took place against instant payment in cash, as in many agricultural markets in developing countries. Different market agents fulfilled various market functions; assemblers or village collectors bought sesame from farmers at their farm or at local markets, selling to wholesalers in main markets, who sold it to exporters. Many traders made use of intermediaries such as selling and buying agents or brokers.

3.3.1 market outlets

Farmers in the two surveys in West Tigray and East Wellega, sold their sesame at various market outlets (table 2). The totals exceed 100% because typically, farmers sold their sesame to more than one outlet; most often on local markets (in West Tigray 89.1% of farmers, in East Wellega 77%), followed by selling to traders who visited farmers at their farm. Farmers usually visited distant markets to get a higher price. This option was not open to all farmers as it requires transport. Sesame prices vary not only in time, but also geographically. There have been several studies on the temporal and spatial arbitrage of Ethiopian cereal prices (Getnet et al. 2005; Tadesse & Guttormsen 2011), which find there was scope to improve spatial market performance. No similar studies have been done for sesame prices, but retail price data for different markets (CSA 2013) shows varying sesame prices

between markets; for instance, in August 2012 the highest price (Tigray) was 2.3 times the lowest price (Benishangul). In local markets, prices will be more aligned, of course, but for farmers, even small differences will be important, which is probably why they visited multiple outlets at different times.

Table 2: Sesame market outlets per region

	West Tigray		East Wellega	
	Count	%	Count	%
Cooperative	416	46.7	36	7
Local Market	794	89.1	377	77
Distant markets	248	27.8	59	12
Traders at farm gate	448	50.3	206	42
Other (not specified)	19	2.1	40	8
N	**891**		**491**	

Farmers also sold part of their sesame to cooperatives. In the sample, just over 30% of farmers sold to cooperatives, with a large regional difference because fewer cooperatives exist in East Wellega. The Ethiopian government has been actively promoting the establishment of new cooperatives in recent years. Cooperatives have existed for a long time in Ethiopia but still face a number of difficulties. The main problem is that by being tied to the government, cooperatives are managed in a top-down manner, do not have an independent voice, are not able to serve their members adequately, and cannot speak on behalf of the wider interests of their constituencies (Francesconi & Heerink 2011; Rahmato 2002; Spielman et al. 2009), which may explain why participation rates are relatively low in Ethiopia (Bernard et al. 2008). However, cooperatives do provide a variety of services related to agricultural production (e.g. supplying agricultural inputs and credit) and commercialisation (aggregating and selling sesame). Farmers do not have to be a member to access these services. When cooperatives buy from farmers, they do so against prices that have been decided upon by the cooperative management for a certain period. Cooperatives offer on average slightly higher prices (Bernard et al. 2008) and more stable prices (Francesconi 2009) that lag behind market prices, which means that if prices increase, farmers might be better off selling to traders in the market. Cooperatives sell to large traders such as wholesalers or exporters.

Only 8.2% of farmers reported selling to the same trader (table 3), with even fewer reporting a long-term contracting relationship with one trader. Selling to the same trader was not always by choice: some 40% who sold sesame to the same

trader answered that there are no other traders. Around 67% stated they have a long-term relationship. Almost 60% said it is because they trusted the trader and over 53% stated that the trader offered the farmer a good price. Note that there are regional differences, with more farmers in West Tigray indicating that they have little choice (54.4% against 8.6%).

Table 3: Reasons for farmers to sell to the same trader or different traders

	West Tigray		East Wellega	
	Count	%	Count	%
Sell to the same sesame trader	**79**	**8.9**	**35**	**7.1**
Of those who sell to the same trader, farmers gave the following reasons:				
There are always the same traders	43	54.4	3	8.6
I have a long-term relation with the trader	45	57.0	31	88.6
I trust the trader	39	49.4	29	82.9
The trader gives me a good price	39	49.4	21	60.0
Other (not specified)	1	1.3	2	5.7
Sell to many different traders	**793**	**89.0**	**456**	**92.9**
Of those who sell to different traders, farmers gave the following reasons:				
Traders come at different times	626	78.9	135	29.6
I sell to the trader who offers me the best price	745	93.9	400	87.7
It does not matter which trader I sell to	529	66.7	413	90.6
The farmer cannot choose	332	41.9	162	35.5
Other (not specified)	38	4.8	20	4.4
N	**872**		**491**	

3.3.2   perceptions

Figure 14 shows the distribution of different farmers' perceptions about the various aspects of buyers' behaviour. Most farmers have "very negative perceptions" about various elements of buyers' behaviour. Farmers with negative perceptions far outweigh those who have favourable perceptions about traders. Interestingly, farmers have relatively favourable perceptions about buyers to provide them with market information: fewer farmers have a very negative perception and more farmers have a very positive one. That said, farmers do not think that buyers will provide them with accurate price information; the sum of the farmers who have a very negative and negative perceptions is the highest for all five.

Figure 14: distribution of different perceptions of farmers about the various aspects of traders' behaviour in transactions in East Wellega and West Tigray
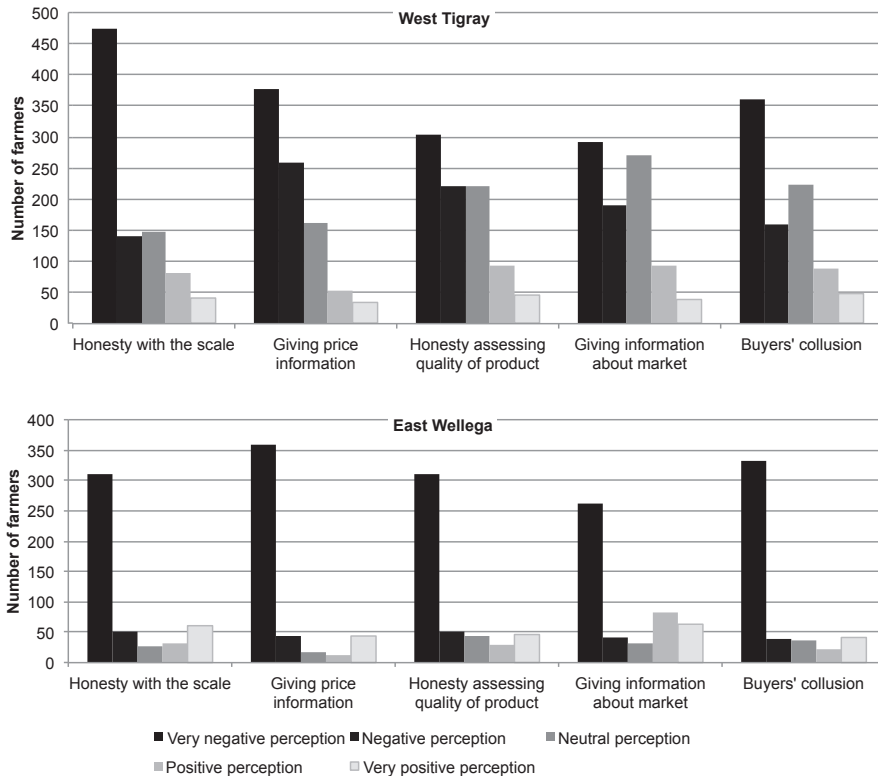
3.3.3   market information

At the time of the survey in 2009, no reliable market information system existed in Ethiopia and farmers had generally little market information on prices, price trends, or quality standards. Most sesame farmers obtained market information from friends, family, and neighbours. Mobile phones were, and still are, extremely scarce. In 2008, 2.42% of the Ethiopian population had bought a mobile SIM card, which increased to 4.89% in 2009 (Calandro et al. 2010). Most of these were probably sold in urban areas, as Ethiopia has not reached 20% of households connected to the electricity grid. Radio is the most widely used information source, with 41% of households in Ethiopia using this medium (Stork et al. 2013). For price

information, newspapers or radio are not always useful, because such information is often out-of-date or not location specific (David-Benz et al. 2012). Ethiopian sesame farmers' information problems were compounded by several factors. Sesame prices often fluctuated daily, and different prices could be obtained in different markets (see previous section on market outlets); the survey shows that the highest price received was over six times that of the lowest price received.[24]

In a situation with no reliable market information it is difficult for farmers to distinguish between trustworthy and untrustworthy traders by identifying "trustworthy" price offers. With highly fluctuating prices, this distinction is more difficult to make. In addition, as most sesame farmers lacked information on grades of sesame quality, which are associated with different price levels, traders could offer lower prices by qualifying the sesame on offer as inferior. Furthermore, many farmers lacked weighing equipment to accurately measure the quantity of sesame, allowing traders to offer lower prices by rigging the weight of the produce.

It is conceivable that the information obtained from friends, family, and neighbours could have helped to assess whether the price offered was fair, especially when a friend, family member, or neighbour sold at the same time at the same market, as several authors have found (Islam & Grönlund 2010; Lwoga et al. 2011; McCullough & Matson 2011). However, because the quality and weight often differs from farmer to farmer, the price information received from others may not have been completely comparable and again not useful as a yardstick. One could also argue that farmers could have obtained market information by negotiating with many traders, as Tadesse and Shively (2013) do. However, farmers in the sample indicated that traders in a particular market usually offered similar prices. To obtain information from different markets, sesame farmers would need to travel to different markets (from small local markets to larger faraway markets, usually located in the regional capital) and/or meet traders who collect produce directly from farmers. Collecting market information in this manner would have entailed high transaction costs in terms of finding traders and bargaining with them, as well as transport costs in terms of time and money spent on travel. In addition, with highly fluctuating prices, collecting market information first and then deciding to sell to the highest bidder may not be the most efficient strategy as prices may have

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[24] The lowest price received was 395 birr/quintal; the highest 2520 birr/quintal (the standard deviation was 427.66; exchange rate of 10.5 birr = 1 euro). The lowest price received a year earlier was 350 birr/quintal and the highest was 2000 birr/quintal (standard deviation 161.86; exchange rate 10.88 birr=1 euro).

changed again by the time the farmers reach the market with their produce, or traders may have moved on.

3.4   methods

3.4.1   measuring perceptions

I have added the five measurements of perception (figure 14) to construct a new "perceptions" variable that captures the overall farmers' perception of traders' behaviour. This variable was tested to ensure that the "validity of empirical behavioural research hinges on ensuring the reliability of the measures on which research conclusions are based" (Duhachek & Iacobucci 2004). I used Cronbach's alpha and confirmatory factor analysis to determine overall construct reliability, setting the cut-off point at the usual value of 0.70 (Nunnally 1978).[25] To simplify the analysis, I combined the middle scales of the 5-scale Likert score of the new "perceptions" variable into one neutral perception" category, thereby obtaining three categories: negative perceptions, neutral perceptions, and positive perceptions.

3.4.2   analysing farmers' perceptions through ordered probit modelling

To analyse the factors associated with farmers' perceptions about opportunistic traders, I use an ordered response model. Ordered probit models have come into fairly wide use as a framework for analysing such responses (Greene & Hensher 2010). A farmers' perception about traders is unobserved and represented by the

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[25] Cronbach's alpha measures how well a set of items (or variables) measures a single unidimensional latent construct (Bland and Altman 1997). Cronbach's alpha for the five elements of perceptions exceeds the cut-off point with a score of 0.76, indicating that the five elements all measure the same latent "perception about behaviour" variable. Factor loadings were used to determine whether each item contributed significantly to the joint "perception" factor with the cut-off point at the usual value of 0.3. All measures loaded on one factor and well above the cut-off point (all were above 0.62). Loading the measures on more than one factor did not achieve an improvement. We also tested whether the scores on the Likert scale suffered from "scale usage heterogeneity". Rossi et al. (2001) caution that respondents often vary in their usage of the scale, which they have termed scale usage heterogeneity: common patterns include using only the middle of the scale or using the upper or lower ends. We tested the respondents' scoring on the Likert scale for perceptions and found that scale usage heterogeneity did not apply.

latent variable Bi*. To model how Bi* varies with personal characteristics x_i I specify the linear relationship:

$$B_i^* = x_i'\beta + \varepsilon_i \tag{1}$$

If we assume that ε_i is $NID(0,\sigma2)$, the above setting corresponds to an ordered probit model, where B_i^* is a latent variable representing the ith individual's beliefs about traders, β is a vector of coefficients associated with selected explanatory variables, x is a matrix containing farmers' information for the selected variables and a dummy for region, and ɛ is the error term. The survey design was clustered: villages or kebeles were randomly selected after which individuals were selected within clusters. This means that there may be common effects across villages, and I use the option cluster in Stata, where the village (kebele) is the subgroup indicator, to produce standard errors which are corrected both for heteroskedasticity and the grouped structure (Deaton 1997). I use the conceptual framework's four categories of factors that influence beliefs in the analysis of farmers' perceptions: short-term experiences with traders, information, exposure to certain environments or institutions, and personal characteristics.

First, I include short-term experiences with traders through several variables representing recent transactions with traders. I include the most recent price received (in the 2008–2009 season), as well as revenues. I also include the price received a year ago (2007–2008 season), because farmers may have used this as a reference price to judge the most recent price received. I included whether the quality or quantity of sesame was reflected in the price offered by traders, as well as two variables indicating the availability of traders: whether they arrived at expected times or not, and whether the farmers felt they could choose a trader.

Second, to capture access to information, I include a variable that indicates whether farmers had access to market information. I also include variables indicating how easy it was to get to different markets, because this is linked to the ease of collecting information. Therefore this thesis also includes transport costs, as well as costs in terms of the time it took to travel to the nearest market (in minutes), and whether the farmers had the means to transport sesame to markets.

Third, to capture exposure to certain environments or institutions, I include a dummy for the two regions. I include crop diversity (number of crops a farmer cultivated) to also reflect this. Another implication of crop diversity is that farmers growing different crops will also meet other traders than sesame traders (although not all crops are grown for the market). Exposure to certain events linked to living

in different environments such as loss of livestock, drought, food shortages, ethnic conflict, or health problems are also included. Farmers exposed to hardship in Ethiopia may have encountered positive experiences such as help from the community after the hardship and have a more positive perception of humanity. The literature on the effects of hardships presents a mixed verdict, but there is some evidence that individuals who have experienced hardships (such as violence) behave more altruistically (Voors et al. 2012). Finally, I include personal characteristics such as age, gender, education, and the size of land owned.

3.4.3   taking into account endogeneity

Perceptions about the opportunistic behaviour of traders were measured after farmers had sold sesame to traders, reducing the likelihood of endogeneity. However, endogeneity issues may still play a role, as negative perceptions about traders may have existed before and during the transactions, affecting the explanatory variables, as well as having a "self-fulfilling prophecy" effect. It is quite conceivable that possessing market information is endogenous. Farmers who have a negative perception about traders' opportunistic behaviour are probably more likely to obtain market information. Those who have a positive perception about traders may not bother to obtain such information. As this is a crucial variable in the analyses, I use two approaches to control for endogeneity. First, I use the instrumental variables estimator (IV) approach to account for endogeneity. For the instrument, I assume that farmers who are inherently inquisitive will collect market information but do not necessarily have a more negative perception of traders. To measure this trait, which cannot be measured directly, a dummy variable was composed from two other variables that are related to obtaining information. I use a semi-ordered bivariate probit model (see appendix 1 for more information and results). Finding a suitable instrument remains problematic. Although the instrument seems sufficiently strong, I also apply a relatively new method developed by Lewbel (2012), which identifies structural parameters in models with endogenous or mismeasured regressors. The identification comes from having regressors uncorrelated with the product of heteroskedastic errors. Lewbel's method also allows us to assume that other variables may be endogenous, such as the price recently received for sesame (see appendix 2 for more information on the approach and results).

3.4.4   analysing market participation through GLM modelling

To analyse whether farmers' negative perceptions about opportunistic behaviour of traders lead to decreased market participation, I conduct two analyses: (i) the relationship between perceptions and (ii) the number of market outlets (see table 2).

I use a Poisson regression to model the number of market outlets. A Poisson regression is used to model count data, assuming the response variable has a Poisson distribution. Poisson models are generalised linear models (GLMs) with the logarithm as the (canonical) link function (i.e. log link function), and the Poisson distribution function as the assumed probability distribution of the response (Greene, 2008). To model how the number of outlets Y varies with the independent variables x, I specify the relationship:

$$Log\big(E(Y|x)\big) = \alpha + \beta'x \tag{2}$$

The model used is slightly underdispersed. When applying the standard Poisson model to underdispersed data, the efficiency of parameter estimates remains reasonably high, yet their standard errors are overestimated. However, the consensus is not to correct for underdispersion (Zuur et al. 2009) because for linear predictor point estimates and the prediction of values, underdispersion rarely is a problem. However, tests and intervals may be unnecessarily conservative.

Based on the literature discussed in section 3.2, I include four categories of variables. First, personal factors such as age, education, and wealth (proxied by area of land owned). Second, I include typical economic factors such as recent price, whether price includes quality and quantity of sesame, price received last year, recent revenues, availability of market information, travel time to nearest market, and whether farmers have means of transport. I also include whether farmers grow different crops besides sesame. Third, I include social factors such as whether farmers feel they can choose which trader to sell to, and whether traders arrive at unexpected times. Finally, I include the perceptions held by farmers about the opportunistic behaviour of traders. I included predicted values for perceptions about traders (pfit2 for neutral and pfit3 for favourable perceptions) obtained in the ordered probit model rather than the measured values of perception to measure the effect of perception. I did this because the measured values of perception were obtained *after* farmers sold their sesame to avoid endogeneity problems. The

prediction is based on variables exogenous to marketing choices, which means that price and revenues were left out.

3.5   results

The results are discussed in two sections. First, I present the results that help explain the negative perceptions of farmers on traders' behaviour. Then I present the results on the farmers' marketing behaviour.

3.5.1   negative perceptions of farmers

Table 4 presents the variables with expected signs, means and standard deviation. The four categories of factors that influence beliefs in the analysis of farmers' perceptions are included: market information, short-term experiences with traders, exposure to certain environments or institutions, and personal characteristics.

Table 4: Variables included in the model

Independent variable		Exp. sign	Mean	s.e.
Market information				
NoMrktInfo	No access to market information	-	0.24	0.127
NoTransp	No access to transport	-	0.15	0.147
TravelTime	Minutes it takes to travel to nearest market	-	55.15	0.001
Recent experience with traders				
TraderUnexp	The reason for selling to different traders – They come at different times	-	0.66	0.123
NoTraderChoice	The reason for selling to different traders – The farmer cannot choose	-	0.37	0.115
PriceQual	Mechanism of negotiating price with traders – Price offered is based on quality of sesame	+	0.64	0.110
PriceQuant	Mechanism of negotiating price with traders – Price is based on quantity of sesame one has	+	0.04	0.275
PriceDiff	Price received for sesame one year ago (2007–2009), scaled	-	0.52	0.006

Independent variable		Exp. sign	Mean	s.e.
Price	Most recent price received for sesame (in January of 2009), scaled	+	1.25	0.486
Rev	Revenue (most recent price x quantity sold), scaled	+	23.54	0.002
Environmental and institutional factors				
CropDiv	Number of crops	+	2.25	0.108
Drought	Experienced severe drought	+	0.62	0.123
EthnConfl	Experienced ethnic conflict	+	0.03	0.301
FoodShort	Experienced food shortage	+	0.64	0.122
HealthProb	Experienced health problem	+	0.58	0.107
LstLoss	Experienced loss of livestock	+	0.43	0.112
PriceFail	Experienced crop price failure	+	0.74	0.122
Personal characteristics				
Age	Age	+/-	44.46	0.005
Edu	Education	+/-	1.39	0.086
Gender	Gender	+/-	1.08	0.177
Land	Size of land	+/-	4.78	0.010
Region	West Tigray or East Wellega	+/-	0.87	0.357

In presenting the ordered probit results, I report the marginal effects of the continuous variables (table 5). The results (significance levels) taking into account endogeneity are presented in appendix 3.. They are similar to those of the ordered probit results. The marginal effects are the estimated change in the probability of having a positive perception about traders ("negative perception", "neutral perception" and "positive perception") given a marginal increase in the value of the relevant regressor while holding all other regressors at their mean value. These marginal effects therefore represent the estimated impact that each regressor has on the probability that an "average" farmer will have a negative, neutral, or positive perception about traders. Note that to evaluate the effect of dummy variables, I need to compare the probabilities when the variable takes its two different values (0 or 1) with those that occur with the other variables held at their sample means (Greene 2008).

Table 5: Summary of marginal effects for ordered probability model

	All data			East Wellega			West Tigray		
	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception
Market information									
NoMrktInfo[a]	0.157***	0.111***	-0.268***	0.368***	0.218***	-0.586***	0.120***	0.124***	-0.244***
	(0.040)	(0.017)	(0.050)	(0.088)	(0.051)	(0.126)	(0.020)	(0.029)	(0.037)
TravelTime[a]	0.000	0.000	-0.001	0.000	0.000	0.001	0.000	0.001	-0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
NoTransp[a]	0.147**	0.094***	-0.241***	-0.068	-0.028	0.096	0.139	0.130***	-0.269**
	(0.067)	(0.016)	(0.077)	(0.102)	(0.058)	(0.160)	(0.088)	(0.027)	(0.106)
Experience with traders									
PriceDiff	0.003**	0.004***	-0.007***	0.005***	0.002*	-0.007***	0.008***	0.014***	-0.022***
	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.004)	(0.005)
Price	-0.231**	-0.274***	0.505**	-0.631***	-0.187**	0.818***	-0.647***	-1.132***	1.779***
	(0.106)	(0.100)	(0.202)	(0.161)	(0.088)	(0.216)	(0.196)	(0.312)	(0.431)
Revenue	-0.001***	-0.002***	0.003***	0.013	0.004	-0.016	-0.001***	-0.002***	0.003***
	(0.000)	(0.000)	(0.001)	(0.013)	(0.003)	(0.015)	(0.000)	(0.000)	(0.000)
TraderUnexp[a]	0.090**	0.106**	-0.196**	0.138	0.041	-0.179	0.076**	0.133*	-0.209**
	(0.036)	(0.047)	(0.081)	(0.126)	(0.044)	(0.167)	(0.036)	(0.072)	(0.104)
NoTraderChoice[a]	-0.045	-0.053	0.097	-0.014	-0.004	0.018	-0.049	-0.085**	0.134**
	(0.033)	(0.033)	(0.066)	(0.077)	(0.022)	(0.099)	(0.032)	(0.036)	(0.066)
PriceQual[a]	-0.081***	-0.095**	0.176***	-0.164	-0.049	0.212	-0.059**	-0.104	0.163*
	(0.023)	(0.041)	(0.062)	(0.140)	(0.047)	(0.184)	(0.024)	(0.072)	(0.096)
PriceQuan[a]	-0.142**	-0.168**	0.310**	-0.378***	-0.112*	0.491***	-0.040	-0.070	0.110
	(0.062)	(0.082)	(0.141)	(0.141)	(0.062)	(0.187)	(0.046)	(0.077)	(0.122)

	All data			East Wellega			West Tigray		
	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception
Environmental and institutional environment									
Region [a]	0.076	0.090	-0.166						
	(0.076)	(0.100)	(0.175)						
FoodShort [a]	0.010	0.013	-0.023	0.222**	0.030	-0.252**	-0.003	-0.006	0.009
	(0.024)	(0.031)	(0.054)	(0.088)	(0.022)	(0.098)	(0.026)	(0.043)	(0.070)
Drought [a]	0.027**	0.033**	-0.060**	0.357	-0.067	-0.290*	0.024**	0.045*	-0.069**
	(0.011)	(0.017)	(0.027)	(0.346)	(0.178)	(0.173)	(0.012)	(0.025)	(0.035)
LstLoss [a]	-0.052***	-0.063***	0.115***	-0.228***	-0.083*	0.311***	-0.041**	-0.073*	0.114**
	(0.016)	(0.024)	(0.039)	(0.078)	(0.043)	(0.114)	(0.016)	(0.041)	(0.055)
EthnConfl [a]	0.033	0.033	-0.066	-0.105	-0.062	0.168	0.012	0.019	-0.030
	(0.069)	(0.057)	(0.126)	(0.172)	(0.174)	(0.345)	(0.057)	(0.088)	(0.146)
HealthProb [a]	-0.044**	-0.050***	0.093***	-0.100	-0.034	0.134	-0.029	-0.048***	0.076**
	(0.017)	(0.012)	(0.029)	(0.086)	(0.030)	(0.114)	(0.019)	(0.017)	(0.036)
PriceFail [a]	-0.050***	-0.051***	0.101***	-0.088	-0.025	0.113	-0.049***	-0.070***	0.119***
	(0.018)	(0.016)	(0.033)	(0.080)	(0.018)	(0.096)	(0.012)	(0.017)	(0.022)
CropDiv	-0.036*	-0.043*	0.079*	-0.051	-0.015	0.067	-0.014	-0.024	0.038
	(0.021)	(0.025)	(0.046)	(0.054)	(0.014)	(0.067)	(0.016)	(0.032)	(0.048)
Personal characteristics									
Gender	-0.001	-0.001	0.003	b	b	b	0.007	0.013	-0.020
	(0.011)	(0.013)	(0.024)				(0.014)	(0.026)	(0.040)
Age	0.001	0.001	-0.001	-0.004	-0.001	0.005	0.001***	0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.006)	(0.000)	(0.000)	(0.001)
Edu	0.014	0.017	-0.031	-0.031	-0.009	0.040	0.002	0.004	-0.006
	(0.014)	(0.015)	(0.029)	(0.101)	(0.030)	(0.130)	(0.012)	(0.020)	(0.031)
Land	0.002	0.002	-0.005	0.018***	0.005**	-0.023***	0.000	-0.001	0.001
	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)	(0.005)	(0.001)	(0.002)	(0.003)

All data			East Wellega			West Tigray		
dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception
Log pseudolikelihood = -520.59722			Log pseudolikelihood = -58.135332			Log pseudolikelihood = -435.97395		
Pseudo R2 = 0.1545			Pseudo R2 = 0.3467			Pseudo R2 = 0.1493		
(Std. Err. adjusted for 15 clusters in kebele)			(Std. Err. adjusted for 10 clusters in kebele)			(Std. Err. adjusted for 5 clusters in kebele)		

[a] binary variable for which additional calculations were done

[b] In East Wellega too few women farmers participated to generate meaningful results

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

Wald chi2 cannot be calculated as the number of parameters is greater than the number of clusters

The main variable in the analyses, market information (NoMrktInfo) is highly significant: farmers who see the lack of market information as a big problem tend to have more negative perceptions about traders, both in East Wellega and West Tigray, with a larger effect in East Wellega. Travel time is not significant. Not having transport is significant in Tigray though; farmers who lack transport are more likely to have negative perceptions about traders. It is not significant in East Wellega, probably due to the fact that the farmers live in an area that is more well-connected and has better infrastructure.

Regarding recent experiences with traders, table 5 shows that price is significant in both regions; and the marginal effects show that an increase in price increases the probability of positive perceptions. The effect is relatively large (0.505), indicating that recent experience with a trader who offered a good price is associated with a more favourable perception of traders. Revenue (Rev) has the same effect as price but is not significant in East Wellega. The price received one year ago (PriceDiff) has the opposite effect: an increase in the price one year ago decreases the probability of positive perceptions, but only very slightly. It is significant in both regions. This may be an indication that the price received a year ago may be used by farmers as a reference price for this year's price. If prices received this year are higher than last year's, the farmer may be inclined to think that he or she received a "good" price this year, and have a more positive perception of traders. Having experienced a "failure in prices" (i.e. very low prices) increases the probability of having a positive perception, which is somewhat counterintuitive, but the effect might be similar to having received low prices in previous years; if the most recent prices received are relatively higher (and they were in 2008), this may improve the perceptions about traders' trustworthiness. Traders arriving at unexpected times (TraderUnexp) lowers the probability of positive perceptions, as I assumed it would. It is only significant in West Tigray. Farmers who think quality is taken into account in pricing (PriceQual) have a higher likelihood of having positive perceptions, but only in West Tigray. In West Tigray the white Humera type is sold, and quality is an important attribute. In East Wellega, the brown Wellega type is sold, and quality is less important. Farmers who think quantity taken into account in pricing (PriceQuan) have a higher likelihood of having positive perceptions, but only in East Wellega, where farmers tend to sell smaller amounts than in West Tigray.

Regarding environmental and institutional factors, the regional differences are substantial in this category. Having experienced food shortages is significant in East Wellega and reduces the probability of having positive perceptions about traders. Drought is significant and also reduces the probability of having positive perceptions about traders. Loss of livestock is significant in both regions and increases the probability of have positive perceptions. Ethnic conflict is not significant. It is interesting to note that hardships that have affected a whole community all reduce the probability of having positive perceptions. Individual hardships seem to have the opposite effect. Finally, crop diversification is significant; the more crops farmers grow, the more likely they are to have a favourable perception of traders, as predicted. However, it is only significant when the data is combined for the two regions; no region-specific effects are found.

Personal characteristics are not significant but are when the data is split. Some are significant for either region, such as age for farmers in West Tigray (as age increases, farmers are slightly more likely to have negative perceptions) and land for East Wellega (larger land owners are slightly more likely to have negative perceptions). The effects are very small though. As no female farmers were interviewed in East Wellega, gender is omitted.

The results for the semi-ordered bivariate probit model that takes into account the possible endogeneity of market information are very similar to those reported in table 5 (see appendix 1). When I use Lewbel's approach (2012), I again assume that market information is endogenous, but also run the analysis assuming that price is endogenous and that market information and price are endogenous (see appendix 2). The main result is that market information remains a significant factor in explaining trust perceptions. Also the related variable of having transport remains significant. Travel time becomes significant and negatively correlated with trust perceptions, although the effect is small.

3.5.2   do negative perceptions of farmers lead to less market participation?

In this section, I explore whether negative perceptions of farmers about the possible opportunistic behaviour of traders leads to less market participation by selling at fewer market outlets (and vice versa). The results are shown in table 6.

Table 6: Summary of results for GLM using a Poisson distribution and link log with dependent variable number of outlets (with clustering for village (kebele))

	Coefficient	s.e.	
Perceptions			
pfit2	0.275	(0.069)	***
pfit3	0.305	(0.134)	**
Personal characteristics			
Region	-0.152	(0.152)	
Gender	-0.120	(0.062)	*
Age	-0.006	(0.002)	***
Education	0.029	(0.014)	**
Land	0.001	(0.003)	
Economic factors			
NoMrktInfo	0.067	(0.074)	
NoTransp	-0.090	(0.081)	
TravelTime	0.001	(0.000)	***
CropDiv	-0.026	(0.042)	
PriceDiff	-0.004	(0.003)	
Price	0.253	(0.181)	
PriceFail	0.052	(0.043)	
PriceQual	0.127	(0.063)	**
PriceQual	-0.150	(0.151)	
Rev	0.001	(0.001)	
Social factors			
TraderUnexp	0.199	(0.065)	***
NoTraderChoice	-0.357	(0.057)	***
_cons	0.562	(0.236)	**

Deviance = 279.6
Pearson = 282.4
AIC = 3.094568
BIC = -3601.984
Log pseudolikelihood = -942.221
Std. Err. adjusted for 15 clusters in kebele, standard errors in parentheses
* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$

An important result is that the fitted values for trust perceptions (pfit2 and pfit3, see methodology section) are indeed significant. Farmers who have neutral or positive perceptions are more likely to increase the number of market outlets, as

hypothesised. Those who perceive the risk of dealing with opportunistic traders as being low diversify market outlets. I assume this is to reduce price risk. I also tested this model with the original trust scores, which were also significant, but weak. I tested whether the pfit2 and pfit3 are different with a Wald test, which confirmed that they are.

With respect to personal characteristics, age, gender, and education are significant. Younger, male, and well-educated farmers are more likely to increase the number of market outlets. Two economic factors are significant. First, if farmers feel that quality is taken into account in pricing, they tend to increase market outlets. This can be explained by the fact that farmers want to get the best price for their sesame. Second, travel time is significant, but the effect is small. Farmers who live in remote areas tend to increase market outlets, which means they are willing to incur higher transaction costs to reduce transaction risks (i.e. to get a higher price). Interestingly, market information is not significant. There may be two opposing forces at play: farmers who have good price information will travel to markets where they know they can obtain a higher price; farmers who have no market information may travel to markets to obtain market information. Both social factors are significant. Farmers who feel they have no choice of trader tend to decrease market outlets: for them all traders are the same and therefore it does not make sense to expend transaction costs to sell at various market outlets. The farmers who say traders arrive at unexpected times sell to more market outlets; farmers apparently choose not wait for traders to show up but visit traders themselves.

3.6   discussion and conclusions

I have set out to explore how negative perceptions of farmers about opportunistic behaviour of traders are linked to various possible explanatory variables and assess the role of these perceptions in farmers' market participation. These findings shed a different light on the literature, which argues that through trust relationships between a farmer and trader and reputation effects, trust is generalised, facilitating trade and market development. Tadesse and Shively (2013), for instance, find that farmers in Ethiopian grain markets face various transaction risks, mainly driven by a lack of market information. By repeatedly transacting with the same trader, farmers are able to reduce transaction costs related to searching for information.

These findings help explain why farmers, such as the sesame farmers in the study, may *not* choose to engage in repeated transactions. I have highlighted the important role of market information, in line with Dixit (2004), who puts forward that relational contracting is only possible when quality information is present.

I conclude therefore that a lack of market information, and the fact that sesame prices are influenced by various factors that introduce a high degree of subjectivity, make it difficult for farmers in Ethiopia to determine what a "fair" price was for an amount of sesame of a certain quality. Farmers lacked an objective "yardstick" to assess the price offered by traders, complicating the assessment of traders' trustworthiness. Past studies have suggested that distrust becomes a chosen strategy of stakeholders when there is an expectation of opportunistic behaviour from other stakeholders (Baba 1999). Without the possibility of "updating" their beliefs about traders, farmers in Ethiopia seemed to have been locked into a default distrust of traders, inhibiting the development of relational contracting.

Instead of engaging in long-term, relational contracting, sesame farmers in Ethiopia sell their produce at different outlets. I see this as a strategy that reduces transaction risks but increases transaction costs (in line with Dorward 2001). I argue that farmers who face the transaction risks of uncertain and fluctuating prices as well as the transaction risk of dealing with many opportunistic traders, decide to limit their market participation: what is the point of traveling to various market outlets if you are going to be cheated anyway? Farmers who consider the transaction risk of dealing with opportunistic traders as low may choose to expend costs to diversify market outlets in order to reduce price risk.

This line of reasoning would predict that if good and timely market information is available to farmers, their trust perceptions of traders would improve. Whether this would then lead to relational contracting is undetermined. The results show that there is a virtuous circle relationship, whereby market participation and trust are mutually reinforcing forces: increasing trust through increased market transparency is likely to lead to more market participation and diversification of market outlets. However, improved market information is likely to have other effects as well. Better market information tends to lead to converging prices (Aker 2010; Jensen 2010), reducing price risk and therefore the need to sell at various market outlets. In this case, more trust might lead to relational contracting, as this would reduce transaction costs. It has also been found that

improved market information induces the market participation of farmers in remote areas (Muto & Yamano 2009), which would negate relational contracting.

This leads us to the more philosophical question of whether personal trust relationships are the only way to institutional development or whether this needs rethinking. Although personalised trust relationships bring several benefits to both farmers and traders, such exclusive relationships are also restrictive. Perhaps there are other "pathways" to market development. Dixit (2004) proposes that when a community is too large or the information network and the system of social norms and sanctions are too weak, and formal state law is unavailable, an arbitrator may solve coordination and information problems. The ECX, which became mandatory for sesame trade after the survey, shares many characteristics of such an arbitrator. It may be seen as a "specialised industry arbitrator which may interpret information at lower cost, making more information verifiable and allowing more complete contracting" (Dixit 2004, p. 49). Whether the ECX has, indeed, taken up this function is for follow-up research.

Several policy implications can be drawn from this chapter. Investing in market information and increasing transparency through certifying weighing equipment and setting quality grades and standards is important not just to improve the bargaining position of farmers, as is often put forward, but also to foster trust between farmers and traders. When there is more trust, transaction risks and costs will decrease, improving trade. The ECX has been established in Ethiopia to fulfil this role. Further research will need to show that if it has achieved the goal of improving market information and setting standards, for example, then it has indeed led to more trust between farmers and traders, exemplified by more favourable perceptions.

CHAPTER 4

formal institutions, market transparency, and social capital between farmers and traders

abstract

This chapter examines whether the newly established Ethiopian Commodity Exchange through its affiliated Primary Transaction Centres (PTCs) has led to improved market transparency. I hypothesise that market transparency will lead to reduced transaction costs for farmers. This chapter builds on an earlier study, which hypothesised that better market information leads to increased trust between farmers and traders. This chapter finds that the ECX has been successful in increasing market transparency and decreasing transaction costs. It argues that traders are behaving less opportunistically as a result of market transparency, and this has improved farmers' trust perceptions about traders and even slightly increased relational contracting and significantly increased credit relations.

keywords: market transparency, ethiopian commodity exchange, farmers, trust

4.1 introduction

The ECX was established in 2008 to solve various problems in Ethiopian's agricultural markets, in which both farmers and traders faced high transaction costs (Gabre-Madhin 2012). Ethiopia's sesame markets resemble those of many other African agricultural markets, which are characterised by a plethora of small traders. There are many intermediaries and most transactions are low value. The participants in agricultural markets – farmers, traders, firms, and government agencies – all face difficulties arising from underlying and related problems of poor communications and transport, lack of standards, weak institutions, and limited access to supporting services (e.g. finance) (Gabre-Madhin 2003; Dorward et al. 2006; Barrett 1997). As a result, markets do not serve producers or consumers well: high margins and poor price integration reduce farm gate prices, raise consumer prices, and increase uncertainty for all (Dorward et al. 2006). Their inefficiency is a major constraint to agricultural development, which would benefit farmers, small traders, and consumers.

The ECX aims to solve these problems in various ways, explained in chapter two. Renkow & Slade (2013, p. 51) find "a remarkably wide array of opinions about the ECX's impacts on traders and farmers – some sanguine, others not" and state that a comprehensive external review is "sorely needed".[26] This chapter is by no means such a review, but it does contribute to a better understanding of the impact of the ECX (through the PTCs) on sesame farmers, after two years of mandatory operation. This chapter presents the farmers' viewpoints on the claimed benefits of the ECX, such as whether market transparency has increased and transaction costs have decreased. This chapter also provides some insights on the area of institutional change. The ECX can be seen as a major institutional change in the sesame markets of Ethiopia. Being the first of its kind in Africa, there is little understanding of how such a major institutional change impacts markets that are mostly governed by informal institutions and social network capital.

This chapter examines whether the ECX has fulfilled its expected arbitrator's role in increasing transparency through the establishment of Primary Transaction Centres. In doing so, the ECX should reduce transaction costs and

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[26] They also remark that such a review is unlikely as baseline data do not exist with which to evaluate the farm-level impacts of trading through the exchange on price discovery, price transmission, and transactions costs.

risks. Improved market transparency is also expected to improve farmers' perceptions about the opportunistic behaviour of traders. Chapter three hypothesises that these negative trust perceptions impeded the development of long-term trust relationships between farmers and traders. It finds that higher trust perceptions were linked to a larger number of market outlets, thus also impeding the likelihood of developing (long-term) trust relationships. If trust perceptions indeed have improved, and the number of market outlets has been limited through the new PTC law, the likelihood of farmers developing a trust relationship with traders may have increased.

The chapter addresses the following main research questions:

1. Is the ECX (through its PTCs) improving market transparency (prices, grades, and measurement)?

2. Did increased market transparency decrease transaction costs for farmers?

3. Did market transparency have a positive knock-on effect on farmers' perceptions about the opportunistic behaviour of traders?

4. Are there more (long-term) trust relationships between farmers and traders?

After this introduction, section 4.2 reviews the literature and provides a theoretical background. Section 4.3 discusses the methodology used in the chapter. Section 4.4 presents data on market outlets and market information. Section 4.5 discusses the results on transaction costs, trust perceptions, and relational contracting. Section 4.6 presents conclusions.

4.2   literature review and conceptual framework

An economy lacking well-functioning, government-provided legal institutions or organisations to protect property rights and enforce contracts needs to develop its own alternative modes of economic governance (Dixit 2004). One of those alternatives is self-enforcing governance through repeated interaction. By interacting with each other repeatedly, parties build up trust, lowering transaction costs and risks. If they value the future, then the prospect of a long-term collapse of the relationship can control the temptation to obtain a short-term gain. There is extensive literature on the role of long-term trust relationships through repeated action (Dasgupta 2009; Fehr et al. 1996; Greif 2005; Haji 2010; Fafchamps 2010; Dixit 2003).

Such relational contracting does not always develop automatically. Chapter three shows that only a very small fraction of farmers in Ethiopia's two main sesame producing areas have a long-term trust relationship with traders. Most farmers prefer to sell their sesame at different market outlets (at different times). On the one hand, farmers generally had little trust in traders. On the other hand, farmers who had more trust in traders tended to sell to more outlets. Both factors thus impeded relational contracting.

Dixit (2004) argues that relational contracting is not always possible, as many economic activities require dealing with different partners at different times. An alternative governance mode is the stable membership of a whole large group. Self-governance in such a group requires that if any one person cheats his current partner, the news is conveyed to others in the group who might be the cheater's future partner. Such reputational effects may deter opportunistic behaviour, but require good information networks and credible multilateral punishment strategies, which is only possible in a stable and cohesive group that is not too large. Self-governance (within communities) may therefore be infeasible when the community is too large or the information network and the system social norms and sanctions are too weak, and formal state law is unavailable, either because the state is too weak or lacks resources. These requirements do not always exist. For example, Fafchamps (2004) finds no evidence of reputational effects in various African markets.

Dixit (ibid) posits that a private arbitrator may provide a solution in such cases. This arbitrator may consist of a private individual or group who offers services for a fee to a group. Dixit proposes to think of this as a "private government" established to serve just this one function, as opposed to the broader institution we call the government, which performs a multitude of functions: "Even through the participants in the economic transactions may not meet the same partners repeatedly, each of them can have a repeated interaction with the person or organization that provides the governance, so an honest equilibrium of this kind is logically conceivable" (Dixit 2004, p. 13).

A commodity exchange may be seen as such a "private government", as commodity exchanges historically have served as private organisations that govern contractual relations between market participants. Their functions have included commodity measurement, contract enforcement, the policing of theft and fraud, and the mitigation of information asymmetries (Pirrong 1995a). The Ethiopian

Commodity Exchange, established in 2008 and obligatory for all sesame trade in 2010, aims to fulfil these functions. It aims to provide market information, increase transparency, and enforce contracts through the establishment of "Primary Transaction Centres" (PTCs) where farmers and (certified) traders meet and trade, and where price and quality information is given and certified weighing equipment is used. The conclusion is that the ECX can be seen as fulfilling an arbitrator's role in Ethiopia's sesame markets, reducing transaction costs and risks.

4.3   methodology

To measure the before and after situation in a more rigorous way, a panel dataset as well as a control group should be used; however, this was not possible. The same kebeles (villages) in two regions (West Tigray and East Wellega) were selected in 2009 and 2012, but different farmers were interviewed. Pooled cross-section data collected in 2009 and in 2012 is therefore used instead. In both surveys, farmers were selected randomly, and the combined dataset includes 2,132 farmers. A difference-in-difference type of assessment would need a control group, but there is no control group because all sesame farmers are more or less affected by the ECX. I use the two different regions to approach a difference-in-difference estimation; the kebeles in West Tigray are more affected by the ECX with the ECX warehouse close by in Humera, while the kebeles in East Wellega are less affected by the ECX with the ECX warehouse further away in Nekemte. Also, not all kebeles in East Wellega have a PTC. I assume that if there is an ECX warehouse close by, there will be better market information (ECX warehouses are directly linked to the ECX and have price tickers). Nonetheless, I have exercised caution in interpreting the results, as it is difficult to construct a counter-factual and to isolate the effects of the ECX from other possible influences (Shadish et al. 2002).

The villages in West Tigray and East Wellega are different in two main ways. The first difference is in the degree of specialisation. The farmers in West Tigray mostly specialise in sesame, as the agro-ecological environment does not allow much crop variety. Sesame is the main cash crop, in addition to which farmers cultivate staple cereals such as sorghum. The agro-ecological environment in East Wellega allows more variety, and farmers grow various crops, of which sesame is one. West Tigray farmers therefore may be seen as sesame specialists and are therefore more likely to be affected by the ECX and PTC. The second difference is

the proximity to the ECX and PTCs. Although the villages in West Tigray are located in the remote north-west corner of Ethiopia, they all have a PTC and are relatively close (7 km to 50 km) to the main ECX warehouse in Humera. By contrast, villages in East Wellega are located 20km to 75 km from the main ECX warehouse in Nekemte and only 4 out of 12 villages have a PTC located in the village. The expectation is that the ECX and linked PTCs have a larger effect on farmers in West Tigray than in East Wellega. I use the same methodology as in chapter five, comparing different indicators for the two years using t-tests.

To check whether distance to the main ECX warehouse has an effect on trust perceptions, I run a regression model controlling for other factors. Because trust perceptions are ordinal (with values 1 to 5), I have used an ordered logit model, which is more suitable than an ordered probit model. Ordered logit and probit models have come into fairly wide use as a framework for analysing ordered responses (Greene & Hensher 2010). A farmer's perception of traders is unobserved and represented by the latent variable B_i^*. To model how B_i^* varies with personal characteristics x_i linear relationship is specified:

$$B_i^* = x_i'\beta + \varepsilon_i \tag{1}$$

If it is assumed that ε_i is $NID(0,\sigma^2)$, the above setting corresponds to an ordered logit model, where B_i^* is a latent variable representing the ith individual's beliefs about traders, β is a vector of coefficients associated with selected explanatory variables, x is a matrix containing farmers' information for the selected variables, and ε is the error term. Because survey design was clustered (villages were randomly selected after which individuals were selected within these clusters), there may be village common effects. The option "cluster" was therefore used in Stata, with village (kebele) as the subgroup indicator, to produce standard errors which are corrected both for heteroskedasticity and the grouped structure (Deaton 1997).

4.4 data

4.4.1 market outlets

On average, farmers sold to fewer different marketing outlets in 2012, which is likely due to the fact they were required to sell at PTCs. They also changed the type of market outlets (table 7). In 2012, over half of farmers (55%) sold to PTCs.

Farmers could also sell directly to the ECX, but only if they were able to sell 50 quintals or more. In East Wellega 1% of farmers sold directly to the ECX, while in West Tigray this number was just below 9%. As a result of the mandatory PTCs, the number of farmers selling to collectors halved in 2012 (from 47.3% to 26%), which is a significant and large difference. It is notable that collectors are still being used, despite the fact that this is officially no longer allowed. On average, farmers sell less often to a local nearby or faraway market, although local markets are still the main market outlet. In East Wellega, more farmers sell to local markets, which is probably due to the fact that often PTCs are missing in their villages. Farmers indicate that they sell more often to cooperatives and in East Wellega slightly more often through contract farming (usually with an exporter). Exporters may circumvent the ECX if they own a farm, which they often combine with buying from neighbouring farmers through contract farming.

Farmers were also asked about their preferred marketing outlets. The three right-hand columns in table 7 show that, again, there are major regional differences, but the primary transaction centres set up by the ECX are generally not favoured by farmers in either region. Instead, farmers in East Wellega prefer to sell at local markets, which increased in number in 2012, while farmers in Tigray prefer to sell to cooperatives, which also increased in number in 2012.

Table 7: Market outlets used and preferred

	Market outlet used			Preferred market outlet		
	2009	2012	Difference	2009	2012	Difference
Primary Transaction Centre						
West Tigray		0.56			0.06	
East Wellega		0.53			0.11	
Collectors who visit farmers at home						
West Tigray	0.50	0.24	-0.26***	0.05	0.02	-0.03***
East Wellega	0.42	0.28	-0.14***	0.13	0.05	-0.08***
Local markets						
West Tigray	0.89	0.75	-0.14***	0.39	0.31	-0.08***
East Wellega	0.77	0.87	0.10***	0.23	0.46	0.23***
Faraway markets						
West Tigray	0.28	0.21	-0.07***	0.19	0.09	-0.1***
East Wellega	0.12	0.04	-0.08***	0.13	0.04	-0.09***

	Market outlet used			Preferred market outlet		
	2009	**2012**	**Diffe-rence**	**2009**	**2012**	**Difference**
Cooperatives						
West Tigray	0.47	0.75	0.29***	0.31	0.46	0.15***
East Wellega	0.07	0.20	0.13***	0.43	0.27	-0.16***
Contract farming						
West Tigray	0.05	0.05	0.01	0.03	0.05	0.03**
East Wellega	0.17	0.23	0.06**	0.05	0.06	0.01

Data shows share of farmers who answered yes
* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

4.4.2 market information

The ECX provides market information in various ways (David-Benz et al. 2011; Tadesse 2010). It publishes (high and low) daily market prices and amounts traded on the ECX for each grade and type of crop (coffee, maize, sesame, and white pea bean, for example) on its website. In addition, it has electronic billboards in 250 markets, linked to the prices of ECX. It provides a radio bulletin three times a day and a television bulletin twice a day. It disseminates information through newspapers and newsletters and has an SMS and IVM service for mobile phones.

Although progress has been made in getting Ethiopia connected in terms of telecommunications, it still lags behind many African countries. Mobile telecommunications grew from only almost 5% of the population in 2008–2009 to a little over 20% in 2011–2012. Even fewer people have a fixed telephone line, and this declined from 1.09% in 2008–2009 to 0.96% in 2011–2012. In 2008–2009 almost 0.1% of Ethiopia's population had an internet subscription, which grew to 0.26% in 2011–2012 (CSA 2012). Actual users are slightly higher: for 2012 it was calculated that almost 1.5% used the internet (ITU 2014). At the same time, although 85.2% of the urban population had access to electricity as of 2011, only 4.8% of the rural population did (REEGLE 2014). While most traders own a mobile phone, hardly any farmers have one.

Table 8 shows that on average farmers rated limited access to market information less of a problem than in 2009, although the decrease is not large. On a scale from 1 to 5, market information was still seen as a medium problem with an average score of 3.1. There is a marked difference between East Wellega and West Tigray: in West Tigray, farmers feel that the lack of market information has become

a larger problem, while in East Wellega farmers feel it has become a smaller problem, which is a counter-intuitive result, as the expectation was that market information would have improved more in West Tigray.

Table 8: t-test results for marketing problems

Woreda	2009	2012	Difference	
Limited access to market information				
All	3.45	3.15	-0.30	***
East Wellega	4.49	3.24	-1.26	***
West Tigray	2.78	3.05	0.28	***

Note: scores are 1 = very small problem to 5=very large problem
* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

To understand this counter-intuitive result, I delve a bit deeper into market information sources and needs of farmers. Table 9 shows what sources of market information farmers consulted in 2012 and how they rate the trustworthiness of this information (from 1 to 5).

Table 9: Source of market information per region (share of farmers who indicate they consult this source) and trustworthiness of information

	Source of information			Trustworthiness of information*		
	East Wellega	West Tigray	All	East Wellega	West Tigray	All
Family & friends	0.70	0.69	0.69	3.5	3.8	3.6
Neighbours	0.74	0.64	0.69	3.3	3.3	3.3
Radio	0.65	0.39	0.52	3.4	3.1	3.2
Local collector/trader	0.52	0.50	0.51	3.1	3.6	3.3
Traders in the city	0.17	0.49	0.33	2.4	3.0	2.7
Staff/board member of coop	0.24	0.25	0.25	2.4	3.0	2.7
News papers	0.07	0.36	0.21	1.9	2.9	2.4
ECX market info	0.06	0.31	0.18	1.8	2.8	2.3
Local official & leaders	0.12	0.17	0.14	2.9	3.5	3.2

Data shows share of farmers who said yes
* 1 = not trustworthy; 5 = very trustworthy

Most farmers still rely on family, friends, and neighbours for their main source of information. They also rate the information from family and friends

relatively highly. Interestingly, farmers in West Tigray rate the information received from local collectors and traders as fairly trustworthy as well (second highest score). The ECX does not score highly, despite its aim to be the go-to price information system. Farmers were also asked to rank the importance of information source. Family, friends, and neighbours were ranked highest, while the ECX was ranked lowest, also in West Tigray, where farmers rated the trustworthiness of ECX market information as relatively high. This means that market information from the ECX is not readily available or accessible.

Table 10 shows the different types of market information farmers search for. Again, there are various differences between the regions.

Table 10: Types of market information searched for by farmers (share of farmers)

	East Wellega	West Tigray	All
Getting to know different buyers in market	0.72	0.46	0.59
Quality standard	0.59	0.51	0.55
Daily prices at farm gate	0.83	0.24	0.54
Daily prices at market	0.51	0.31	0.41
Decision to grow sesame	0.15	0.63	0.39
Market trends	0.26	0.50	0.38

Data shows share of farmers who said yes

In East Wellega, farmers are mostly interested in daily (farm-gate and market) prices, and getting to know different buyers in the market. By contrast, in West Tigray, farmers are less interested in prices and seek information that will help them decide whether and how much sesame to grow, which is in line with the fact that farmers in West Tigray specialise in sesame cultivation.

On average, information on quality standards rank second in table 10 (and higher than price information). The survey data also show that farmers feel they have better information on quality standards. In 2009, 78% of farmers in West Tigray indicated they had a lack of information on quality (in 2012 this was 51%). In East Wellega, the share of farmers declined from 80% to 41%. Not only do farmers state that they have better information on quality, they also indicate that traders' behaviour has changed. Traders more often take into account quality when offering a price: in West Tigray, all farmers stated in 2012 that quality is taken into account (up from 60% in 2009) while 86% of farmers in East Wellega stated the same (up from 43%). Both results are significant in a t-test (at 1% significance

level). This suggests that market transparency with respect to quality standards has increased substantially, which is an important result, as lack of good quality sesame was seen as a major problem for many years (Mheen-Sluijer & Cecchi 2011; Gelalcha 2009; Wijnands et al. 2009).

With respect to quantity, transparency seems to have improved as well. Farmers indicate that traders more often take into account quantity when offering a price. In West Tigray, 99% of farmers indicated this was the case in 2012, up from a mere 1.1% in 2009. In East Wellega, the share of farmers stating this increased from 20% to 71%. both differences are significant at the 1% level when tested with a t-test.

4.5   results

The data section reveals that around half of the farmers sell their sesame to the PTCs, where quality standards and certified weighing equipment are enforced, although farmers feel that price information has not improved much. This section explores whether transaction costs, trust perceptions, and relational contracting have improved as well.

4.5.1   transaction costs

As expected, transaction costs have decreased significantly (Table 11). A notable difference is that the time it takes to discuss price, quality etc. with traders has almost halved. On average, the transaction costs have decreased with 23%, or 24 minutes per transaction. One notable exception is that for farmers in West Tigray the time to meet a buyer has not decreased significantly; apparently the farmers in West Tigray were already well-connected to traders and markets.

Table 11: t-test results for transaction costs (in minutes)

	2009	2012	Difference	
Meeting the buyer				
All	60.10	51.03	-9.07	***
West Tigray	48.75	47.31	-1.45	
East Wellega	80.68	54.60	-26.08	***

	2009	2012	Difference	
Discussing price, quality etc. with trader				
All	16.05	8.70	-7.35	***
West Tigray	15.40	10.80	-4.60	***
East Wellega	17.21	6.67	-10.55	***
Inspecting sesame				
All	11.67	7.51	-4.16	***
West Tigray	12.30	9.65	-2.65	***
East Wellega	10.53	5.46	-5.07	***
Weighing				
All	8.77	6.70	-2.07	***
West Tigray	9.82	8.82	-1.00	*
East Wellega	6.85	4.66	-2.20	***
Payment				
All	7.53	5.41	-2.12	***
West Tigray	8.72	6.47	-2.25	***
East Wellega	5.36	4.39	-0.98	

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

4.5.2   trust perceptions

This chapter hypothesised that the ECX as an "honest broker" would increase farmers' trust perceptions of traders. Table 12 seems to confirm this hypothesis. On average, the trust perceptions for the potentially different types of opportunistic behaviour (using faulty scales, not providing correct price or market information, colluding to keep prices down) have all improved. The largest improvement is in "honesty with scales", signifying that the required used of certified scales by traders has had an effect. Trust perceptions have improved more in West Tigray than in East Wellega.

Table 12: t-tests for average trust perceptions in 2009 and 2012

	2009	2012	Difference	
Honesty with scales				
All	1.95	2.81	0.86	***
West Tigray	1.96	3.43	1.47	***
East Wellega	1.93	2.21	0.28	***

	2009	2012	Difference	
Price information				
All	1.86	2.54	0.68	***
West Tigray	1.99	3.03	1.04	***
East Wellega	1.63	2.06	0.43	***
Market information				
All	2.05	2.75	0.70	***
West Tigray	2.32	3.14	0.82	***
East Wellega	2.26	2.53	0.27	***
Buyers collusion				
All	2.30	2.83	0.53	***
West Tigray	2.21	2.99	0.78	***
East Wellega	1.74	2.52	0.78	***

Note: scores are 1 = very low trust to 5=very high trust

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

Figure 15 shows the distribution of trust perceptions: the most marked difference is that the proportion of farmers who have very negative perceptions (around score 1) has decreased most.

Figure 15: Trust perceptions of farmers about traders' opportunistic behaviour (averaged)
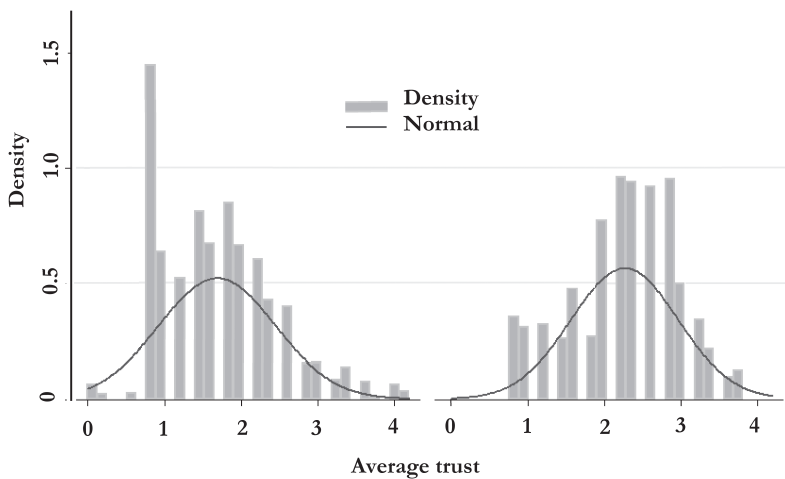
Note: 0= not available; 1 = very low trust, 5 = very high trust. Averages were taken of scores on "honesty with scales", "giving price information", "buyers' collusion" and "giving market information".

An ordered logit was conducted to test whether other factors such as personal characteristics contribute to trust perceptions. The results in table 13 show

that year is positively and significantly linked to higher trust perceptions. Distance from a PTC is significantly and negatively correlated with trust perceptions, as was also found in chapter three. With regard to personal characteristics, female farmers have a more positive outlook on traders' behaviour, as do older traders. Marital status (compared to married) is correlated with different trust perceptions. It is not clear why this effect exists.

Table 13: Ordered logit models for trust perceptions in 2012, controlling for personal characteristics (clustered by kebele)

Variable	Honesty with scales		Giving price information		Buyers collusion		Giving market information	
Year	0.429	***	0.422	***	0.266	***	0.367	***
	(0.071)		(0.056)		(0.059)		(0.045)	
Distance from PTC	-0.009	*	-0.014	**	-0.006	*	-0.009	*
	(0.005)		(0.006)		(0.003)		(0.005)	
Personal characteristics								
Gender	0.398	***	0.444	***	0.312	*	0.110	
(1=female)	(0.126)		(0.155)		(0.159)		(0.107)	
Age	0.013	**	0.021	***	0.013	***	0.016	***
	(0.006)		(0.006)		(0.005)		(0.004)	
Education	0.008		-0.002		0.028		0.003	
	(0.017)		(0.018)		(0.012)		(0.020)	
Marital status								
Divorced	0.004		0.225		0.446	***	0.715	***
	(0.139)		(0.217)		(0.117)		(0.241)	
Separated	0.351		-0.347		0.363		0.457	
	(0.798)		(0.431)		(0.450)		(0.391)	
Single	-0.658	**	-0.358		0.424		0.150	
	(0.264)		(0.279)		(0.209)		(0.254)	
Widower	0.017		-0.018		0.043		0.079	
	(0.156)		(0.097)		(0.221)		(0.175)	
/cut1	862.152		848.800		535.805		737.661	
	(141.685)		(112.917)		(118.935)		(91.269)	
/cut2	862.864		849.942		536.676		738.453	
	(141.684)		(112.949)		(118.972)		(91.271)	
/cut3	864.009		851.312		538.019		739.674	
	(141.808)		(113.068)		(119.075)		(91.274)	
/cut4	865.000		852.456		539.367		740.955	
	(141.901)		(113.163)		(119.129)		(91.292)	

* $p < 0.10$ ** $p < 0.05$ *** $p<0.001$, standard errors in parentheses

4.5.3 relational contracting

Table 14 shows that there are some signs that relational contracting is increasing in West Tigray and East Wellega, albeit slightly, with the largest shift in West Tigray.

Part of the explanation may lie in the fact that only licenced traders may buy from farmers in the PTCs, reducing the number of traders, especially collectors who used to buy directly at the farm. This is indicated by the answer "there are always the same traders in the market". However, farmers who sell to the same trader also indicate it is not only by necessity, but also because they trust particular traders, who offer them a good price, and with whom they have started a (long-term) relationship. Fewer farmers in West Tigray observe that traders are coming at different times, although not in East Wellega. More farmers feel that they have a choice in selecting which trader to sell to, and that it does matter which trader you sell to. For slightly more farmers, the price traders offer is the reason to sell to different farmers.

Table 14: Reasons for selling to the same trader or different traders

	2009	2012	Difference	
Farmers sell sesame to same trader or different (1=same 2=different)				
West Tigray	1.91	1.64	-0.27	***
East Wellega	1.93	1.89	-0.04	**
Reasons for selling to the same trader:				
Always the same traders in the market				
West Tigray	0.05	0.16	0.11	***
East Wellega	0.01	0.03	0.02	**
I trust the trader				
West Tigray	0.04	0.13	0.09	***
East Wellega	0.06	0.08	0.02	
Trader gives me a good price				
West Tigray	0.04	0.25	0.21	***
East Wellega	0.04	0.05	0.01	
I have a (long-term) relationship				
West Tigray	0.05	0.17	0.12	***
East Wellega	0.06	0.09	0.03	
Reasons for selling to different traders				
Traders come at different times				
West Tigray	0.78	0.52	-0.26	***
East Wellega	0.30	0.47	0.17	***
I sell to the one who offers me a good price				
West Tigray	0.93	0.94	0.01	***
East Wellega	0.88	0.94	0.06	**
It does not matter which trader you sell to				
West Tigray	0.66	0.23	-0.43	***
East Wellega	0.91	0.42	-0.49	***
Farmer has no choice which trader to sell to				
West Tigray	0.41	0.16	-0.26	***
East Wellega	0.36	0.08	-0.28	***

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

As trust is important in extending and receiving credit, it is noteworthy that the survey also indicates that an increasing number of farmers received credit from traders. In 2012, 30% and 26% of farmers in West Tigray and East Wellega respectively had received credit, up from 8% and 5% of farmers in 2009.

4.5.4   attribution

The results should be interpreted with some care, as there may be several attribution problems. Other factors may have influenced the results but are difficult to determine without a counterfactual at hand or a proper control group. A study by Minten et al. (2014) on structural transformation in cereal markets in Ethiopia may serve as a comparison. Cereal markets are not impacted by the ECX. Although officially maize and wheat may be traded on the ECX, the trade of these products has virtually stopped d; unlike coffee or sesame, the ECX has not been made mandatory.

Minten et al. (2014) find that the use of mobile phones by intermediaries (e.g. brokers) and traders has increased to almost 100%. Although telephone communications through fixed lines existed prior to the introduction of mobile phones, Minten et al. find that mobile phone technology has improved the ease of access to communications. This must have had an impact on the availability of market information. However, most farmers in Ethiopia, especially small farmers in remote rural areas, still lack telephones, fixed or mobile (CSA). This unequal distribution should lead to an increase in asymmetric problems, potentially increasing farmers' negative perceptions of traders. Minten et al. report that farmers have better market information, presumably from primary transaction centres.

With respect to transport costs and time, they report that the Ethiopian government has embarked on a large road investment programme, and as a result all-weather surfaced roads are either in the process of being built or have already been built between the capitals of all regions. However, the rate of progress between 2009 and 2012 is not that significant. In an earlier paper Minten et al. (2012b) report on the time required to travel by truck between wholesale markets and Addis Ababa; although this has decreased in a decade from on average 10 to 8 hours, between 2009 and 2011 it has remained stable. The number and capacity of trucks has increased, contributing to better transport of goods. More larger trucks (FSR; able to carry about 7–8 tonnes) compared to smaller ones (Isuzu; carrying

4

about 5–6 tonnes) are being used. However, the difference between 2009 and 2012 is not very large (approximately 5% more large trucks).

Minten et al. (2014) find there has been a marked improvement in market integration (i.e. the degree to which cereal prices move together across markets throughout Ethiopia) over the past decade: in the aggregate, 33% more markets were integrated in 2011 than in 2001. Even though this is a real improvement, it does not mean there has been a marked improvement between 2009 and 2012. In addition, Minten et al. (2012b) report that while spatial margins have on average declined over time between markets, these differences between markets still vary significantly. I conclude therefore that the change in market integration and price variability has not changed significantly enough between 2009 and 2012 to make a large difference to farmers.

4.6   discussion and conclusions

Chapter three argues that without reliable price information, which could function as a "yardstick" to assess traders' trustworthiness, farmers will generally distrust traders. It was expected that if reliable price information was to be made available, and more generally, if market transparency would be improved, farmers' trust perceptions of traders would improve. The results seem to contradict this expectation: farmers in West Tigray believe that price information has deteriorated, yet have significantly improved their perceptions of traders. The reverse is true in most of East Wellega, where farmers state that price information has improved, yet their perceptions of traders' trustworthiness have not improved as much.

Delving a bit deeper into this apparent paradox, two things become clear. First, farmers in different locations seek different types of market information, and the market price is not always the most important. Farmers in West Tigray specialise in sesame and for them information that will help them decide how much sesame to cultivate is much more important. Second, most farmers do not use the information provided by the ECX (through PTCs). Nor do they rate the reliability of the information very highly either. This may be due to the fact that the ECX relies heavily on mobile phones and internet, which most farmers lack. It does convey market information at main ECX sites, such as Humera and Nekemte, but this is not very convenient for farmers. The market information system of the ECX

may therefore not yet function as a "yardstick" that farmers can use to assess the trustworthiness of traders.

However, market information is only one, albeit an important, element of market transparency. The results show that market transparency also increased in terms of quality grades and weighing equipment, more in West Tigray than in East Wellega, as expected. This seems to have led to lower transaction costs: farmers indicate that they spent less time discussing the price and quality of sesame, and less time inspecting and weighing. Therefore, farmers are not necessarily using price information as a "yardstick" to assess traders, but instead may be using the increased market transparency as a yardstick, and as a result have improved their trust perceptions of traders.

There may be a second effect of market transparency, also hypothesised in chapter three, that it makes traders behave less opportunistic (though we should be careful in putting too much weight on "opportunistic"). It may be that traders did not take into account quality grades and used weighing equipment because they themselves did not know, or lacked the proper facilities. This corresponds with findings by Cecchi and Melesse (2014) on formal and informal (customary) dispute resolution institutions in Ethiopia. Although few participants use the formal dispute resolution institution, the fact that participants have this option already shifts pre-existing norms linked to customary dispute resolution institutions (see also Aldashev et al. 2012b; Aldashev et al. 2012a).

A surprising result therefore is that although the PTCs seem to provide benefits in terms of market transparency and decreased transaction costs, farmers indicate that the PTCs are their least favoured market outlet. The survey results offer no clues why this is the case, nor did informal discussions clarify this. The mandatory character of the PTCs, as well as the fact that they are government run, may be part of the reason. Past experiences, especially under the Derg regime, have tarnished farmers' confidence in government-run organisations such as cooperatives (see for instance Francesconi & Heerink 2011; Rahmato 2002; Spielman et al. 2009). This is clearly an area for further research.

Increased market transparency combined with improvements in traders' behaviour seem to have changed relations between farmers and traders. Slightly more farmers indicate that they are establishing (long-term) trust relationships with traders, and many more farmers are obtaining credit from traders.

4

CHAPTER 5

formal institutions and social capital in value chains

abstract

We explore whether the creation of the ECX and its formal monitoring and enforcement institutions has affected the role of social capital and trust in the Ethiopian segment of the sesame value chain. Consistent with a simple theoretical marketing model, the panel data suggest that this is indeed the case. Trade in sesame is increasingly governed by formal rather than informal institutions, and in response traders appear to have broadened their trading network, relying more frequently on traders with whom they do not have social relations, and they have reduced the provision of credit that cements personalised relationships. They also have lower levels of trust in the intentions and capabilities of their trading partners, and attach less weight to trust. Policy-makers should therefore be aware that expanding formal institutions may invite the erosion of norms and informal rules in the same or adjacent domains of human interaction (possibly with ambiguous welfare implications).

5.1   introduction

The quality of institutions, broadly defined, is widely regarded as a key determinant of economic performance. There is little consensus about which specific dimensions of the institutional framework matter most for development, and even less about the mechanisms driving institutional change over time (but see Kingston & Caballero 2009). The institutional framework is broad, encompassing formal and informal institutions. The distinction between formal and informal institutions is akin to the distinction between the formal and informal economy (e.g., Hart 1973), which ultimately revolves around whether or not economic activities are beyond the purview of the state (Habib-Mintz 2009 for a discussion of the evolution of thinking about informality). In the words of Roberts (1994, p. 8): "all markets are regulated ... the issue is the balance between formal regulation based, ultimately, on the state, and informal regulation based on personal relations such as those of kinship, friendship or co-ethnicity". As explained in chapter one, formal institutions are centrally designed and enforced, and informal ones are subject to self-governance by economic agents (Dixit 2004; Williamson 2009). Thus defined, formal and informal institutions co-exist in all economies. It is increasingly recognised that the nature of the interaction between formal and informal institutions matters for economic outcomes (e.g. Boettke et al. 2008; Williamson 2009). Formal and informal institutions may provide substitute mechanisms to govern (economic) transactions. If so, an exogenous expansion of the realm of formal institutions may have implications for informal arrangements, and the type of game-theoretic equilibria that can be sustained. Caselli (1997) and Dixit (2004) have demonstrated that this may have unforeseen welfare consequences.

Commodity exchanges are one particular "type" of formal institution that has gained prominence in African policy circles. While African agricultural markets have become increasingly liberalised, resulting in greater private investment and increased levels of regional trade and market integration (Mason et al. 2011; Smale et al. 2011), price volatility of food staples remains high and traditional forms of exchange still involve relatively high transaction costs (Sitko & Jayne 2012). Such marketing challenges may be tackled via commodity exchanges – platforms that bring together buyers and suppliers. According to Gabre-Madhin and Goggin (2005), commodity exchanges stimulate market transparency and price discovery, and attenuate collusion, (speculative) bubbles, and price volatility. They may also lower transaction costs by increasing the range of trading partners, by providing

monitoring and enforcement of standards and contracts, and by tackling conflicts via arbitration services (Sitko & Jayne 2012). In light of these expected benefits, it is no surprise that donors and national governments are promoting and facilitating the emergence of commodity exchanges across the African continent (albeit with mixed results, see Sitko & Jayne 2012).

In this chapter, we examine the effects of the emergence of a commodity exchange on informal marketing institutions.[27] Specifically, we explore how the ECX affected the structure of the sesame supply chain within Ethiopia, and probe the consequences for transaction patterns and trust within this chain. Broadly speaking, we analyse how the emergence of a formal trading structure affects various measures of structural and cognitive social capital within the sesame trade sector (key components of informal institutions governing the domestic trade in sesame). To guide the analysis, we present a theoretical model proposed by Ahlerup et al. (2009), which arrives at the testable hypothesis that social capital and formal institutions are substitutes to guide economic behaviour. Earlier studies of social capital in Africa confirm the important economic role of social capital in early stages of development, supporting the view that social capital matters most when formal institutions are weak (e.g. Narayan & Pritchett 1999; Bigsten et al. 2000; Fafchamps & Minten 2002; Stiglitz 2001; see also chapter one). In the empirical analysis we ask whether the expansion of a formal institution – the creation of the ECX – has substituted for informal institutions.

This chapter is organised as follows. In section 5.2 we provide background information about the main differences of the "before and after" situation of the ECX. In section 5.3 we sketch a simple model highlighting the effect of formal on informal marketing institutions, and derive several testable hypotheses. Most importantly, since formal and informal institutions provide substitute mechanisms to govern the flow of sesame from producer to exporter, the model predicts that the ECX will substitute for social capital in the trading sector. In section 5.4 we introduce the data and discuss the methodology. We use a simple identification strategy, based on a comparison of pre- and post-ECX characteristics combined with differences in exposure to the ECX for different types of traders. Results are provided in section 5.5, supporting the view that the creation of the ECX and its

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[27] Informal institutions may, of course, also have an effect on formal institutions; informal institutions may affect the way the formal rules linked to the Ethiopian Commodity Exchange are applied. However, this is not the focus of this chapter.

monitoring and enforcement apparatus has reduced the role of social capital in the sesame value chain – consistent with the idea of formal institutions substituting informal ones. Section 5.6 presents the robustness analysis and section 5.7 presents conclusions.

5.2   sesame trade before and after the ecx

Chapter two provides detailed background information on the ECX. In this section, we review the main differences of the "before and after the ECX" situation in the sesame trade, which is used in this paper. Before the ECX was created, farmers would typically sell to (visiting) traders. These traders "bulked" sesame into larger quantities for selling at larger regional wholesale markets, in Addis Ababa, or directly to exporters. Large farmers could also sell to cooperatives or exporters. In 2010, after the government of Ethiopia decreed that "any person involved in sesame transactions shall effect sesame transaction only at primary transaction centres (PTCs) and the Ethiopian Commodity Exchange" (Government of Ethiopia 2010), buying or selling sesame directly from farmers became illegal. Farmers must now sell at a PTC and traders must buy at a PTC. A PTC is a fenced location with certified scales, a market information board, and local inspectors certifying goods traded at the PTC.

In the ECX contracts for sesame, quality is measured by foreign matter (impurities) colour contrast. In pre-ECX days, prices were mainly based on quantity, and farmers and traders blended different seed types. This decreased the overall quality and value of the seeds. The ECX was supposed to improve sesame quality by grading at warehouses, but various observers have noted that the actual quality of sesame may bear little resemblance to grades accorded by the ECX (Coulter 2012; Van den Broek 2012). There are rumours that traders can bribe grading officials to upgrade their produce, so that low-grade sesame is delivered to traders who paid for a higher grade.

The very short supply season (November to January) invites the involvement of various agents in sesame marketing. Broadly speaking, two categories of sesame trader exist in Ethiopia: (i) those who buy and sell on their own account (wholesalers, assemblers, suppliers, and exporters) and (ii) those who perform an intermediary function and are contracted by the first category of traders (selling or buying agents and brokers). Buying and selling agents differ from

brokers because their remuneration depends on price margins; they may run a price risk. With the establishment of the ECX, brokers were obliged to be officially registered with the ECX, which greatly reduced their numbers.

For this study, we interviewed buying and selling traders and have not included intermediaries. More specifically, in what follows we distinguish between exporters and other traders (wholesalers, assemblers, and suppliers). The reason for this distinction is that exporters trade fully *within* the ECX system – buying sesame deposited at an ECX warehouse and selling to foreign importers (see figure 16, which also illustrates the sesame trade before the introduction of the ECX). In contrast, other traders have one foot in the ECX system and the other one in the traditional system. That is, they trade with ECX warehouses, but may also buy from other traders (and sometimes farmers) or sell to other traders. Such transactions are arguably still governed by informal institutions, hence we speculate that "other traders" are less affected by the formal institutions of the ECX than exporters. We return to this issue in section 5.4.

Figure 16: Stylised representation of the before–after establishment of the ECX
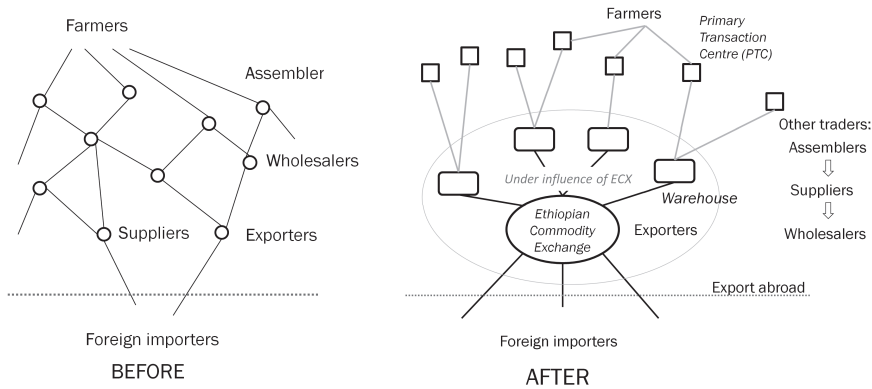
5.3   a theoretical model

In this section, we sketch a simple model that shows the interaction between social capital (and trust) and formal institutions in the process of value generation within the (sesame) value chain. This model is based on Ahlerup et al. (2009), but rather than analysing how an exogenous change in the level of social capital affects economic performance (and specifically how this impact is mediated by the quality of formal institutions – as in Ahlerup et al. 2009), we seek to examine the impact of a shock in terms of the quality of formal institutions, such as the sudden provision

of arbitrage, monitoring, and enforcement services via the ECX. We use the term shock in this case because the ECX became mandatory overnight in September 2010, when the Ethiopian government mandated that all sesame destined for export be traded across the exchange floor.

We closely follow the model of Ahlerup et al. (2009), using the same sequential, principal agent supply game with a representative supplier (S) and demander (D), and an outside agency that may be accessed for arbitrage services (A). The model is simple in that we ignore outside options beyond the trade opportunity analysed in the game, and reputation effects or other dynamic effects do not play a role. The stages of the game are depicted in figure 17.

Figure 17: The extensive form of the principal agent supply game
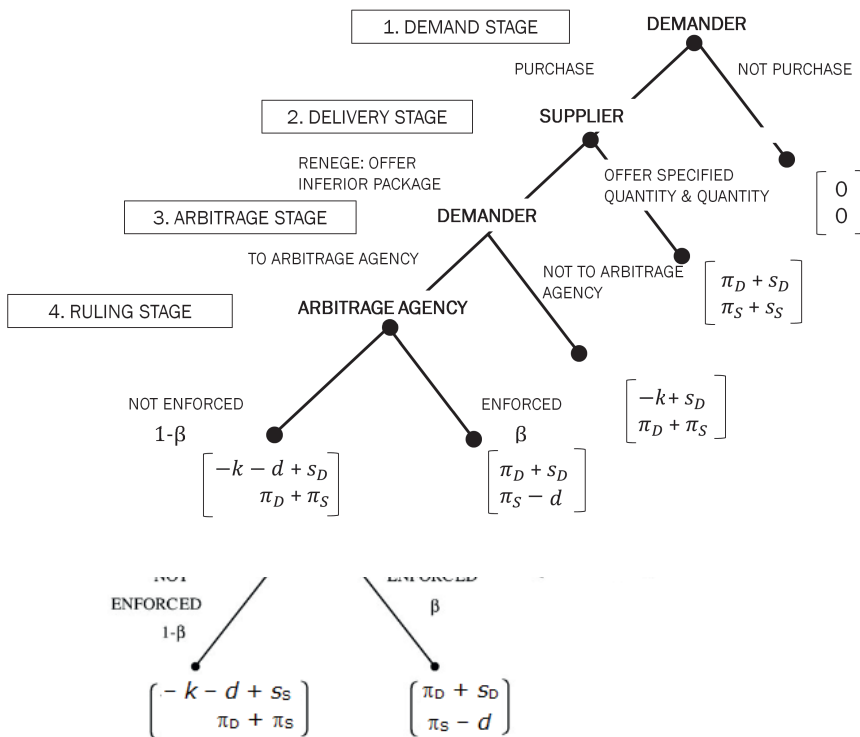
In the demand stage, the demander decides whether or not to purchase a certain quantity, valued at k, of the commodity (sesame) that is traded. If the demander chooses not to purchase the sesame the game ends, and payoffs for both parties equal zero:

$u_D = u_S = 0$. In case the demander decides to purchase the sesame valued at k, the game enters the delivery stage.

In the delivery stage, the supplier decides whether to offer the specified quantity and quality of sesame, or to renege and offer an inferior package. In the former case, payoffs are defined as follows: $u_D = \pi_D + s_D$ and $u_S = \pi_S + s_S$. In these expressions, π_i denotes the standard gains from trade for agent i and s_i denotes a non-monetary social benefit associated with being an honest trader (where i = S,D). This is a social reward, or moral satisfaction stemming from generalised trust and trustworthiness, and is associated with the level of social capital (see below). We may think of s_i not as an innate characteristic of traders, but as a payoff that is specific to pairs of traders, conditional on prior experiences (i.e. as a function of past "investments"). That is, within a round of the game, s_i may be treated as a parameter, but across rounds these social rewards may change, becoming more or less important (something we do not model explicitly here, but discuss below). Obviously, $s_i, \pi_i > 0$. The socially optimal outcome of honest trade does not eventuate, however, when the supplier reneges. In that case the game enters the arbitrage stage.

In the arbitrage stage, the demander decides whether to take the supplier to an arbitrage agency to enforce the initial contract, or not. If the demander accepts the inferior package without accessing arbitrage, the payoffs are defined as follows: $u_D = -k + s_D$ and $u_S = \pi_D + \pi_S$. In words, if the demander accepts the package he foregoes the full value of the sesame. Hence, without loss, we assume here the value of the inferior package that was offered equals zero; the analysis is easily augmented to capture the case where the value of the inferior package equals αk, so that the loss for the demander is only $(1-\alpha)k$. The demander retains the social reward from being an honest trader. The supplier in this case captures the full benefit from the trade, but of course does not enjoy the non-monetary social reward ($s_S = 0$). In contrast, when the demander decides to seek arbitrage, the game enters the ruling stage.

In the ruling stage, the arbitrage agency rules in favour of the demander, or not. The exogenous probability of enforcing the contract, or a measure of the quality of formal institutions in what follows, is given by β. In case the agency supports the demander, and enforces the initial contract, the payoffs are defined as $u_D = \pi_D + s_D$ and $u_S = \pi_S - d$. In words, the demander is fully compensated, and in addition enjoys the social reward. The supplier enjoys the regular benefit from

trade, but has to pay a fine d, which is the cost of running the arbitrage case. With probability $(1-\beta)$ the arbitrage agency does not rule in favour of the demander, in which case the demander pays the fee so that payoffs are defined as: $u_D = -k - d + s_S$ and $u_S = \pi_D + \pi_S$.

With these payoffs, the optimal strategies for the agents are readily derived. The sub-game perfect Nash equilibrium of the game, and associated best response strategies, are described as follows.

In the demand stage, the demander should demand if any of the following three conditions is satisfied: (1) $L = s_D + \beta(\pi_D + k + d) - k - d \geq 0$, (2) $s_D - k \geq 0$, or (3) producer will be honest. If none of these conditions is satisfied, the demander should not purchase any sesame. Note that high levels of social capital, represented by large realisations of s_D, are conducive to trade. The same is true for the quality of formal institutions, β, or the probability that deviations from honest behaviour will be punished by the arbitrage agency down the line – s_D and β are substitute mechanisms to increase the probability of engaging in trade.

In the delivery stage, the producer should be honest if $F = s_S + \beta(\pi_D + d) - \pi_D \geq 0$. Otherwise he should renege and offer the inferior package. Social capital, here entering via the term s_S, again is conducive to honest trade, and so is the formal institutions parameter β. Social capital and formal institutions are substitute mechanisms to discipline potentially cheating suppliers.

In the arbitrage stage, the demander should not seek arbitrage services if both $s_D - k \geq 0$ and $\beta(\pi_D + k + d) - d \leq 0$. Else he should seek arbitrage.

We can use this model to probe the consequences of an exogenous shock in the quality of institutions (β), such as due to the new arbitrage and enforcement services made available by the ECX. Examining the optimal responses in the demand and delivery stage, it is obvious that raising β increases the probability of honest trading behaviour: $\partial L/\partial \beta > 0$ and $\partial F/\partial \beta > 0$. The probability that improving enforcement arbitrage "tilts" the balance such that the equilibrium outcome of the game switches from no trade (or reneging) to honest trade is decreasing in the level of social capital. By design, formal institutions and social capital provide substitute mechanisms to foster honest behaviour. For sufficiently large values of social capital, relative to monetary payoff parameters k, d and π_D, improving the quality of formal institutions does not matter (i.e. both $L>0$ and $F>0$, even for really low values of β).

If formal institutions are poor or absent (i.e., $\beta \approx 0$), trade will not occur unless social capital levels are sufficiently high. In the formal institutional vacuum of the pre-ECX era, trade beyond the "flea-market" or cash-and-carry types of exchange could only occur in the presence of trustworthiness and social rewards (s_i). Maintaining trust and trustworthiness requires investment in social relations, as was documented for the case of Ethiopian sesame trading by Cecchi and Bulte (2013). It also poses natural limits on the expansion of trade levels and trade will only occur within a small circle of trustworthiness (see Tabellini (2008) for a formal treatment of "distance" as a factor explaining trustworthy behaviour). However, the availability of formal arbitrage conditions ($\beta > 0$) alters the rules of the game, enabling the transition from personalised to anonymous exchange within a broad set of (potential) "strangers".

This has two types of implications for the role of social capital in governing exchange, and on the equilibrium level of social capital in the value chain. First, formal institutions enable transacting between traders that heretofore would never engage in trade (because of low levels of trust and associated social rewards), so new trading pairs with low levels of s_i enter the market. Second, and somewhat beyond the simple model sketched above, the availability of formal enforcement reduces the importance of social capital, potentially rendering on-going investments in social capital redundant. If so, social capital erodes or s_i falls, even among pre-existing trading pairs. A new equilibrium emerges characterised by more trading pairs but, on average, lower levels of social capital between interacting parties. Formal institutions will gradually substitute for informal ones.[28]

In what follows, we try to test this hypothesis using various proxies of social capital among sesame traders in Ethiopia, collected before and after the introduction of the ECX.

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[28] The model presented here explains how social capital and formal institutions are substitutes in promoting honest trade. This is an artefact of the way the model has been developed – more complex specifications of the model can be envisaged, including ones where formal enforcement and social capital may be complements. For example, one may develop a model where socially-based exchanges serve as the basis for formally-based exchanges, or where the quality of formal enforcement depends on its mapping on existing informal institutions (as in Williamson, 2009). In the latter case, formal enforcement β enters as a function $\beta(s)$, with $\beta`(s) > 0$.

5.4   data and methodology

5.4.1   data

We collected data during interviews with sesame traders in 2010 and 2012 – just before and after the introduction of the ECX. There are inherent (practical) difficulties in interviewing traders in developing countries (e.g. Barrett 1988; Scott 1995). Traders are often mobile, and may be reluctant to disclose information about their turnover and profits. Moreover, a complete list of traders (the sampling frame) usually is not available – and it was not available for the population of Ethiopian sesame traders. Hence we could not select a random subsample of traders for the interviews. Instead, we visited 41 markets in 5 sesame producing regions (Gonder, Humera, Metema, Nekemte, and Addis Ababa), and tried to interview all traders present. To avoid selection bias (e.g. certain traders are only present at certain times of the day) we tried to visit most markets at different times of the day (morning, afternoon, and evening). Overall, 70% of the traders participated in the survey. An overview, broken down by type, of the participating traders is provided in the top panel of table 15. We also report information on the subsample of traders for which we have been able to collect data during both rounds of interviewing (the "panel subsample").

Total participation in the first (second) survey amounted to 194 (196) traders, and the panel subsample amounts to 105 traders. We believe this constitutes a representative sample of traders in Ethiopia's sesame markets. While the total number of sesame traders is unknown (there is no trading license specifically for sesame), we know there are around 80 sesame exporters in Ethiopia. No less than 45 of them are contained in the sample. Moreover, the sum of Ethiopian sesame production for 2010 and 2012 was about 450,000 tonnes. Aggregating across individuals and survey years, the traders in the sample traded almost 300,000 tonnes. This amount almost certainly includes some double-counting (as the same quantity of sesame may be sold more than once along the value chain), so we cannot conclude that the sample covers 70% of total production. But these statistics do suggest that we cover a sizeable share of total sesame production (even if the size of the trader sample is small, also see Loveridge (1995)).

Table 15: Characteristics of traders in the 2010 and 2012 surveys and in panel data

	All traders				Traders in panel (2010 and 2012)	
	2010		2012			
Type of trader	**n**	**%**	**n**	**%**	**n**	**%**
Exporter	75	38.7	45	23.0	30	28.6
Wholesaler	71	36.6	80	40.8	51	48.6
Supplier	14	7.2	7	3.6	6	5.7
Assembler	18	9.3	52	26.5	14	13.3
Other type of trader	16	8.2	13	6.6	4	3.8
Demographic variables	**2010**		**2012**		**2010**	**2012**
Age of traders (in years)	40.63		39.07		39.73	40.11
	(8.81)		(7.75)		(8.46)	(8.46)
Female traders (proportion)	0.088		0.038		0.052	0.038
Education (proportion)						
- Illiterate	0.31		0.12		0.20	0.20
- Primary/secondary school	0.37		0.41		0.35	0.35
- Third grade	0.33		0.47		0.45	0.45
Age of firm	10.37		7.476		7.64	9.34
	(8.60)		(4.91)		(4.77)	(6.54)
Sesame trade-related variables						
Quantity purchased	1808.74		2474.16		1889.84	3213.29
	(3070.58)		(14837.13)		(3912.55)	(19463.97)
Purchase price	1541.81		1700.93		1568.31	1692.69
	(277.24)		(196.98)		(334.96)	(229.30)
Quantity sold	1652.78		1381.62		1511.32	1552.86
	(1760.22)		(2232.39)		(1839.51)	(2376.83)
Selling price	1614.12		1896.61		1587.84	1885.60
	(304.77)		(273.68)		(302.59)	(295.47)

2010 survey: N=194; 2012 survey: N=196; Panel data: N=105

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

In terms of demographics, the population of traders has not changed much (table 15). A small share of the traders in the sample is female (around 4%), and this percentage has decreased somewhat. Traders in the 2012 survey are on average two years younger than those in the 2010 survey (39 and 41 years, respectively, p-value = 0.008). There are fewer illiterate traders and more traders with a third grade education (after secondary school). The average time the trader has been in business (age of firm) is around three years shorter than in 2010. These shifts seem to indicate that the ECX has made the sesame business more demanding, leading to a small exit of illiterate, female and older traders. We have also included some variables about involvement in the sesame trade, which show that traders tended to

purchase more in 2012 than in 2010. The amount sold is similar or even a little less, indicating that traders had not sold everything at the time of the second interview. Prices were higher, but this largely captures inflation.

As is evident from table 15, the composition of the trader population has changed considerably. For example, in 2012, there were fewer exporters and more assemblers, reflecting (financial) requirements implied by ECX membership and a trend towards larger volumes. Most of the interviewed traders say they use the ECX through members, especially the wholesalers and assemblers. Hence, they do not sell directly on the ECX, but sell to other traders who are full or limited members. While most exporters have full or limited ECX membership, the picture for suppliers is mixed.

5.4.2   methodology

defining social capital

We are interested in exploring whether the creation of the ECX has affected the role of social capital in the sesame value chain. Social capital is a multi-faceted concept, and we measure it by several indicators or proxies. For example, following Fafchamps and Minten (2002) we seek to capture measures of the size and strength of a trader's network. First, following Fafchamps and Minten (2002), we consider the number of trading contacts and regular customers. If formal regulation reduces the risk of malfeasance, replacing trust and personal connections, then we would expect the number of trading contacts to expand as traders can now engage with a broader set of partners. Second, we asked whether and how much trade credit traders provide to their clients. Providing trade credit to other traders requires social capital, and can be used to create personalised relationships (Fisman & Raturi 2004; Giannetti et al. 2011; Hermes et al. 2012). If less credit is extended in the sesame value chain, this might indicate an erosion of social capital. Third, we measure the use of intermediaries such as selling and buying agents. Such intermediaries can substitute for social capital (Gabre-Madhin 2001; Quattri et al. 2012), so an increase in the use of intermediaries may signal a reduction in social capital. In addition, we look at the 'nature' of the social relationship of traders with intermediaries. Fourth and finally, we measured trust perceptions of traders. Specifically, we measured their assessment of the trustworthiness of their partners

5

(i.e. goodwill trust) and their appraisal of the ability of their partners (Das & Teng 2004; Williamson 1993).

causal effects and attribution

Our main objective is to explore how the ECX has affected the role of social capital in the sesame value chain. Identification of such effects is complicated by the fact that the ECX affects all trading parties in Ethiopia – all sesame exports are traded via the ECX, and the impact of the ECX (for example via the dissemination of price information) affects all trading parties to some extent. In other words: a proper control group does not exist for the ECX treatment, and a simple difference-in-difference approach to gauging the impact of the ECX is not feasible.

We therefore have to resort to an identification strategy that is decidedly second-best. We first compare "*before*" and "*after*" social capital measures for various subsamples of traders, and attribute differences over time to the creation of the ECX. This is clearly a strong assumption as other factors may have intervened – affecting social capital levels. We therefore emphasise that the empirical results should be interpreted with care.

To attenuate concerns about attribution we argue the following. First, the time lag between the two survey rounds was relatively short (two years), so the scope for other factors to intervene was limited. Second, we focus the presentation on panel data, which implies we automatically control for time-invariant factors. Third, we seek to exploit variation in the degree to which traders are actually governed by the ECX. As mentioned, while all transactions of exporters are governed by the ECX monitoring and enforcement system, the other traders in the system (assemblers, wholesalers, and suppliers) have one foot in the realm of the ECX and the other in the domain of informal institutions and social capital – conducting trades beyond the scope of the ECX enforcement and arbitrage services. By assessing differences in the evolution of social capital for the two types of traders, we are hopefully able to learn something about the causal effect of the ECX on social capital. Since all other macro factors (e.g. changes in policies and prices) are the same for the two types of traders, any differences in the evolution of social capital cannot be attributed to these. Instead, we argue, it is more likely they can be attributed to the ECX. Specifically, the theoretical model predicts that formal institutions substitute for informal ones, so we expect that changes in the

measures of social capital should be larger for "exposed" exporters than for "semi-exposed" other traders.

Fourth, as a robustness test we estimate a simple regression model. We estimate the following model for the panel sub-sample:

$$s_{it} = \alpha + \beta_1 T_{it} + \beta_2 E_{it} + \beta_3 E_{it} T_{it} + \sum \gamma_i X_{it} + \varepsilon_{it} \qquad (1)$$

where s represents a measure of social capital for individual i=1, …, 105 at time t (2010 or 2012), T is a treatment dummy (or a dummy for the 2012 observations), E is an exporter dummy, and X is a vector of trader controls (summarised in table 1). As usual, ε is an iid error term. We also estimate models with trader fixed effects, replacing α in (1) with α_i.

The hypothesis that formal institutions substitute for social capital for suppliers, wholesalers, and assemblers is consistent with the result that $\beta_1 < 0$ for some variables (e.g. probability of extending credit or advance payments and number of regular suppliers). For other variables, such as the number of trading contacts or the share of goods purchased via a buying agent, the substitution hypothesis is consistent with a positive coefficient. Moreover, in light of the fact that exporters are more exposed to the ECX and are therefore (even) more likely to be characterised by a fall in social capital, we also hypothesise that $\beta_3 < 0$ for some variables, and $\beta_3 >$ for others.

5.5   results

We now discuss how the formal institutions created by the ECX have impacted various dimensions of social capital for the 105 traders for whom we have collected pre-ECX (2010) and post-ECX (2012) data. We have also compared the 2010 and 2012 cross-section data (using all respondents, not just the panel subsample), to compare the characteristics of the sampled populations of traders over time. This nearly doubled the sample (improving the power), but of course makes attribution even more difficult as we cannot control for time-invariant characteristics. Qualitatively, the results for the cross-section comparison tend to support the panel results, but identification based on distinguishing between exporters and "other traders" is less successful (which may not be surprising given the changes in the composition of the trader population following the introduction of the ECX). To

economise on space the cross-section is not reported here, but the details are available in appendix 3, which provides a link to further detail.

5.5.1   trading contacts and the ecx

We speculate that the presence of formal enforcement and arbitrage institutions enables traders to engage in trade with a larger number of parties, no longer confining them to interact with an inner circle of trusted partners. In table 16 we summarise panel data on the number of trading contacts, distinguishing between the full panel subsample and the two sub-types of traders. While at the aggregate level there is no evidence to suggest that the number of trading contacts has significantly changed after the ECX, we note that the number of contacts in the purchase market has increased for the subsample of exporters. This is consistent with the expectation that exporters can more easily broaden their set of trading partners.

Consistent with the expectations, the same is not true for "other traders" operating outside the governance system supported by the ECX. Indeed, the reverse seems true. While the number of contacts on the purchase side has stayed the same, the number of trading partners on the sales side has decreased – arguably reflecting overall consolidation in higher segments of the sesame value chain (due to increased fixed costs of trading via the ECX). In contrast, the mean number of trading contacts for exporters in sales markets increased from 4.5 to 6.1, but this increase is not significant. In what follows, we will focus on social capital among Ethiopian traders, and not on governance between exporters and importers (details about how the ECX affected governance on the sales side are available on request).

Table 16: Trading contacts and the ECX (panel data only, N=105)

	All traders		Exporters		Other traders	
Indicator	2010	2012	2010	2012	2010	2012
Number of trading contacts						
Number of trading contacts in main purchase market	5.37	5.77	3.14	5.16*	6.35	6.12
Number of trading contacts in main sales market	3.84	3.14	4.5	6.1	3.7	2.02**

	All traders		Exporters		Other traders	
Indicator	2010	2012	2010	2012	2010	2012
Number of regular suppliers						
Number of regular suppliers	13.66	8.85	10.43	1.46**	14.92	11.61
Proportion of purchases with regular suppliers	49.90	29.59***	68.80	25.00***	43.74	31.32*
Number of regular suppliers you meet socially	5.60	2.34*	1.36	0.14*	6.87	3.16
Number of regular suppliers who are close relatives	1.30	0.53	0.00	0.04	1.65	0.72
Number of suppliers who sell exclusively to you	5.18	2.02***	3.73	0.36***	5.52	2.64

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$

We have also asked about the identity of trading contacts, and particularly whether the ECX affected the propensity to limit trade to "regular customers and suppliers". Table 16 shows that regular suppliers have become less important after the ECX. Aggregating across all traders, the data are consistent with the hypothesis that in the ECX era, the number of regular traders and the proportion of sesame purchased from regular traders have gone down. The respondents also trade less with friends (traders they meet socially) or close relatives – trading partners characterised by relatively low informal monitoring and enforcement costs (Gabre-Madhin 2001). The same patterns emerge in the data when we consider customers (sales side of the market). These data suggest it has become less important for traders to have a network of regular customers and suppliers, as the ECX has taken over the role of the trading network, and that traders are investing less in maintaining social capital (by meeting socially with regulars). When distinguishing between exporters and other traders, it is evident that these results are especially driven by developments among the subsample of exporters. Other traders still predominantly trade with the same regular partners as before, and continue to spend time with these partners outside business hours as well.

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5.5.2 credit and the ecx

The extension of credit is an important part of social capital and personalised exchange in trading networks. We have two proxies for credit: the share of purchases associated with the extension of credit (via advanced or delayed payments), and a measure of the stated willingness of traders to extend credit to each other. Table 17 indicates that the share of commodities purchased on credit has decreased, and that "payment on delivery" has become the dominant mode of purchasing (now covering some 72% of all trades). If we break this result down by distinguishing between exporters and other traders, a mixed picture emerges. Comparing baseline (2010) data, it is evident that exporters have always relied more on "payment upon delivery" and less on the extension of credit to their partners than the category of "other traders". Nevertheless, suppliers' credit became even less important after implementation of the ECX (to a paltry 0.17% of all purchases), while suppliers' credit became significantly more important for other traders (from nearly 16% to 24% of all purchases). However, we also document that advance payments to traders became less important for "other traders". We believe this reflects the establishment of primary trading centres (PTCs), so that securing supply via brokers and small-scale traders has become less important. The decline in advance payments to farmers simply reflects that buying directly from farmers is now officially banned.

Table 17: Credit and the ECX (panel data only, N=105)

	All traders		Exporters		Other traders	
	2010	2012	2010	2012	2010	2012
Payment mode (as a share of total purchases)						
Suppliers credit	12.08	17.25	2.43	0.17*	15.93	24.18*
Advance payment to traders	7.18	3.03**	1.90	8.00	9.29	1.01***
Advance payment to farmers	16.94	5.59***	2.47	1.67	22.73	7.18***
Payment upon delivery	58.87	71.63**	83.8	83.5	48.89	66.82***
Credit received or advance given in sesame trade						
Do suppliers let you buy on credit? [a]	2.13	1.42***	2.31	1.00***	2.07	1.59***
Do you let customers buy on credit? [a]	1.17	1.30***	1.10	1.10	1.20	1.44***

	All traders		Exporters		Other traders	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**
Do you buy with advance to farmers? [b]	2.38	1.40***	2.43	1.07***	2.36	1.53***
Do you buy with advance to traders?	1.84	1.35***	1.90	1.10***	1.81	1.44***

[a] 1= none; 2=some; 3=all. Values are average scores

[b] 1=never; 2=sometimes; 3=often; 4=always. Values are average scores

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$

Table 17 also provides information on the willingness of suppliers and customers to provide credit, and the willingness of the trader to provide credit. Consistent with the results above, and considering the full panel, we find that this willingness has decreased. Across the board, this seems true for both exporters and other traders, but "other traders" are *more* willing to extend credit customers in 2012. The overall patterns in the data are consistent with the hypothesis that formal institutions substitute for informal ones, and curtail the extension of credit in informal trading networks. But we acknowledge that attributing these changes to the ECX is not straightforward as there is some evidence of a broad trend of reduced credit extension affecting both exporters and other traders.

5.5.3 use of intermediaries

If social capital becomes less important, traders can more easily work through intermediaries. Hence, we expect that the number of buying agents and brokers used by the trader should increase, and that the interaction between traders and intermediaries becomes increasingly "professional" – i.e. less closely governed by social interactions. The reduced importance of "regular trading partners" was already established in table 16. The results in table 18 provide further support for this hypothesis. We observe that exporters have significantly increased the number of intermediaries via whom they trade, and that they seem somewhat less likely to meet such buying agents socially (even if the latter effect is not significant at the 10% level). Similar patterns in the data do not exist for "other traders".

Table 18: Number of intermediaries used in total purchases and relationships with those intermediaries (panel data only, N=105)

	All traders		Exporters		Other traders	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**
Number of buying agents	0.58	0.93**	0.40	0.88**	0.65	0.95
Number of buying agents you meet socially	0.29	0.46	0.25	0.12	0.31	0.51
Number of buying agents that are close relatives	0.17	0.2	0.25	0.08	0.13	0.25
Share of goods purchased via buying agent	12.08	34.42***	5.17	69.17***	15.32	25.6**

* p< 0.10 ** p< 0.05 *** p<0.001

The share of goods purchased through an intermediary (buying agent) has increased. Distinguishing between exporters and other traders, we observe that this result is driven by both categories of traders, but also note that the exporters' share of goods purchased through a buying agent has especially increased (from 5% to nearly 70%, compared to an increase from 15% to only 26% for "other traders").

5.5.4   trust and disputes: goodwill trust and trust in ability

If formal institutions substitute for informal ones, we would expect that transactions are increasingly governed by rules rather than shared norms and trust. If so, we also expect an deterioration in (average) trust levels in the sesame value chain – not necessarily because traders suddenly distrust their existing trade partners, but because they have expanded the set of partners with whom they interact and trade. We distinguish between two types of trust: goodwill trust, or trust in the intentions of others, and trust in the ability of partners to produce or deliver as promised. Table 19 summarises traders' perceptions.

Table 19: Average scores for trust perceptions of sesame traders (panel data only, N=105)

	All traders		Exporters		Other traders	
	2010	2012	2010	2012	2010	2012
Goodwill trust						
Average trust in suppliers	3.15	3.14	3.94	2.46***	2.81	**3.44*****
Knows price well but does not share info	3.33	3.13	3.96	2.57***	2.79	3.16
Knows quality of produce but does not share info	3.25	2.69***	3.96	2.57***	2.87	2.75
Knows quantity well but does not share info	3.28	2.84**	3.89	2.71***	2.98	2.89
Able to pay but cheats	3.47	3.57	4.20	2.39***	3.08	**4.10*****
Colludes with other buyers/sellers and suppliers	3.05	**3.91*****	3.67	2.61**	2.80	**4.49*****
Trust in ability						
Average trust in ability of suppliers	3.34	3.06*	3.96	2.66***	3.09	3.23
Does not know price well	3.16	2.98	3.96	2.96***	3.00	3.21
Does not know quality of produce	3.39	2.84***	3.96	2.57***	2.87	2.75
Does not know quantity	3.56	2.62***	4.00	2.39***	3.39	2.71***
Cannot pay you because short of cash	2.82	3.36	2.92	2.25	2.79	**3.86*****
General						
Importance of trust	4.04	3.71**	4.45	4.10*	3.88	3.56*
How much do you trust traders in general?	3.87	3.6*	4.28	3.83**	3.71	3.51
How much do you trust buyer of last transaction?	3.93	3.54***	4.46	3.76***	3.73	3.45*
Number of transactions you undertake before trust	3.85	3.43	3.81	3.10	3.86	3.52
Number of years it takes to trust trade partners	2.81	1.45***	2.40	0.95***	2.96	1.58***

1=very low trust; 2=low trust; 3= neutral; 4=high trust;5=very high trust. Values reflect averages for traders of these scores
Underlined figures denote a significant decrease, bold figures denote a significant increase
* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$

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Across the board, we indeed find that goodwill trust and trust in ability have decreased over time. Traders increasingly believe their partners may try to benefit from asymmetric information, and that their partners are unable to properly assess the quantity and quality of sesame they promise to deliver. This is due to the fact

that quantity and quality is now assessed at the warehouses by warehouse managers, and corresponds with findings by Coulter (2012). One positive point is that traders see less collusion among the sellers from whom they purchase sesame – trust levels in this area have increased. One possible reason is that social capital may facilitate collusion (Adler 2000; Fafchamps & Minten 2002) so that a reduction in social capital may lead to lower levels of collusion.

Consistent with expectations, there are striking differences between exporters and "other traders" in their trust perceptions. While exporters' perceptions of goodwill trust and trust in ability have significantly deteriorated across all dimensions, the same is not true for "other traders". Indeed, in contrast, average goodwill trust among these traders has increased, as has trust for specific dimensions (less cheating and less collusion). Trust in ability among other traders has not been affected robustly in either direction.

Turning to more general statements at the bottom of table 19, it is interesting to note that traders argue that trust between traders has become less important, but is still highly valued. Traders also state it takes fewer years to trust other traders. This may both reflect ECX's increasing transparency and decreasing contract default.

We have also looked at trade disputes in the sesame value chain. Specifically, table 20 summarises the share of traders with trade disputes over various issues, and documents how often such disputes occur (as a share of all disputes). This table substantiates anecdotal evidence about quality problems reported by Coulter (2012) and Van den Broek (2012), and corroborates the results of low trust in quality hinted at in table 19.

Table 20: Reported disputes by sesame traders (panel data only, N=105)

	All traders		Exporters		Other traders	
Indicators	**2010**	**2012**	**2010**	**2012**	**2010**	**2012**
Dispute with suppliers due to bad quality purchase	0.28	**0.50*****	0.10	**0.48*****	0.47	**0.66****
% Of all disputes with suppliers due to bad quality purchase	15.08	18.39	2.67	**19.64****	16.14	18.02
Dispute with suppliers due to disagreement over measuring unit	0.22	0.22	0.07	**0.28****	0.31	0.30
% Of all disputes with suppliers due to disagreement over measurement	9.40	8.17	5.00	3.00**	9.78	10.05

	All traders		Exporters		Other traders	
Indicators	**2010**	**2012**	**2010**	**2012**	**2010**	**2012**
Dispute with suppliers due to attempt to renegotiate	0.40	<u>0.19</u>***	0.76	<u>0.10</u>***	0.87	<u>0.37</u>***
% Of all disputes with suppliers due to attempt to renegotiate	11.24	15.67	13.09	<u>2.67</u>***	10.57	**17.11****
Dispute with suppliers due to stolen property	0.06	0.03	0.03	0.00	0.11	0.06
% Of all disputes with suppliers due to stolen property	3.11	4.00	0.17	0.00	2.88	4.00
Dispute with suppliers due to place of delivery	0.25	<u>0.13</u>***	0.17	0.21	0.39	<u>0.12</u>***
% Of all disputes with suppliers due to place of delivery	2.14	3.19	0.57	**7.61****	2.77	1.36

* p< 0.10 ** p< 0.05 *** p<0.001
Disputes variables measure the proportion of traders indicating they have had a dispute. % of all disputes… reflects how important the particular dispute was compared to all disputes a trader may have had (in %).
Underlined figures denote a significant decrease, bold figures denote a significant increase

As expected, the ECX resulted in a reduction in disputes over renegotiation with suppliers (as when prices change quickly). The warehouse system also attenuated problems associated with stolen property. However, disputes over measuring units persist, and around a third of all traders reports this, although the actual number of disputes is low.

Breaking down the results between exporters and other traders, we again detect significant differences. Overall, exporters are more likely to report an increase in disputes, and indicate an increase in the share of disputes with suppliers due to bad quality, measuring units, or the place of delivery. However, they also reported a decrease in the shares of disputes due to disagreement over measurement or attempts to renegotiate. The overall conclusion is that the ECX has succeeded in bringing down the incidence of disputes in some areas, but has increased them in other areas. Given the fact that not all of the components of the ECX are functioning as expected (such as the quality control at warehouses), this is to be expected.

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5.6   robustness analysis

As a robustness analysis we used a regression analysis to explain variation in the main dependent variables (equation 1). To economise on space we only report coefficients and standard errors associated with the ECX dummy, the exporter dummy, and the interaction term (additional details are available in appendix 3, which provides a link). Additional controls were included in the estimations. In one model we only include demographic characteristics (age, education, sex, and years in business), obviously exogenous to the creation of the ECX. In another model we include both demographic as well as potentially endogenous variables (amounts purchased and sold, and prices paid and received). In light of the potential endogeneity of these variables we emphasise that these latter regression results should be interpreted with care. We ran the regression model for all indicators shown in the previous tables and find that, overall, the regression results support the patterns discussed above; social capital became less important after the introduction of the ECX, in particular for exporters.

Table 21: Robustness analysis: regression results

	OLS		Fixed effects model	
	Parsimonious	**Elaborate**	**Parsimonious**	**Elaborate**
Number of trading contacts in main sales market				
Year (ECX dummy)	-0.47	-0.30	-0.9	-0.61
	(0.31)	(0.31)	(0.61)	(0.75)
Exporter dummy	-3462.0**	-2693.0**	-8.14	0.76
	(1173)	(1165)	(6.06)	(5.97)
Interaction term	1.72**	1.34**	3.4***	2.81*
(year*exporter)	(0.58)	(0.58)	(1.16)	(1.41)
Number of trading contacts in main purchase market				
Year (ECX dummy)	0.30	-0.02	0.7	-0.81
	(0.54)	(0.64)	(1.07)	(1.30)
Exporter dummy	-2261.0	-3138.0	-11.42	-5.74
	(2057)	(2406)	(10.63)	(10.37)
Interaction term	1.12	1.56	2.35	2.63*
(year*exporter)	(1.02)	(1.20)	(2.03)	(2.45)
Proportion of purchases with regular suppliers				
Year (ECX dummy)	-6.36*	-9.77**	-17.52***	-23.86**
	(3.45)	(3.86)	(7.05)	(9.40)
Exporter dummy	31687.3**	58090***		
	(13838)	(15840)		
Interaction term	-15.75**	-28.89***	-39.98**	-38.38*
(year*exporter)	(6.88)	(7.88)	(15.09)	(20.80)

	OLS		Fixed effects model	
	Parsimonious	**Elaborate**	**Parsimonious**	**Elaborate**
Do suppliers let you buy on credit?				
Year (ECX dummy)	-0.24***	-0.25***	-0.49***	-0.53***
	(0.05)	(0.05)	(0.1)	(0.12)
Exporter dummy	836.40***	843.20***	0.98	1.24 (0.96)
	(173.9)	(192.9)	(0.99)	
Interaction term	-0.42***	-0.42***	-0.86***	-0.716***
(year*exporter)	(0.09)	(0.10)	(0.19)	(0.23)
Do you let customers buy on credit?				
Year (ECX dummy)	0.12***	0.11***	0.23***	0.208**
	(0.04)	(0.04)	(0.07)	(0.09)
Exporter dummy	233.50*	344.1**	-0.02	0.231
	(135.4)	(156.7)	(0.67)	(0.71)
Interaction term	-0.12*	-0.17**	-0.25*	-0.309*
(year*exporter)	(0.07)	(0.08)	(0.13)	(0.17)
Do you buy with advance to farmers?				
Year (ECX dummy)	-0.42***	-0.44***	-0.84***	-0.89***
	(0.10)	(0.06)	(0.11)	(0.14)
Exporter dummy	535.62**	526.8**	-1.66	-0.84
	(217)	(240.1)	(1.07)	(1.13)
Interaction term	-0.27**	-0.26**	-0.53**	-0.35
(year*exporter)	(0.l0)	(0.12)	(0.21)	(0.27)
Do you buy with advance to traders?				
Year (ECX dummy)	-0.19***	-0.17***	-0.37***	-0.30***
	(0.04)	(0.05)	(0.07)	(0.09)
Exporter dummy	421.97**	546.3***	0.15	0.78
	(170.4)	(193.1)	(0.71)	(0.73)
Interaction term	-0.21**	-0.27***	-0.46***	-0.42**
(year*exporter)	(0.08)	(0.l0)	(0.14)	(0.17)
Share of goods purchased via buying agent				
Year (ECX dummy)	5.82**	3.99	11.14**	4.84
	(2.34)	(2.85)	(4.97)	(6.86)
Exporter dummy	-53220***	-54500***	61.18	34.81
	(9160)	(1050)	(48.32)	(54.0)
Interaction term	26.47***	27.11***	50.37***	39.78***
(year*exporter)	(4.56)	(5.49)	(10.01)	(13.43)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$, standard errors in parentheses
For the online full regression output see reference in appendix 3.

Table 21 contains the results for a large and representative sample of social capital indicators. Columns (1) and (2) present OLS results and columns (3) and (4) contain the regression output for models with trader fixed effects. The coefficient associated with the ECX dummy picks up any effect of the ECX on social capital for other traders. Depending on the nature of the proxy, as mentioned above, the substitution hypothesis is consistent with a negative (e.g. credit provision) or positive coefficient (e.g. number of trading contacts). Similarly, for the ECX to

have a more profound effect on exporters than on other traders, the coefficient of the interaction term should be negative for some proxies and positive for others.

The regression results tend to match the earlier findings, as reported in tables 2–6. For example, consider the results in the column of the parsimonious OLS regression model. While the number of trading contacts in the main sales market has remained more or less the same for all traders ($\beta_1=0$), it has increased for exporters after the introduction of the ECX ($\beta_3>0$). Results for the number of trading contacts in the purchase market are not significant. The proportion purchased with regular suppliers decreased for all traders, but especially for exporters ($\beta_1<0, \beta_3<0$). The same is true with respect to the provision of credit: all traders, especially exporters, are less likely to obtain credit ($\beta_1<0, \beta_3<0$). Also, in contrast to other traders, exporters are less likely to extend credit after the introduction of the ECX ($\beta_1>0, \beta_3<0$). We also obtain significant results for the proxy measuring the extension of advance payments to farmers, and find that advance payments to other traders have fallen for all traders, $\beta_1<0$, and especially for exporters, $\beta_3<0$. Finally, and also consistent with the earlier results, traders are more likely to use a buying agent ($\beta_1>0$), and again we find a differential response from exporters ($\beta_3>0$).

The regression results for the elaborate model are even stronger, and now we also obtain significant year and interaction effects for the variable measuring advance payments to farmers ($\beta_1<0, \beta_3<0$). The fixed effects results in columns (3) and (4) are also roughly similar. Even if the exporter dummy no longer enters significantly in these models, the year variable and year-exporter interaction term tend to enter significantly and are of the "right" sign.

5.7   discussion and conclusions

A small literature considers the multi-faceted relation between integration in formal markets and trust. It is clear that trust fosters trade. For trade to extend beyond what Fafchamps (2004) has called a "flea market" exchange, where sales are made on a cash-and-carry basis, moral obligations of fairness and reciprocity should extend to strangers, not just to kith and kin. Generalised morality and trust enables expansion of markets (e.g. Qin & Bulte 2010). But, in turn, trade may also affect trust. For example, Henrich et al. (2010) argue that integration into markets (or the transition from personalised to anonymous exchange) is associated with higher levels of generalised trust. They propose that "market norms may have evolved as part of an overall process of societal evolution to sustain mutually beneficial exchanges in contexts where established social relations (for example, kin, reciprocity, and status) were insufficient" (p. 1480). Hence, market integration "involved the selective spread of those norms and institutions that best facilitated successful exchange…" (p. 1484). If markets foster trust, and trust fosters market integration, then markets and trust are complements in development, enabling virtuous cycles of development. These results echo those found in chapter three, where a positive link between farmers' trust in traders and market participation was found.

However, market integration and trust may not necessarily evolve hand-in-hand. For example, Kumar and Matsusaka (2009) emphasise the difference between "village social capital" and "market social capital". Village social capital typifies rural economies in poor countries, capturing kinship ties, patron-client relations, and repeated personalised exchange governed by trust and reciprocity. In contrast, market social capital involves access to and knowledge about third-party punishment, including courts, auditors, credit ratings, and so on – or the type of formal institutions associated with the ECX and analysed in the current chapter. To fully benefit from specialisation and trade, Kumar and Matsusaka argue, communities should adjust the composition of their social capital stocks – divesting in village capital and investing in market capital. If so, market integration and trust are substitutes, rather than complements, in development. Tentative evidence provided by Siziba and Bulte (2012) supports this perspective.

Are formal and informal institutions complements or substitutes? To a large extent the answer to this question depends on the perspective chosen. For example, market integration may foster generalised trust (enabling exchange with

anonymous others) while simultaneously eroding (average) trust in trading partners (personalised trust).

In this chapter we further probe the relation between formal and informal institutions as mechanisms to govern trade. Focusing on the sesame value chain, we document evidence suggesting that the ECX has substituted informal governance mechanisms – traders have expanded the set of parties with whom they trade, are less likely to extend credit to their partners, and are less likely to invest in "social relations" with their trading partners. Moreover, traders express that trust has become less important following the creation of the ECX, and state that they trust their trading partners less than before. These patterns in the data are more pronounced for exporters than for "other traders", consistent with the hypothesis that the substitution effects are especially pronounced for exporters who fully operate within the realm of the ECX (in contrast to "other traders" who operate within and beyond the realm of the ECX).

We realise that methodological issues remain. The time lag between the creation of the ECX and the ex post measurements is very short, and attribution is far from perfect because a proper control group does not exist – no traders in the sesame value chain are unaffected by the ECX. Hence the empirical results should be interpreted with care, and we argue in favour of future scrutiny and replication in different contexts. Nevertheless, we believe the results to be relevant. Commodity exchanges are increasingly regarded as a powerful tool to promote agricultural development in developing countries, yet the impact of these institutions on traders is unclear. Indeed, we believe this is the first attempt to document the impact of commodity exchanges on social capital of traders – a crucially important yet chronically under-researched set of actors in the broader development debate.

Our tentative results may have significant implications for policy makers. The erosion of social capital could, in theory, attenuate or reverse the potential welfare gains associated with expansion of formal institutions (such as commodity exchanges). For example, Dixit (2004) compares the outcomes of relational and formal contracting, and demonstrates that opportunities created by formal contracting may undermine the scope for relational contracting. Formal contracting may make first-best outcomes unattainable, so that overall efficiency deteriorates as formal institutions develop. The mechanism explaining this counter-intuitive result is as follows: the harsher the punishment facing deviators, the better the informal

(repetitive) equilibrium that can be sustained. If formal contracting provides a fall-back option for deviating traders, then deviating will occur more often unless the scope for such behaviour is reduced by altering the terms of the informal contract. In other words, when the incentive contract is binding and the informal contract yields a second-best outcome, then a partial improvement in formal institutions worsens the outcome of the informal contract. However, even in the absence of such counter-intuitive outcomes, it is important for policy makers to realise that formal institutions have an effect on informal institutions, and that the expansion of formal contracts, by new regulations or policies, may invite the erosion of norms and informal rules in the same or adjacent domains of human interaction.

5

C H A P T E R 6
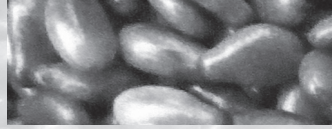
social capital, trade credit, and sesame trade in ethiopia

abstract

Trade credit is an important source of financing for businesses, especially in less developed countries. This chapter uses two unique surveys of 195 Ethiopian sesame traders held in 2010 and 2012 to investigate the nexus between performance, credit, and social capital. To obtain credit, a trader needs social capital (a few trusted trade partners), but this may limit his ability to buy from other traders. The chapter finds that small traders at the upstream end of the trade network need credit most, but at the same time, they also need to assemble small amounts of sesame from a large number of trade contacts. The Ethiopian Commodity Exchange, which became mandatory for all sesame trade after 2010, has made trade credit less common although its importance did not decrease. The policy implications are that better credit facilities should be available to small traders, who are typically overlooked in microcredit schemes and are usually cash-constrained.

key words

trade credit, agricultural markets, Ethiopia

6.1   introduction

Trade credit occurs when there is a delay between the delivery of goods or the provision of services by a supplier and payment. It is an important form of financing for businesses in countries with well-developed financial markets, but especially in less developed countries where financial institutions are less developed (Demirgüç-Kunt & Maksimovic 2002; Fisman 2001; Fisman & Love 2003). A lack of external financing for (small) firms and traders in such countries is usually a constraint to their performance (Fafchamps & Gabre-Madhin 2006; Jabbar et al. 2008; Lyon 2003; Nkonya 2002; Santorum & Tabaijuka 1992) resulting in lower economic growth (Beck et al. 2008).

Several studies on trade credit appeared in the 1990s, when many African (agricultural) markets were liberalised. Liberalisation was expected to induce massive trader entry and the development of competitive markets in Africa. Research has identified various constraints that explain why this did not happen. For instance, limited access to credit may have limited trader entry to more easily accessible niches in which credit and state connections are relatively unimportant (Jabbar et al. 2008; Santorum & Tabaijuka 1992).

A number of studies have pointed out that traders are often financially constrained and that informal trade credit plays an important role. For instance, Lyon (2000) describes that in the tomato trade in Ghana, 11% of the farmers obtain credit from traders, while around 67% of traders obtain credit from farmers or other traders. Gabre-Madhin (2001) reports for the Ethiopian grain trade that credit provided by and to traders plays an important role in grain traders' business. However, trade credit does not play an important role in all markets. Fafchamps (2004) finds that most transactions in Madagascar, Benin, and Malawi take a simple cash-and-carry form and that supplier credit is infrequent.

Despite its importance, there are relatively few analytical studies on trade credit between agricultural traders in developing countries. Most studies focusing on agricultural trade credit are descriptive, and have limited empirical or econometric analysis (e.g. Cook et al. 1990; Fafchamps 2004; Fuentes 1998; Lyon 2003; Osborne 2005; Shepherd 2004), with the exception of Hermes et al. (2012) and Nguyen (2011). Studies on trade credit in developing countries have generally concentrated on manufacturing firms (Ayele et al. 2009 on handloom business; Biggs et al. 2002; Bigsten et al. 2003; Fafchamps 1997; Fafchamps 2004; Fisman 2001; Fisman & Raturi 2004; McMillan & Woodruff 1999). The empirical literature

6

is usually based on the analysis of large but perhaps unrepresentative firms across countries, reflecting data availability (Beck et al. 2008). In addition, while several studies focus on the determinants of trade credit, few studies ask why trade credit is important in the first place (Fisman 2001).

In this chapter, I investigate the interplay between credit, social (network) capital, and performance by exploring four hypotheses. First, social capital is important for obtaining credit as it relies on trust relations to reduce the risk of non-repayment. Second, credit leads to higher performance, as it facilitates traders to purchase more at a particular time. Third, because small traders have different assets, they will pursue different strategies than large traders. Fourth, the ECX has had an influence on traders' credit relations and performance. Chapter five finds that the newly established ECX has changed the informal relationships between sesame traders after 2010, when the ECX became a mandatory trade channel.

This chapter aims to unravel the close relationship between three factors: performance, credit, and social capital. Social capital is important for providing and receiving trade credit, as traders need to trust that the loan will be paid back. Knowledge of the trustworthiness of the trade partner is important, as is knowledge about his or her business. Social capital and credit both may contribute to performance. Trading with a few trusted partners who provide credit may be a successful strategy to obtain credit and increase working capital, with which larger volumes may be purchased (see also Nguyen 2011). However, it may also be a restricting strategy, as it obliges traders to restrict their trade partners to these trusted few. A different strategy may be to trade with many trade partners, based not on trust relationships and possibility to obtain credit, but on amounts of sesame for sale and price. This may reduce the amount of credit, however (Ali & Peerlings 2011). Kranton (1996) explains the interaction between reciprocal exchange systems and anonymous market exchanges. In reciprocal exchange, traders may economise on search costs but obtain only the commodity sold by their exchange partner. Traders who use the market have access to a variety of goods, however they must search for trading partners. According to Kranton (ibid), the two systems crowd each other out: if many traders engage in market exchange, the market is thick and it is easy to buy and sell but difficult to enforce reciprocal exchange. If many people engage in reciprocal exchange, the market becomes thin and it becomes more difficult to find trading partners.

To explore the questions raised, I use different types of analyses. The analysis is constrained by various endogenous relationships. Various studies note

that social capital and working capital might be endogenous to performance (Fafchamps & Minten 2001b; Minten et al. 2013). The amount purchased may (partly) also determine working capital, or the number of social contacts of a trader. Credit may also be endogenous to performance: traders who purchase large amounts may receive credit more easily. As there are various possible endogenous relationships, I use a new approach (Lewbel's method) to cope with endogeneity issues, which circumvents some of the typical problems of finding suitable instrumental variables. To analyse the different strategies pursued by small versus large traders, I use quantile regressions, which are suited to explore heterogeneity of traders. Finally, I compare different years. Two datasets were collected in 2010 and in 2012. In 2010, the ECX became mandatory for sesame export (see chapter two for more information on the ECX). Chapter five finds that the ECX has modified the social capital relations of traders. Social capital has become less important, which has had repercussions on trade credit, which has become less frequent.

The analyses show that credit is an important factor in explaining the performance of sesame traders but that its role is not straightforward because it is tied to social capital. Trading with regular suppliers (social capital) increases the likelihood of receiving credit and increases working capital, but reduces the ability to purchase large amounts of sesame from multiple traders. Trading with a large number of traders (social network capital) increases the amount purchased, but reduces the likelihood of obtaining credit, constraining working capital. The analyses also shows that the strategy pursued depends on the type of trader and his location in the market; small traders who need to accumulate purchases from a large number of small traders and farmers seem to employ the second strategy, while large traders who need a few large traders to purchase from seem to follow the first strategy.

Section 6.2 provides a literature review focusing on the different reasons why traders extend trade credit, and discusses the literature on trader performance and social capital. The hypotheses and research questions are formulated on the basis of this literature review. Section 6.3 introduces the data and explains the methodology used. Section 6.4 presents the results. Section 6.5 discusses why the results differ for small and large traders and section 6.6 compares the "before and after" situation of the ECX. Section 6.7 presents conclusions.

6.2   literature review

6.2.1   why do traders extend credit?

The literature offers various theories explaining the use of trade credit for both suppliers and for customers. Garcia-Teruel and Martinez-Solano (2010) distinguish financial, operational, and commercial motives.

Financial motives for using credit consist of the fact that sellers of products have advantages over financial institutions when it comes to information acquisition and monitoring of debtors (Petersen & Rajan 1994; Petersen & Rajan 1997). Suppliers of credit can monitor their customers more closely than financial institutions. In addition, the merchandise represents more valuable collateral for suppliers than for financial institutions. This motive predicts that firms with easier and cheaper access to capital markets will provide more trade credit, while those with fewer financial options will resort more to trade credit from their suppliers. Beck et al. (2008) confirm this hypothesis in a study of financing patterns of firms across 48 countries (except Africa). They note that although small firms use significantly more informal finance, such as trade credit than large firms, financing from such sources is limited and does little to relax financial constraints.

Operational motives for trade credit consist of the benefits linked to separating the exchange of goods and payment. If the frequency of purchase is either unknown or varies in time, firms need to keep a precautionary level of cash holdings to settle these payments. Trade credit transforms an uncertain stream of money payments into a sequence that can be known with greater certainty and removes the reason for precautionary money holding (Ferris 1981). Especially in developing countries, holding on to large amounts of cash may be a problem because of risk of theft (Fafchamps 1997; Fafchamps 2004). Trade credit therefore also removes the risk associated with carrying larger than necessary sums of cash. It provides more flexibility in the conduct of operations (Emery 1984). Finally, firms without access to liquidity face barriers to the optimal handling of working capital, leading to inventory shortages, and resulting in discontinuities and inefficiencies in production. Fisman (2001) finds for five African countries that supplier credit is indeed positively correlated with capacity utilisation.

Commercial reasons to provide trade credit include the use of trade credit as a form of price discrimination by firms, enabling a firm to sell the same product at different prices to different customers. Trade credit can also be a way to allow a

customer a period of evaluation of the product, and thus implicitly guarantee quality. Ayele et al. (2009) and Fafchamps (2004) find this to be true for traders in manufacturing businesses in Africa. It is not clear though whether this motive is applicable to agricultural traders in developing countries as usually the goods are inspected on the spot. In Ethiopia, for instance, bags of sesame are routinely emptied for inspection and put into new bags.

A fourth motive for trade credit, not mentioned by Garcia-Teruel & Martinez-Solano (2010), is that in a competitive market,[29] trade credit can be seen as an additional service by which one can attract more buyers and sellers: if trade credit is not provided, customers may threaten to purchase from an alternative supplier (Fisman & Raturi 2004; Van Horen 2005; Cuñat 2007; Giannetti et al. 2011; Hermes et al. 2012; Osborne 2005). This argument is disputed by some, who argue that suppliers of credit in competitive markets may face difficulties in enforcing payment, since buyers may simply renege and move on to other credit suppliers (McMillan & Woodruff 1999 for firms in Vietnam; Petersen & Rajan 1997 for the US).

Surprisingly, few authors have focused on the effect of credit on performance indicators such as the amount purchased and sold, revenues, or gross margins (Akoten et al. 2006; Fisman 2001). Kihanga (2010) explains that Tanzanian rice traders provide and receive credit to sell or buy large amounts of rice. By receiving credit, traders are able to purchase larger amounts which they could not have purchased otherwise. By providing trade credit, traders enable customers to purchase large quantities (which they would not be able to afford without trade credit) increasing the turnover of trade (avoiding capital being tied up in stock).

6.2.2 the importance of social capital

As extending trade credit always entails the risk that credit will not be repaid, especially in countries with weak legal enforcement, trade credit depends on the extent to which suppliers trust customers (Guiso et al. 2004). Several studies find that trade credit is only provided to customers with whom suppliers have developed long-term trust relationships (Biggs & Shah 2006; Giannetti et al. 2011) or in regions with high social trust (Wu et al. 2014). Traders may thus prefer not to provide trade credit to all clients.

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[29] The authors do not mean perfect competition where profits are reduced to zero and credit would be too costly.

Several papers have looked into ethnic ties (Ali & Peerlings 2011; Biggs et al. 2002; Fafchamps 1997). These authors find that ethnicity itself is not the determinant of trade credit, but that by facilitating credible information flows about the creditworthiness of firms, ethnic ties are important. In a similar vein, Macmillan & Woodruff (1999) observe that belonging to a business network increases trade credit. Fafchamps (1997) discovers sharp differences in purchasing on credit across ethnic groups and firm sizes. Ali & Peerlings (2011) find for Ethiopian handloom producers and traders that ethnic ties in credit provisions lock producers into trade relationships, even when the impact of ethnic ties on economic performance of producers result in lower profits. In Ethiopia, where there are more than 80 languages and as many ethno-linguistic groups, ethnic ties play an important role both the day-to-day lives of people and in trade relationships (Ali & Peerlings 2011). Other authors find that ethnic, clanship, kinship, or religious ties play a minimal role in contract enforcement or business relations, such as credit (Fafchamps 1997; Haji 2010).

6.2.3 factors contributing to performance

Studies by Fafchamps, Minten and Gabre-Madhin on African agricultural markets find that both working capital and social network capital are important determinants of performance indicators, such as gross value, gross margins, or turnover (Fafchamps 2004; Fafchamps & Minten 2001b; Fafchamps et al. 2005; Gabre-Madhin 2001). These did not include credit as a factor. Few studies have analysed to what extent trade credit contributes to performance of agricultural traders. Akoten et al. (2006) find that factors that affect access to credit are different from those affecting profitability and growth of firms, indicating that credit access is not a decisive factor determining firm performance. Jabbar et al. (2008) found that "borrowing" for livestock trade has no significant impact on performance (gross margins). Osborne (2005), who did not analyse trade credit per se but liquidity, finds that although greater liquidity permits greater purchasing, it coincides with a lower expected net marginal revenue (selling price less full marginal cost) because traders pay a somewhat higher purchase price.

Jabbar et al. (2008) use a comprehensive framework to analyse the factors that contribute to performance of (livestock) traders in Ethiopia. They distinguish assets (physical, financial, human, and social capital), trading practices, and transaction costs. Their analysis shows that traders' financial and human capital as

well as trading practices such as use of brokers and regular suppliers and customers had varying effects on margins and costs of cattle and small ruminant trade

6.2.4   key questions

The literature review shows that there are various reasons why traders use and provide trade credit. The different reasons link up with performance, working capital, and social capital. The operational motive for trade credit, consisting of the benefits linked to separating the exchange of goods and payment, is relevant for performance. The operational motives suggest that trade credit is important for performance as it allows traders to increase their working capital without the associated risk of carrying large amounts of cash. It permits the trader to be more flexible, i.e. purchase goods when the price is right, even if the trader is short on cash. Trade credit may facilitate the sales of goods to traders short of cash, by extending trade credit.

The other motives are closely linked to social capital, which is critical for trade credit (see also Grootaert & Bastelaer 2002). The financial motives explain that suppliers of credit can monitor their customers more closely than financial institutions, but this is only true when traders know each other's business well. The commercial reasons to provide trade credit are that trade credit can be used as a form of price discrimination by firms, enabling a firm to sell the same product at different prices to different customers. This is again linked to social capital, as offering different prices through credit may help cement relationships in a social capital setting. The fourth motive for trade credit, whereby trade credit can be seen as an additional service by which a trader can attract and "tie" buyers and sellers, may be seen as increasing and solidifying social (network) capital.

The literature seems to have ignored the question of how the different motives for trade credit are linked – specifically how social capital, trade credit, and performance are linked. Social capital motives may counteract the operational motive: the motive to "tie" customers through credit relationships in competitive markets may not be beneficial to buyers of sesame who then forfeit the option to buy from other traders (who may provide larger amounts of sesame of better quality or for a better price). Trade credit may increase performance by increasing working capital, but to obtain credit, traders require social capital, which in turn may restrict the number of traders they can trade with, thus potentially decreasing performance.

6

To investigate the interplay between credit, social (network) capital, and performance four questions are discussed. First, what is the role of social capital in obtaining trade credit?. Second, does trade credit lead to better performance (i.e. more sales)? Third, do small traders pursue different strategies than large traders? Fourth, what was the influence of the ECX on traders' credit relations and performance?

6.3   methodology

6.3.1   data collection

I pool two waves of cross-section data collected in 2010 and in 2012. Pooling two or more independent cross sections is a straightforward extension of standard cross-sectional methods; nothing new needs to be done in stating assumptions. The practically important issue is allowing for different intercepts, and possibly different slopes, across time (Wooldridge 2010). This is done in the analysis by adding a year dummy and doing the analyses by year. Data were collected in fourteen main sesame growing zones[30] (in the Amhara, Benishangul Gumez, Oromiya, and Tigray Regions). Almost all sesame is destined for Addis Ababa, from where it is exported, and therefore Addis Ababa zone was also included. A total of 51 markets in 34 different woredas were selected for the survey. These 51 markets represent various markets, from small town markets to main wholesale markets (such as Humera, Gonder, and Nekemte), allowing for a variety of traders to be interviewed. Table 22 shows the type of trader for each region. Only four traders were interviewed in Benishangul Gumez, which is a relatively new and minor sesame producing area.

At the time of the first survey, about 100 traders were registered with ECX to trade with sesame, but only a handful had started trading a small amount through ECX. When the second survey was conducted, trading through the ECX (for export) had become mandatory and the number of traders using the ECX had increased significantly. Around 63% used the ECX through (other) members, 27% had full membership and 8% had limited membership; of those with ECX membership, 60% were exporters.

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[30] Ethiopia is administratively subdivided into regions (or regional states), zones, woredas (districts), and kebeles (wards).

Total participation in the first (second) survey amounted to 194 (196) traders. The total number of sesame traders is not known (there is no trading license specifically for sesame). However, the surveys constitute a representative sample of traders in Ethiopia's sesame markets. Data obtained from EPOSPEA, the oilseeds and pulses trade association, lists around 80 sesame exporters in Ethiopia. Around half this number participated in the surveys. Ethiopian sesame production for 2010 and 2012 was about 450,000 tonnes (FAO 2014). Aggregating across individuals, the traders in the sample traded around 300,000 tonnes in both years. This amount almost certainly includes some double-counting (as the same quantity of sesame may be sold more than once along the value chain), so it cannot be concluded that the samples cover 70% of total production. Nonetheless these statistics do suggest that the surveys cover a sizeable share of total sesame production. See Loveridge (1995) on sampling traders, who also notes that even if the total size of the trader sample is small, it may represent a sizeable share of produce traded.

Table 22: Types of trader per region in surveys for 2010 and 2012

Region	Assembler	Mixed activities	Retailer	Wholesaler	Exporter	Broker	Total
Addis Ababa	5	11	3	14	101	5	**139**
Amhara	44	8	8	60	8		**128**
Benishangul Gumez	1			3			**4**
Oromiya	4		6	50			**60**
Tigray	16	4	4	24	11		**59**
Total	**70**	**23**	**21**	**151**	**120**	**5**	**390**

Note: 105 traders participated in both surveys.

Table 23 shows the means and standard deviations for the variables included in the analysis of determinants of credit as well as the total amount purchased. These will also be used later on in the chapter, to analyse the differences for 2010 and 2012.

Table 23: Means and standard deviations for variables

	All Mean (s.e.)	2010 Mean (s.e.)	2012 Mean (s.e.)
Total amount purchased (log)	6.45 (1.49)	6.70 (1.49)	6.22 (1.45)
Do your suppliers provide you with credit? (0=no, 1=yes) (credit_yn)	0.83 (0.38)	0.88 (0.32)	0.78 (0.41)
How often do suppliers let you buy on credit? (1=never, 2=some, 3=all) (oftencredit)	1.88 (0.76)	2.12 (0.64)	1.64 (0.79)
What share of your purchases is bought with credit? (in %) (sharecredit)	19.71 (32.64)	10.54 (21.92)	28.84 (38.53)
Number of intermediaries used (interm)	3.66 (4.33)	3.06 (4.29)	4.26 (4.29)
Assets			
Number of trucks (truck)	1.91 (5.07)	2.22 (4.97)	1.60 (5.16)
Log of working capital (wcap)	14.42 (2.03)	14.74 (2.47)	14.11 (1.40)
Total number of languages spoken (lan)	2.31 (0.91)	2.64 (0.91)	1.98 (0.79)
Education (edu)	1.65 (1.16)	1.25 (1.23)	2.08 (0.91)
Total number of traders' contacts (sellers) (tradecont)	2.59 (15.44)	1.71 (2.70)	3.45 (21.58)
Total regular contacts (regtrad)	104.39 (94.91)	89.87 (75.37)	118.70 (109.16)
Transaction costs			
Log of transaction costs per quintal (tc)	5.50 (1.76)	4.10 (0.85)	6.87 (1.26)
Control variables			
Exporter (expo)	0.31 (0.46)	0.39 (0.49)	0.23 (0.42)
Wholesaler (whol)	0.39 (0.49)	0.37 (0.48)	0.41 (0.49)
Retailer (reta)	0.05 (0.23)	0.07 (0.26)	0.04 (0.19)
Assembler (asse)	0.18 (0.39)	0.09 (0.29)	0.27 (0.44)
Gender of trader (sex)	1.07 (0.25)	1.09 (0.28)	1.05 (0.22)
Firm age (firm_age)	9.00 (6.96)	10.80 (8.60)	7.23 (4.17)
Age of trader (age)	40.04 (7.96)	40.95 (8.81)	39.15 (6.91
N	194		

6.3.2   analysing determinants of credit

I use three variables that measure credit: (i) a binary variable that indicates whether traders have received credit or not; (ii) an ordinal variable that indicates how often a trader receives credit (never, sometimes, and always); and (iii) a continuous variable that indicates what share of sesame was purchased with credit.

To analyse the determinants of whether a trader had received credit or not, I use a probability model for binary choices (Greene & Hensher 2010). The observed outcome c_i, is determined by a latent regression:

$$c_i^* = \gamma' x_i + \varepsilon_i \tag{3}$$

The random variable c_i takes two values, one and zero, with probabilities

$$Prob(c_i = 1|\boldsymbol{x_i}) = Prob(c_i^* > 0|\boldsymbol{x_i})$$

$$= Prob(\boldsymbol{\gamma' x_i} + \varepsilon_i > 0)$$

$$= Prob(\varepsilon_i > -\boldsymbol{\gamma' x_i}). \tag{4}$$

The model is completed by the specification of a particular probability distribution for ε_i. I use a logit model, which had a better fit than the probit model. In the logit model, $f(\varepsilon_i)$ is kept in the standardised form with the implied standard deviation, $\sigma = \pi/\sqrt{3}$, where $\pi =$Prob(class $=$ c) (Greene & Hensher 2010, p. 16).

The second variable for credit (how often a trader receives credit from traders) is ordinal with three ordered categories. The model has a latent regression model:

$$d_i^* = \boldsymbol{\beta' x_i} + \varepsilon_i, i = 1, \dots, n \tag{5}$$

In which the continuous latent measure d_i* is observed in discrete form through a censoring mechanism:

$$d_i = 0 \; if \; \mu_{-1} < d_i^* \le \mu_0$$

$$= 1 \; if \; \mu_0 < d_i^* \le \mu_1$$

$$= \dots$$

$$= J \; if \; \mu_{J-1} < d_i^* \le \mu_J \tag{6}$$

6

The probabilities associated with the observed outcomes are

$$Prob(d_i = j|x_i) = Prob(\varepsilon_i \leq \mu_j - \boldsymbol{\beta}'\boldsymbol{x_i}) - Prob(\mu_{j-1} - \boldsymbol{\beta}\boldsymbol{x_i}), j$$
$$= 0,1,\dots,J$$

(7)

The standard treatment completes the ordered choice model by assuming either a standard normal distribution for ε_i or a standardised logistic distribution (mean zero, variance $\pi^2/3$), which produces the ordered logit model (Greene & Hensher 2010). I use a standard ordered logit model, again because this was a better fit than its alternative, the ordered probit model.

The share purchased with credit is a continuous variable and was analysed using a simple OLS regression. The robust option was chosen for estimating the standard errors using the Huber-White sandwich estimators.

The explanatory variables in all three models are partly based on the literature review, which identified working capital and social capital as explanations why credit is provided or received. For social capital two proxies are used, number of trading contacts (representing social network capital) and number of regular customers, in line with the models for performance. In addition, personal characteristics (gender, age, education, and languages spoken) are included, as a business characteristics (age of firm, whether firm uses buying agent or broker, total number of people in firm, and number of trucks). Finally control variables year and type of trader are included. To make the link with performance, the same variables are included as for the analysis of performance.

6.3.3   analysing performance

Jabbar et al. (2008) use a comprehensive framework for analysing the factors that contribute to performance, which is used for this study. The relationships between trading performance, assets, trading practices and transaction costs may be specified in the following way:

$Q = f(A; T,C)$ (8)

$A = f(M, K, H, S)$ (9)

where Q is a measure of performance of a trader (volume of purchases); A represents assets. T is some indicator of trading practice(s), which includes mode of payment (credit) as well as intermediaries used, as do Jabbar et al. (ibid). Traders

use a variety of payment terms to settle their transactions of goods and services. Trade credit comes in various forms: I distinguish between sale and purchase trade credit, and advance payments. When deciding payment terms, suppliers simultaneously determine their sales on trade credit, their demand for cash in advance, and their cash sales. Mateut and Zanchettin (2013) for instance, find that while many firms use supplier credit and cash in advance as substitutes, for small vendors, advance payments and credits sales are complementary terms of payment. Most traders are buyers and sellers of sesame and may thus receive credit from their suppliers' credit (purchase credit) as well as provide credit to their customers (sales credit). This chapter focuses on traders who receive credit. Traders use various intermediaries (brokers, and buying and selling agents). I include the total number of intermediaries used. Finally, C represents the transaction costs involved (in terms of time to find a trader, negotiate, etc.).

M, K, H, S are respectively measures or proxies of physical, financial, human, and social capital. Physical capital (M) is proxied by the number of trucks owned. Financial capital (K) is proxied by working capital. Whether a trader has received a loan from the bank was not included. The bank loan may be added to working capital, thus double counting. Around a third of traders received loans from a bank. Because a bank loan may have an influence on the credit received, I tested whether including this variable would make a difference, which was not the case. Number of languages spoken and education level are used for human capital (H). In their study on performance, Fafchamps and Minten use "traders you know" as proxy for social capital (S). I use a close proxy "number of trade contacts". This variable reflects the social *network* capital of a trader. The second proxy for social capital is the number of regular traders whom the trader regularly trades with, because there is a (long-term) relationship. Finally, a number of control variables are included: year, type of trader, gender and age of trader, as well as firm age.

6.3.4   quantile regression to model heterogeneity

The dataset contains traders who display a high degree of heterogeneity in the amount of sesame purchased. Quantile regression models heterogeneous effects of different variables on a dependent variable. It allows for heteroskedasticity among the disturbances (Koenker 2005). The quantile regression model is:

$$q_i = X_i^T \beta + \mu_{\tau i}\mu_{\tau i} \sim H_{\tau i} \ subject \ to \ H_{\tau i} \ (0) = \ \tau(1) \tag{10}$$

where i denotes the individual (trader), q_i is the dependent variable, X_i is the vector of covariates for individual i, β denotes the quantile-specific linear effects, and $0 < \tau < 1$ is a given quantile. Compared with a linear regression model, the coefficients of a quantile regression model are allowed to vary between quantiles. They are represented in (1) as an unknown function of the quantile τ. The unknown error term $\mu_{\tau i}$ is characterised by an unspecified cumulative distribution function $H_{\tau i}$. No specific distributional assumptions are made about $H_{\tau i}$ except that the distribution function at 0 is τ. This is known as a linear quantile restriction which may be relaxed if non-parametric versions of the quantile regression models are used.

The difference between a linear regression model and a quantile regression model is that the former assumes that the response variable is conditionally Gaussian, which means that the mean equation applies to all parts of the distribution. The quantile regression makes no such distributional assumptions, and therefore the conditional quantile function may vary across quantiles. Quantile regression is not the same as the regressions based on split samples because every quantile regression utilises all sample data (with different weights). This means that quantile regressions avoid the sample selection problem arising from sample splitting. In this chapter both methods (quantile regressions and splitting sample data) are used.

6.3.5   Iewbel's approach to take into account endogeneity

Various studies note that social capital and working capital might be endogenous to performance (Fafchamps & Minten 2001b; Minten et al. 2013). Endogeneity issues may therefore play a role in the analyses. A loop of causality between the independent variables credit and social capital and the dependent variable performance is likely to lead to endogeneity issues. The customary approach to take into account endogeneity is to use instrumental variables (IV). Reliance on IV methods usually requires that appropriate instruments are available to identify the model. These instruments (Z), must satisfy three conditions: (i) they must themselves satisfy orthogonality conditions ($E[uZ] = 0$); (ii) they must exhibit meaningful correlations with the suspected endogenous variable X; and (iii) they must be properly excluded from the model, so that their effect on the dependent variable is only indirect.

Finding appropriate instrumental variables that satisfy all three conditions is often problematic. Because this was the case in the regressions analyses presented above, I apply a relatively new method developed by Lewbel (2012), which identifies structural parameters in models with endogenous or mismeasured regressors. The identification comes from having regressors uncorrelated with the product of heteroskedastic errors. This method enables the identification of endogenous regressors when the chosen instrumental variables are weak or non-existent. The method can also be used to increase the efficiency of the estimates of existing instrumental variables. According to Lewbel (2012) identification can be achieved if errors display some heteroskedasticity and if regressors exist that are uncorrelated with the product of these heteroskedastic errors. Lewbel's method follows the traditional two-stage instrumental variable approach, except that the auxiliary equation or "first-stage" regression may be used to provide the necessary components for Lewbel's method.

In the simplest version of this approach (as outlined in Baum et al. 2013), generated instruments can be constructed from the auxiliary equations' residuals, multiplied by each of the included exogenous variables in mean-centred form:

$$Z_j = \left(X_j - \bar{X} \right) \cdot \epsilon \tag{11}$$

where ϵ is the vector of residuals from the "first-stage regression" of each endogenous regressor on all exogenous regressors, including a constant vector. These auxiliary regression residuals have zero covariance with each of the regressors used to construct them, implying that the means of the generated instruments will be zero by construction. If there is clear evidence of "scale heteroskedasticity" with respect to the regressors, their element-wise products with the centred regressors will not be zero. The greater the degree of scale heteroskedasticity in the error process, the higher will be the correlation of the generated instruments with the included endogenous variables which are the regressands in the auxiliary regressions. I make use of this fact by adding a non-significant but highly heteroskedastic variable (margin between selling and buying price, pricemar), to solve problems of unsatisfactory test statistics. Without this additional variable pricemar, the overidentification test of all instruments (Hansen J statistic) fails.

The ivreg2h program for STATA can be used to apply Lewbel's method, which produces three sets of estimates: the standard 2sls (IV) estimates, estimates with only generated instruments, and estimates using both generated and excluded

6

instruments. In the latter case, of an underidentified equation, only the estimates using generated instruments are displayed. The robust option is chosen, which produces robust standard errors.

6.3.6   before and after the ECX

Two sets of data are used, one from 2010 and one from 2012. However, in between these two years, the ECX became a mandatory trading place for all sesame for export (which is over 90% of total sesame production). Linked to the ECX are local Primary Transaction Centres (PTCs), mandatory market places where farmers and different traders meet. These PTCs are equipped with weighing equipment and quality control, for example. The ECX also includes a number of local warehouses, where sesame to be sold at the ECX trading floor in Addis Ababa is stored until it is bought and shipped off. A warehouse receipt system, whereby traders (and occasionally farmers) receive credit is likewise part of the ECX. The obligation to sell through the ECX has had repercussions for the sesame traders, and especially the social trade networks (see chapter five). The formal institution of the ECX appears to have reduced the (need for) social and network capital. This may have had repercussions on the relationship between performance, credit, and social capital.

Care should be taken not to see this as a rigorous "before and after" impact assessment. It is not, as various other external factors may explain the difference between 2010 and 2012, such as (international) prices for sesame, foreign exchange availability, and exchange rate, to mention a few.

6.4   results

6.4.1   determinants of credit

To analyse what role social capital (number of regulars) and network capital (number of trade contact) play in receiving credit, I analyse which factors contribute to the three different variables for credit. Table 24 shows the results.

Table 24: Results of determinants of credit

Variable	Logit credit_yn		Ordered logit oftencredit		Linear regression sharecredit	
Social capital						
Number of trading contacts (sellers) (tradecont)	-0.131	**	-0.083	**	-0.215	
	(0.057)		(0.040)		(0.403)	
Number of regulars (regtrad)	0.003		0.010	***	0.184	***
	(0.002)		(0.002)		(0.015)	
Working capital						
Log of working capital (wcap)	0.394	***	0.056		-3.076	***
	(0.129)		(0.083)		(0.811)	
Personal characteristics						
Gender (sex)	-0.421		-0.073		2.871	
	(0.632)		(0.412)		(5.084)	
Age (age)	0.002		-0.001		-0.244	*
	(0.021)		(0.013)		(0.139)	
Education (edu)	0.364	**	0.027		-4.157	***
	(0.180)		(0.106)		(1.341)	
Number of languages spoken by trader (lan)	-0.488	***	-0.419	***	-2.975	*
	(0.238)		(0.136)		(1.724)	
Variable	**Logit credit_yn**		**Ordered logit oftencredit**		**Linear regression sharecredit**	
Business characteristics						
Age of firm (firm_age)	0.024		-0.004		-0.254	*
	(0.031)		(0.009)		(0.134)	
Buying agent (buyagent)	0.136		0.152	**	-2.445	***
	(0.148)		(0.076)		(0.691)	
Broker (broker)	0.031		0.017		0.239	
	(0.073)		(0.033)		(0.462)	
Total number of people in firm (support)	-0.003		0.001		0.007	
	(0.003)		(0.001)		(0.007)	
Number of trucks (truck)	0.028		-0.012		0.019	
	(0.059)		(0.030)		(0.231)	
Control variables						
Year (2010 or 2012) (year)	-0.706	***	-1.217	***	4.827	***
	(0.218)		(0.151)		(1.493)	
Exporter (expo)	0.390		-0.034		-0.282	
	(0.664)		(0.429)		(4.972)	
Wholesaler (whol)	0.520		0.389		8.502	
	(0.623)		(0.452)		(5.167)	
Retailer (reta)	3.206	**	0.812		9.015	
	(1.348)		(0.590)		(6.839)	
Assembler (asse)	3.085	***	1.560	***	17.482	***
	(0.940)		(0.507)		(5.665)	

6

Variable	Logit credit_yn		Ordered logit oftencredit	Linear regression sharecredit	
Constant (_cons)	1416	***		-10561	***
	437			(3229)	
/cut1			-2452		
			(304.2)		
/cut2			-2447		
			(303.8)		
/cut3			-2444		
			(303.7)		

Logit regression credit_yn	Ordered logistic regression oftencredit	OLS sharecredit
Number of obs = 369		Number of obs = 367
LR chi2(17) = 62.16	Number of obs = 369	F(17, 349) = 29.70
Prob > chi2 = 0.0000	Wald chi2(17) = 110.68	Prob > F = 0.0000
Pseudo R2 = 0.1897	Prob > chi2 = 0.0000	R-squared = 0.6030
Log likelihood = -132.73862	Pseudo R2 = 0.1976	Root MSE = 21.228
	Log pseudolikelihood = -325.326	

Note: the tables for the logit and ordered logistic regression do not contain the marginal effects, and the interpretation of the coefficients should take this into consideration (Greene 2008).

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$, standard errors in parentheses

The main results are that working capital and social capital are often significant but not always. Working capital is significantly and positively related to the likelihood of receiving credit, which makes intuitive sense: traders with sufficient working capital are more likely to pay back the loan and selling traders are therefore more likely to extend credit. It is not significantly related to how often a trader received credit. It is negatively related to the amount purchased with credit, which also makes intuitive sense: traders with sufficient working capital have less need for credit.

The social capital variables show an interesting picture. The total number of trading contacts (sellers of sesame) is significantly but negatively linked to the number of traders who indicated they had received credit and to how often traders received credit. The number of regular contacts is positively related with how often a trader receives credit and the share of sesame purchased with credit. Network capital is therefore important in increasing the prospect of receiving credit, but not on how often traders receive credit. This can be explained by the fact that receiving credit is based on trust, which is more likely to exist between traders with a (long-term) relationship. Knowing many different traders enhances the prospect of receiving credit, but is not related to how much or how often credit is received.

The year is significant. In 2012, traders received credit significantly less often than in 2010: fewer traders indicated that they received credit (credit_yn) and fewer

traders indicated that sellers of sesame extended credit more often (oftencredit). This corresponds with the results obtained in chapter three. The amount purchased with credit (sharecredit) increased, however, by around 5%. The other dummy variables, controlling for type of trader, show that assemblers are more likely to receive credit than other traders. Assemblers are usually small traders and credit is more important to them, as they are often financially constrained.

With respect to personal characteristics, gender and age are not significant factors. Education is significant: traders with higher education are more likely to receive credit, while traders with lower education tend to purchase sesame with a larger share of credit. The number of languages spoken affects receiving credit and purchased share of sesame with credit negatively.

I split the type of intermediaries into buying agents and brokers. Using buying agents increases the likelihood of receiving credit more often but decreases the share of sesame purchased with credit. Using a broker has no effect on credit. The difference between a buying agent and a broker is that a buying agent receives an order to buy a certain amount and uses money provided by his client (the buying trader). A broker merely finds a potential seller for his client (the buying trader). Neither the number of people who are employed by the trader nor the number of trucks is related to credit.

6.4.2   performance, credit, and social capital

Table 25 shows the results for the different models (OLS and Lewbel's approach) incorporating different credit variables (credit_yn, oftencredit, and sharecredit). The model using Lewbel's approach has three instrumented variables: social capital (tradecont), working capital (log, wcap), and credit (credit_yn, oftencredit and sharecredit). The instrumented variables are shown in italics. Incorporating more instrumented variables demands more instrumental variables. Three instrumental variables is already stretching it, and therefore the second proxy for social capital (number of regular traders regtrad) was left out of the analysis. This seems a safe choice, as the variable is not significant and its coefficient is small.[31]

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[31] The sizes of coefficients may not be comparable. To make them comparable, the standardised regression coefficients need to be calculated. When this is done, the standardised regression efficient variable "number of regular traders" is a little larger than the variable for total number of traders' contacts (-0.115 versus -0.100).

Table 25: Total amount purchased (log) with different credit variables; OLS and Lewbel's approach (with generated IVs).

	OLS regression			Lewbel's approach with IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Trading practice						
Suppliers provide credit (0=no, 1=yes) (credit_yn)	-0.114 (0.199)			*0.302* (0.164)		
How often do suppliers let you buy on credit? (1=never, 2=some, 3=all) (oftencredit)		-0.328*** (0.106)			*-0.514*** (0.139)*	
Share of purchases bought with credit (in %) (sharecredit)			0.007** (0.003)			*0.002 (0.003)*
Number of intermediaries used (interm)	-0.037*** (0.013)	-0.042*** (0.014)	-0.032 (0.013)	*-0.037*** (0.010)*	*-0.052*** (0.011)*	*-0.037*** -0.011*
Assets						
Number of trucks (truck)	0.017** (0.008)	0.017** (0.008)	0.017** (0.009)	0.018*** (0.005)	0.015*** (0.005)	0.017*** (0.006)
Log of working capital (wcap)	0.233*** (0.047)	0.243*** (0.048)	0.249*** (0.048)	*0.213*** (0.051)*	*0.245*** (0.050)*	*0.255*** (0.048)*
Total number of languages spoken (lan)	0.109 (0.088)	0.078 (0.086)	0.126 (0.089)	0.111 (0.076)	0.049 (0.074)	0.118 (0.072)
Education (edu)	0.169** (0.066)	0.168** (0.066)	0.194** (0.070)	0.156** (0.060)	0.193 (0.062)	0.167 (0.059)
Total number of traders' contacts (tradecont)	-0.031* (0.017)	-0.036** (0.016)	-0.028* (0.017)	*-0.030* (0.018)*	*-0.051*** (0.016)*	*-0.024 (0.016)*
Total regular contacts (regtrad)	0.000 (0.001)	0.001 (0.001)	-0.002 (0.001)			
Transaction costs						
Log of transaction costs per quintal (tc)	0.295*** (0.058)	0.298*** (0.048)	0.276*** (0.057)	0.267*** (0.045)	0.349*** (0.051)	0.260*** (0.051)
Control variables						
Dummy for 2012 (year)	-1.054*** (0.203)	-1.258*** (0.215)	-1.059*** (0.197)	-0.429*** (0.085)	-0.794*** (0.103)	-0.500*** (0.085)
Exporter (expo)	-0.119 (0.259)	-0.128 (0.253)	-0.113 (0.263)	-0.106 (0.193)	-0.121 (0.201)	0.147 (0.166)

	OLS regression			Lewbel's approach with IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Wholesaler (whol)	-0.558**	-0.506**	-0.633**	-0.794***	-0.651***	-0.206
	(0.297)	(0.290)	(0.298)	(0.232)	(0.242)	(0.203)
Retailer (reta)	-0.969**	-0.901**	-1.066***	-0.787**	-0.509	-0.805***
	(0.408)	(0.407)	(0.414)	(0.307)	(0.357)	(0.254)
Assembler (asse)	-0.541**	-0.408**	-0.695**	-0.726***	-0.329	-0.69**
	(0.291)	(0.279)	(0.303)	(0.253)	(0.247)	(0.32)
Gender of trader (sex)	-0.097	-0.104	-0.112	0.04	-0.079	-0.747
	(0.193)	(0.198)	(0.184)	(0.176)	(0.197)	(0.265)
Firm age (firm_age)	0.018**	0.018**	0.020***	0.017	0.013	0.018
	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.005)
Age of trader (age)	0.002	0.001	0.004	0.008	0.004	0.009**
	(0.008)	(0.008)	(0.008)	(0.005)	(0.005)	(0.005)
Additional heteroskedastic variable (price margin) (pricemargin)				0.1	0.064	0.114
				(0.068)	(0.070)	(0.075)
Constant (_cons)	1.99***	2.46***	1.632***	863.73***	1598.6***	1004.64
	(0.952)	(1.016)	(0.954)	(170.475)	(207.93)	(169.626)

Model	Test statistics
(1)	Number of obs = 365; F(17, 347) = 17.13; Prob > F = 0.0000 R-squared = 0.3898; Root MSE = 1.1496
(2)	Number of obs = 365; F(17, 347) = 20.30; Prob > F = 0.0000 R-squared = 0.4080; Root MSE = 1.1323
(3)	Number of obs = 363; F(17, 345) = 21.03; Prob > F = 0.0000 R-squared = 0.3993; Root MSE = 1.1428
(4)	Number of obs = 369; F(17, 351) = 45.96; Prob > F = 0.0000 Centred R2 = 0.4258 Underidentification test (Kleibergen-Paap rk LM statistic): 109.779; Chi-sq(42) P-val = 0.0000 Weak identification test[32] (Cragg-Donald Wald F statistic): 8.573 (10-20%) Overidentification test of all instruments Hansen J statistic: 48.517; Chi-sq(41) P-val = 0.2958 Exogeneity/orthogonality of suspect instruments C statistic: 0.773; Chi-sq(2) P-val = 0.6795
(5)	Number of obs = 369; F(17, 351) = 39.92; Prob > F = 0.0000 Centred R2 = 0.4479 Underidentification test (Kleibergen-Paap rk LM statistic): 72.877; Chi-sq(42) P-val = 0.0053 Weak identification test (Cragg-Donald Wald F statistic): 3.106 (<30%) Overidentification test of all instruments Hansen J statistic: 45.215; Chi-sq(41) P-val = 0.4210 Exogeneity/orthogonality of suspect instruments C statistic: 2.076; Chi-

[32] Stock-Yogo weak ID test critical values: maximal IV relative bias:
5% 20.66 | 10% 10.81 | 20% 5.77 | 30% 4.04
Source: Stock-Yogo (2005). Reproduced by permission

sq(2) P-val = 0.3542

(6)	Number of obs = 367; F(17, 349) = 33.76; Prob > F = 0.0000
	Centred R2 = 0.4327
	Underidentification test (Kleibergen-Paap rk LM statistic): 81.694; Chi-sq(42) P-val = 0.0007;
	Weak identification test (Cragg-Donald Wald F statistic): 5.102 (20-30%)
	Overidentification test of all instruments Hansen J statistic: 54.772; Chi-sq(41) P-val = 0.1280
	Exogeneity/orthogonality of suspect instruments C statistic: 2.352; Chi-sq(2) P-val = 0.3086

Note: standard errors in brackets. Instrumented variables in italic.

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$, standard errors in parentheses

The test statistics for the Lewbel approach seem reasonable. If the H_0 of the underidentification test (Kleibergen-Paap rk LM statistic) is not rejected, then underidentification is an issue. Underidentification is therefore not an issue for any of the models. The Cragg-Donald Wald F statistics provide values that can be used to identify the IV relative bias. The values are rather low for oftencredit (the IV relative bias is over 30%), which means the instruments are rather weak. For the other two, the bias is acceptable. The Hansen J statistic is used to detect overidentification of all instruments. In this case, if the H0 is rejected, then overidentification is an issue. Overidentification is not an issue in any of the variables. The C statistic is used to check exogeneity of suspect instruments. If the C statistic for instruments is highly significant, the instruments do not appear valid in the context. This is not the case.

In both models, two out of the three credit variables are significant. In the OLS (1) oftencredit (how often suppliers let traders buy on credit) is negatively correlated with the amount purchased and (2) sharecredit (share of purchases bought with credit) is positively linked to amount purchased: 1% increase in purchases with credit, increases the amount purchased by around 1 quintal of sesame[33]. In the Lewbel model, oftencredit is also significant, but sharecredit is no longer significant, while the binary variable credit_yn (do your suppliers provide you credit?) is. The important result is that credit remains significantly linked to performance. The result that traders who receive credit from more traders will purchase less is surprising. Also the result that using more intermediaries is significantly but negatively linked to performance is counter-intuitive and not in

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[33] 0.008*sharecredit=log of purchase; sharecredit=1 then purchase = 1.008 quintal

line with the literature. The question why is explored in the next section, where the effect of type of trader is taken into account.

With respect to the different types of assets, the number of trucks and working capital are both significantly and positively linked to amount purchased, as expected. The human capital variable lan (number of languages spoken) is not significant, while education is (although not for model 6 in table 25). Social capital shows a mixed and again counter-intuitive picture. Total number of traders' contacts (tradecon) is significant, as expected, but negatively linked to performance. Transaction costs are significant in all models and positively linked to performance.

The year control variable is significant for all models and negatively linked to performance. In a following section, the effect of the different years will be further explored by splitting the dataset into two years. Firm age is significant in the OLS models, but not in the Lewbel models.

6.5   are small traders different from large traders?

Some of the counter-intuitive results lead to the suspicion that there might be an omitted variable problem; the results may be better explained taking into account the type and size of trader because there is quite some heterogeneity amongst traders. Assemblers buy sesame either directly from the farmers (mainly in 2010) or at the newly established Primary Transaction Centres (mainly in 2012). Retailers trade between various traders. Wholesalers usually have a fixed market stall at major markets and trade from there. Exporters buy sesame from various other traders, occasionally directly from farmers, and sell to foreign markets. Traders who take up different roles are designated as "mixed activities" traders. Small upstream traders need to buy small amounts of sesame from many farmers and traders and therefore need many trade contacts. They are also financially more constrained. Very large traders typically have a few contacts to whom they sell large amounts. They are usually also less financially constrained. The more downstream traders (exporters) are larger traders in terms of number of employees, warehouse capacity, and working capital, for example.

I explore whether the different traders and their different strategies may explain the results in two ways. For this I use quantile regression to investigate the differences between traders who purchase varying amounts, using quantile plots to analyse the quantile regression results. I also divide the dataset into three subsets
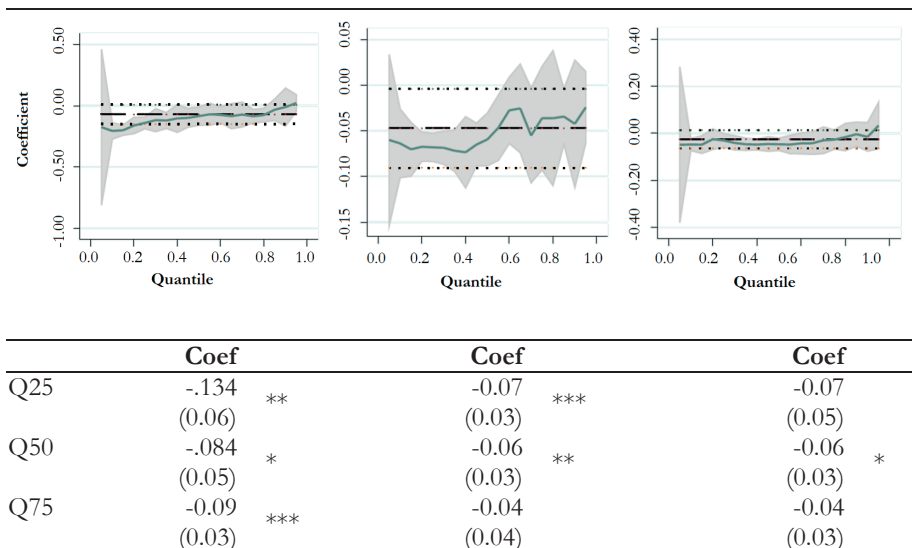
6

representing traders who purchased small amounts, medium amounts and large amounts and run the regressions for the subsets small and large amounts. It is assumed that traders who purchase small amounts are small traders (e.g. assemblers) who operate at the upstream level, while those who purchase large amounts (e.g. exporters) are large traders operating at the downstream level. In reality the categories are not that clean-cut; for instance, there are also relatively small exporters, but overall, the assumptions hold.

The quantile plots show the mean coefficient and the mean confidence intervals (i.e. coefficient and confidence intervals of the OLS), and the coefficients and confidence intervals for the quantile regression. This allows us to detect whether the quantile regression results differ significantly from the standard OLS and whether the size of purchases has an effect. I do not show all regression results, or all graphs, but focus on the most relevant results. The other results are available upon request.

Figure 18 shows the quantile regression results for the variable total number of traders' selling contacts (tradecont) and how often suppliers let traders buy on credit (oftencredit). I show results for 2010, 2012, and both years (all). The large confidence intervals of the low quantiles of 2010 make it difficult to interpret the graphs. I therefore note the regression results as well for the 25th, 50th, and 75th quantiles.

Figure 18: Quantile regression results for total amount purchased showing tradecont and oftencredit, (2010, 2012, and all pooled data)

	Coef		Coef		Coef	
Q25	-.134	**	-0.07	***	-0.07	
	(0.06)		(0.03)		(0.05)	
Q50	-.084	*	-0.06	**	-0.06	*
	(0.05)		(0.03)		(0.03)	
Q75	-0.09	***	-0.04		-0.04	
	(0.03)		(0.04)		(0.03)	

	Coef		Coef		Coef	
Q25	-0.12		-0.10		-0.21	*
	(0.13)		(0.26)		(0.13)	
Q50	-0.15		-0.18		-0.26	***
	(0.17)		(0.26)		(0.09)	
Q75	-0.35	**	-0.25		-0.42	***
	(0.17)		(0.19)		(0.11)	
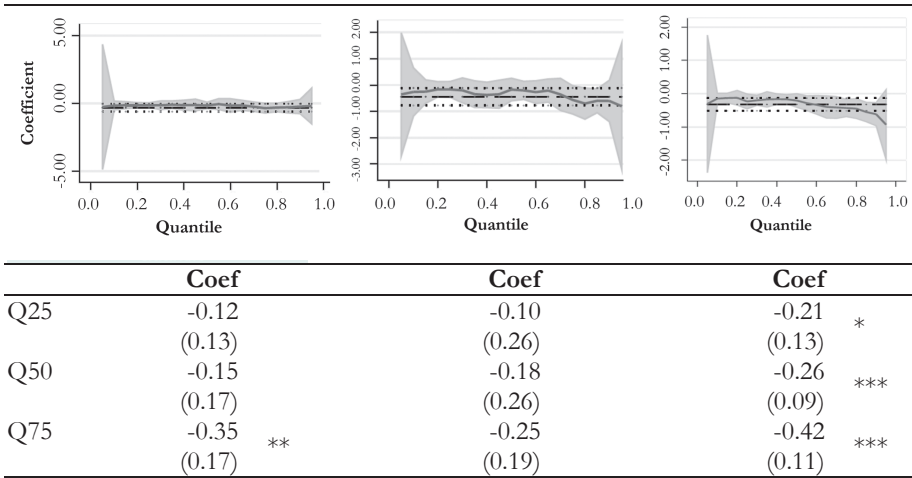
* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

The quantiles of the dependent variable (performance) are on the horizontal axis with the coefficient magnitudes on the vertical axis. The OLS coefficient is plotted as a dashed horizontal line with the confidence interval as two dotted horizontal lines around the coefficient line. The quantile regression coefficients are plotted as solid lines with shaded confidence intervals around them. If the quantile coefficient is outside the OLS confidence interval, there are significant differences between the quantile and OLS coefficients (as denoted by the significance in the tables). The quantile coefficients for the number of trading contacts (tradecon) on performance are significantly different from the OLS coefficients in 2010 and for lower quantiles in 2012. Traders with more trading contacts have a lower performance level; those with fewer trading contacts have a higher performance level. The quantile regression results for oftencredit show that very large traders receive trade credit from fewer traders. The effect becomes larger with higher quantiles: for the first 25% the coefficient is -0.213, and it is almost double for the remaining 75% (-0.419).

The quantile regression results only show the effects of the variables tradecon and oftencredit on performance, comparing small traders to large traders. To investigate whether total number of contacts and credit has a positive effect on amount purchased for small and large traders, I needed to run the regressions for

the subset of small and large traders. Table 26 shows the results of the OLS regression for the smallest 30% of traders.[34]

Table 26: OLS regression results for total amount purchased by small and large traders (smallest and largest third of all traders)

	(1)		(2)		(3)	
	Small	Large	Small	Large	Small	Large
Trading practices						
Suppliers provide credit (0=no, 1=yes)	0.011**	-0.304				
	(0.158)	(0.201)				
How often suppliers let you buy on credit (1=never, 2=some, 3=all)			0.018	-0.098		
			(0.108)	(0.087)		
Share of purchases bought with credit (in %)					0.006*	-0.000
					(0.003)	(0.002)
Number of intermediaries used	-0.010	-0.017	-0.010	-0,015	-0.004	-0.017
	(0.016)	(0.013)	(0.016)	(0.013)	(0.016)	(0.013)
Assets						
Number of trucks	-0.039	-0.002	-0.039	0.001	-0.035	0.001
	(0.109)	(0.008)	(0.109)	(0.007)	(0.100)	(0.013)
Log of working capital	0.028	-0.007	0.029	-0.020	0.050	-0.026
	(0.058)	(0.045)	(0.059)	(0.043)	(0.060)	(0.045)
Total number of languages spoken	-0.044	-0.022	-0.013	-0.017	-0.010	-0.003
	(0.110)	(0.067)	(0.117)	(0.066)	(0.116)	(0.063)
Education	0.344***	-0.009	0.355***	-0.012	0.377***	-0.023
	(0.105)	(0.051)	(0.107)	(0.051)	(0.101)	(0.050)
Total number of traders' contacts (sellers)	0.062*	0.031*	0.063*	0.028	0.063*	0.031*
	(0.035)	(0.19)	(0.034)	(0.019)	(0.032)	(0.019)
Total regular contacts	-0.002**	0.000	-0.003**	0.001	-0.004***	0.000
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Transaction costs						
Log of transaction costs per quintal	0.160*	-0.109*	0.159*	-0.113*	0.141	-0.116*
	(0.090)	(0.061)	(0.087)	(0.061)	(0.087)	(0.060)

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[34] Instead of following the quantile regression subsets and selecting 25%, I chose to make the selection a little larger to obtain more observations. As a test, I also ran the regression with smaller subsets and obtained similar results.

	(1)		(2)		(3)	
	Small	Large	Small	Large	Small	Large
Control variables						
Year (2010 or 2012)	-0.144	0.249*	-0.140	0.203	-0.158	0.265*
	(0.108)	(0.140)	(0.107)	(0.153)	(0.102)	(0.139)
Exporter	-1.869	-0.146	-1.869	-0.193	-1.891*	-0.190
	(1.300)	(0.134)	(1.302)	(0.131)	(1.204)	(0.127)
Wholesaler	-0.556	-0.158	-0.455	-0.144	-0.586	-0.137
	(0.341)	(0.183)	(0.340)	(0.174)	(0.360)	(0.174)
Retailer	-1.273**	-0.223	-1.273**	-0.253	-1.400**	-0.284
	(0.550)	(0.244)	(0.556)	(0.225)	(0.569)	(0.227)
Assembler	-0.021	-0.584***	-0.007	-0.653***	-0.182	-0.663***
	(0.349)	(0.190)	(0.350)	(0.177)	(0.387)	(0.176)
	(1)		**(2)**		**(3)**	
	Small	Large	Small	Large	Small	Large
Gender	-0.135	-0.55	-0.134	-0.046	-0.122	-0.050
	(0.206)	(0.169)	(0.204)	(0.186)	(0.206)	(0.181)
Firm age	0.011	-0.001	0.010	-0.002	0.009	-0.002
	(0.021)	(0.005)	(0.203)	(0.006)	(0.020)	(0.006)
Age of trader	0.003	-0.002	0.002	-0.002	0.006	-0.003
	(0.010)	(0.005)	(0.010)	(0.005)	(0.011)	(0.005)
Constant	292.40	-492.29*	285.63	-397.93	321.74	-522.60*
	(217.14)	(282.97)	(215.35)	(306.85)	(205.14)	(279.53)
Number of obs = 124	Number of obs = 124	Number of obs = 124	Number of obs = 124	Number of obs = 123	Number of obs = 124
$F_{(17, 106)}$ = 2.23	$F_{(17, 106)}$ = 1.81	$F_{(17, 106)}$ = 2.11	$F_{(17, 106)}$ = 1.83	$F_{(17, 105)}$ = 2.07	$F_{(17, 106)}$ = 1.91
Prob > F = 0.0071	Prob > F = 0.0358	Prob > F = 0.0114	Prob > F = 0.0332	Prob > F = 0.0133	Prob > F = 0.0247
R-squared = 0.3943	R-squared = 0.1822	R-squared = 0.3944	R-squared = 0.1642	R-squared = 0.4149	R-squared = 0.1546
Root MSE = 0.67016	Root MSE = 0.50009	Root MSE = 0.67008	Root MSE = 0.50557	Root MSE = 0.66118	Root MSE = 0.50848

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.001$, standard errors in parentheses

Table 26 shows that small traders who obtain credit, as well as small traders who have a higher share of sesame bought with credit are significantly more likely to purchase larger amounts of sesame. These relationships are not significant for large traders. Whether a small trader received credit from some or many traders is not significant (although the sign is positive, as expected). The total number of contacts now is positively and significantly linked to the amount purchased, both for small and large traders. Although regular suppliers were not significant in earlier models, it turns out that for *small* traders, the number of regular suppliers is negatively linked to the amount purchased. These results may be explained by the

fact that having regular suppliers is a constraint to purchase more sesame, because if a trader has several regular suppliers, he or she is obliged to purchase from them, even if they cannot supply sufficient amounts. The results for the largest 30% of traders show that having regular suppliers is not a constraint for these traders.

Another surprising result is that although transaction costs are significant for both small and large traders, signs are positive for small traders and negative for large traders. Apparently, for small traders putting in more effort in finding trade partners and bargaining, for example, is positively linked to purchase size. For large traders, though, it is negatively linked. These results match with the different strategies that small upstream and large downstream traders pursue. Small traders put a great deal of effort into purchasing a large number of small amounts of sesame, while large traders have a few trading contacts from whom they purchase large amounts of sesame. To take into account endogeneity issues, I compared the results in table 26 with results obtained using Lewbel's approach. The main results remain unchanged and the results are not shown here.

6.6   before and after the ecx

Table 27 shows the results for the two years. Several variables are significantly different between the years. The variable regular contacts is left out again, as including it as an endogenous variable would stretch the Lewbel approach (generating weak instruments). As the variable regular contacts was not significant in table 25, omitting the variable will not change the analysis much.

Table 27: GMM model using Lewbel's IVs approach with Generated Instruments and External Instruments (2010 and 2012)

	2010			2012		
	(1)	(2)	(3)	(1)	(2)	(3)
Trading practices						
Suppliers provide credit (0=no, 1=yes)	-1.366*** (0.248)			0.517*** (0.132)		
How often suppliers let you buy on credit (1=never, 2=some, 3=all)		-0.325* (0.190)			-0.246 (0.160)	
Share of purchases bought with credit (in %)			0.012*** (0.003)			0.001*** (0.003)
Number of intermediaries used	-0.027* (0.015)	-0.024 (0.018)	-0.040*** (0.014)	-0.045 (0.021)	-0.043** (0.021)	-0.040** (0.020)

	2010			2012		
	(1)	(2)	(3)	(1)	(2)	(3)
Assets						
Total number of traders' contacts	-0.047**	-0.056**	-0.058***	-0.047***	-0.057***	-0.059**
	(0.021)	(0.025)	(0.018)	(0.012)	(0.013)	(0.012)
Log of working capital	0.330***	0.327**	0.372***	0.151**	0.110	0.145*
	(0.053)	(0.060)	(0.051)	(0.085)	(0.094	(0.092)
Number of trucks	0.002	-0.003	-0.005	0.027***	0.034**	0.033**
	(0.008)	(0.011)	(0.008)	(0.009)	(0.011)	(0.011)
Total number of languages spoken	0.184**	0.170*	0.194**	-0.005	-0.018	-0.006*
	(0.090)	(0.090)	(0.090)	(0.100)	(0.101)	(0.098)

	2010			2012		
	(1)	(2)	(3)	(1)	(2)	(3)
Education	-0.062	-0.048	-0.040	0.480***	0.504*	0.498*
	(0.066)	(0.066)	(0.067)	(0.089)	(0.093)	(0.084)
Transaction costs						
Log of transaction costs per quintal	0.202**	0.153*	0.090	0.309	0.372*	0.367*
	(0.078)	(0.082)	(0.0700)	(0.053)	(0.058)	(0.055)
Control variables						
Exporter	0.109	0.074	-0.113	-0.063	0.055	0.125
	(0.154)	(0.170)	(0.143)	(0.451)	(0.458)	(0.490)
Wholesaler	0.434*	0.363	0.407*	-0.803*	-0.563	-0.555
	(0.225)	(0.276)	(0.224)	(0.430	(0.443)	(0.471)
Retailer	0.226	-0.061	-0.136	-0.964*	-0.617	-0.404
	(0.329)	(0.399)	(0.272)	(0.544)	(0.543)	(0.558)
Assembler	0.610*	0.398	0.326	-1.121**	-0.577	-0.784
	(0.279)	(0.287)	(0.234)	(0.442	(0.457)	(0.497)
Gender	0.019	-0.009	0.061	-0.108	-0.168	-0.213
	(0.135)	(0.142)	(0.157)	(0.263)	(0.267)	(0.276)
Age of trader	0.002	0.006	0.005	0.003	-0.014***	-0.004***
	(0.006)	(0.006)	(0.006)	(0.009)	(0.008)	(0.009)
Firm age	0.018	0.014***	0.015***	0.024	0.028**	0.021**
	(0.004)	(0.004)	(0.004)	(0.017)	(0.016)	(0.016)
Constant	1.030	0.771	-0.394	1.417	2.793	1.551
	(0.917)	(1.027)	(0.929)	(1.224)	(1.482)	(1.323)

Note: to save space, the test statistics for these regression analysis are shown in appendix 4. Endogenous variables in italic.

* p< 0.10 ** p< 0.05 *** p<0.001, standard errors in parentheses

Whilst appreciating the limitations of this analysis, it is clear that significant changes occurred between 2010 and 2012. The most notable change is the switch from negative to positive of the coefficient for credit_yn (whether traders received credit or not). This result may be explained by taking into account the results obtained for small traders. In 2012, traders were officially no longer allowed to buy from farmers directly, but were obliged to purchase sesame via the primary transaction centres (PTCs), where farmers are also obliged to sell their sesame.

Although the data shows that several assemblers still (illegally) purchase directly from farmers, the PTCs have basically taken over the main role that assemblers fulfilled: aggregating numerous small amounts of sesame. Although various assemblers are purchasing from PTCs, many have also stopped, thus decreasing the number of very small traders. This is confirmed by the fact that in 2012, the average amount of sesame purchased (per trader) has increased. The "small trader effect" is consequently reduced in 2012.

The age of the trader becomes significant but negative in 2012: older traders purchase less than their younger colleagues. The number of languages spoken is no longer an asset in 2012; the sign is negative. Education becomes a significant factor in 2012; traders with higher education levels are able to purchase more. The number of trucks a trader possesses becomes a significant factor in 2012, while warehouse capacity becomes a negative factor.

6.7   discussion and conclusions

Credit is an important factor in explaining the performance (amount purchased) of sesame traders in Ethiopia. However, the role of credit is not straightforward. On the one hand, traders who are able to buy on credit from their supplier are able to purchase more because they increase their working capital. On the other hand, receiving credit is linked to the number of regular suppliers (social capital), which may limit traders' ability to purchase from other traders who may offer better prices, higher quality, or more quantity. Having many trade contacts (social *network* capital) allows a trader to quickly "shop around" and get the best deal. However, having many trade contacts is negatively linked to receiving credit; only trusted, regular trade contacts will provide credit. The nexus between social (network) capital, performance, and credit is therefore not clear-cut.

This is exemplified when differentiating between small traders who are positioned upstream in the trade network and large traders who are located downstream. The quantile regression results show that small upstream traders who need to obtain sufficient amounts of sesame from many small sellers, rely on a network of trade contacts from whom they purchase. However, the results also show that having more trade contacts reduces the likelihood of obtaining credit. This hurts small traders because in general, they are more financially constrained and need trade credit to increase their working capital to purchase larger quantities

of sesame. These conclusions correspond with those of Kihanga (2010) who argues that the importance of using trade credit in financing the purchase of goods by (small) traders reflects the difficulties that these firms are faced with when trying to get credit. Having regular trade contacts is positively linked to obtaining credit, but reduces the amount of sesame purchased.

Large traders need less credit because they have more financial means (larger amounts of working capital). Nor do they seem to need a large network of trade contacts, but appear to have a few trade contacts from whom they are able to purchase large amounts of sesame. This fits with their upstream position, where the quantities of traded sesame are aggregated.

The findings also have methodological implications, as they highlight the consequences of pooling different types of traders and years in one dataset. Taking averages of these traders may miss crucial differences between different types of traders. As noted, small traders upstream will employ different strategies than their colleagues at the downstream end because they face different challenges.

This chapter has explored the social capital, credit, and performance nexus also by comparing different years and the possible effect of the ECX. Chapter five finds that the ECX formalised relationships between traders, reducing social capital. This seems to have had repercussions on trade credit: in 2012, traders received credit significantly less often than in 2010; fewer traders indicated that they received credit and fewer traders indicated that sellers of sesame extended credit more often. However, the amount purchased with credit increased. Although trade credit reduced, it still seems to play an important role in explaining the total amount purchased, and it even gains in importance because the relationship between whether a trader has received credit or not and performance flips from being negative in 2010 to positive in 2012. Thus, while social capital relationships have changed after the ECX, the role of social and social network capital in obtaining credit and purchasing sesame remains important. This seems to suggest that the ECX has yet not replaced trade credit with more formal forms of credit (e.g. through its warehouse receipt system). This corresponds with a previous study's findings that the warehouse receipt system, created to provide credit to farmers as well as traders, appears to serve only the large traders as yet (Coulter 2012)

The policy implications are that more needs to be done to also alleviate credit constraints for small traders, especially with the formalisation of trade relationships within the context of the ECX. Small traders are, due to the size of their business, often not eligible for loans from formal financial institutions. More informal financial institutions usually focus on farmers and farmers' groups.

7.1   introduction

This thesis analyses institutional change, specifically how a designed, formal institution (the Ethiopian Commodity Exchange or ECX), which became mandatory for all sesame trade in late 2010, changed informal market institutions in the Ethiopia's sesame markets. It hypothesises that the ECX will be successful if it can complement existing informal institutions or substitute less effective informal institutions in terms of coordination and enforcement. For the ECX to succeed, it also means that a critical mass of agents (i.e. traders and farmers) needs to begin, even if gradually, to modify their beliefs and actions to form a new equilibrium as a result of the ECX. The analyses in this thesis use data collected in 2009 and 2012 among farmers in two main sesame producing areas of Ethiopia (West Tigray and East Wellega) as well as data collected in 2010 and 2012 among different traders (from collectors to exporters) in different sesame markets. The datasets collected in 2009 and early 2010 represent the "before the ECX" situation and those collected in 2012 the "after the ECX" situation.

The question how the ECX has impacted informal institutional arrangements is analysed on two levels, which are described in the first chapter. The first level is the more theoretical question of how institutional change occurs, in particular how informal institutions consisting of norms and beliefs change when a designed formal institution is enforced; and whether the formal institution complements or substitutes informal institutions. The second level links up with the question of whether a formal, designed institution can actually achieve what it intended, namely bring more market transparency, reduce transaction costs, and benefit (small) farmers and traders alike, or whether there have been unintended consequences. In my view, two scholars who worked together on agricultural markets in Africa embody two different views. Eleni Gabre-Madhin became a strong proponent of the ECX as a researcher, and went on to become its first CEO, while Marcel Fafchamps, in his book on African markets, warned that no matter how carefully researched a development solution is, there will be always unintended (negative) consequences.

This thesis provides several insights. First, on the more theoretical question of institutional change in section 7.2 and how the ECX complemented and substituted informal institutions in section 7.3. Second, it considers the two different viewpoints of Gabre-Madhin and Fafchamps on the intended and unintended consequences of the ECX, and links this with policy recommendations

in section 7.4. I discuss the limitations of my research and make a few recommendations on measuring informal institutions in section 7.5. Finally, several avenues for future research are suggested in section 7.6.

7.2   institutional change

This thesis supports Eggertsson's suggestions (2005) that the successful transfer or introduction of new social technologies is more complex than the transfer of production technologies because pre-existing institutional arrangements often undermine the effect. The 2010 traders' survey finds that before the ECX became mandatory for all sesame trade in late 2010, it was hardly used by traders, who preferred to continue to rely on their informal social networks.[35] The lack of support from traders was already signalled in an early review of the commodity exchanges in Africa by Robbins (2011). As Eggertsson (ibid) predicted, the existing institutional arrangements apparently suited the traders fine and they opposed the imposition of the ECX. The same seems to hold true for farmers. The 2012 farmers' survey finds that farmers prefer not sell to the mandatory Primary Transaction Centres (PTCs), but to existing market outlets (e.g. collectors and local markets) if they had the choice. However, successful institutional reform depends on active support from a large portion of relevant actors (i.e. critical mass) (Aoki 2001). In addition, commodity exchanges can only function effectively if they achieve sufficient market size, both in terms of number of participants as well as volume of trade (Mbeng Mezui et al. 2013). To achieve institutional change, the Ethiopian government decided to make the ECX mandatory. Ethiopia has the capacity to enforce the use of the commodity exchange. Reportedly, traders may be sentenced to up to 20 years in jail if they circumvent the ECX (Mbeng Mezui et al. 2013).

Other African commodity exchanges, which have not been made mandatory, are languishing (Sitko & Jayne 2012). Sitko & Jayne (ibid) point out that commodity markets in Zambia have evolved in such a way that informal institutions, characterised by interpersonal relationships between buyer and seller, have become of paramount importance in mitigating various risks (e.g. contract

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[35] The lack of critical mass and therefore lack of institutional change can still be seen in the maize markets: it is not mandatory to trade maize through the ECX and maize trade on the ECX has all but petered out.

enforcement, ensuring availability of supplies, and protecting against severe price collapses). These informal institutions are more reliable and more trusted than the formal institution of the Zambian Commodity Exchange (Zamace). This echoes Stiglitz' (2001, p. 67) warning noted in chapter one: "A real disaster may happen when states are powerful enough to disrupt an existing local cooperative status but not capable enough to replace it with anything functional and less arbitrary". Therefore, making commodity exchanges mandatory may not always solve the problem of languishing commodity exchanges but may make problems worse: there is always the risk that effective informal institutions are replaced by ineffective formal institutions.

In this line, it is noteworthy that Robbins (2011) observes that no commodity exchange in Africa has been initiated by the traders themselves, while most commodity exchanges in developed countries (e.g. CBOT in the USA on which the ECX was modelled) were established and developed by the (grain) traders themselves (see Pirrong 1995a).[36] In these countries, institutional change was initiated by the traders themselves; institutional change was in their own interest. Pirrong (1995b; 1995a) also describes how crucial a supportive government and formal institutions were for the CBOT, e.g. to avoid market manipulation by powerful traders and to protect property rights. However, introducing new elements to the CBOT (e.g. a grading system) was only possible with the cooperation of the participants, whose costs were compensated. This illustrates that institutional change (establishing a commodity exchange) required a large portion of relevant actors willing to change existing informal institutions, with formal institutions substituting and/or complementing these changing informal institutions. This leads to the next section, on how informal and formal institutions may complement and/or substitute each other.

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[36] In this light it is striking that Gabre-Madhin (2012, p. 6) states that she "stumbled upon (...) almost by accident" an informal grain exchange, having seen traders and brokers in the Addis Ababa grain market gathered to trade at 6 a.m. every morning: "all of this happened by tradition, with no government invoment at all". This informal commodity exchange led her to come up with the idea to establish a formal commodity exhange.

7.3   complements and substitutes

This thesis provides evidence that formal and informal institutions are both complements and substitutes, depending on the perspective. Chapters three and four show that the ECX has provided complementary functions, which has fostered farmers' trust of traders. Chapters five and six show that the ECX has substituted informal governance mechanisms, but has eroded trust between traders.

Chapter three explains that the informal institutions between farmers and traders before the ECX were characterised by farmers' distrust of traders. Farmers in West Tigray and East Wellega had rather negative beliefs about traders' opportunistic behaviour; they expected traders to provide false market and price information, and be dishonest about weight, quality standards, and collusion (agreeing on prices). Farmers who were located far away from markets, who had no means of transport, and who felt they lacked price information were especially likely to distrust traders. Chapter three argues that when farmers lack a "yardstick" for assessing traders' behaviour, distrust in traders prevails. There was very little relational contracting, and the general distrust among farmers was likely an impediment. Farmers who had relatively more favourable views of traders were more likely to visit more market outlets, presumably to reduce price risk, but which also impeded the development of relational contracting. Dixit (2004) proposes that the absence of formal institutions creates informal, alternative institutions to provide coordination (information) and enforcement mechanisms instead. However, there seems to be an implicit assumption in the theoretical literature that these informal alternative institutions consist of social capital, with related coordination and enforcement mechanisms such as relational contracting and reputation mechanisms, for example. Chapter three shows that this is not always the case.

Chapter four describes what happens when the formal, imposed institution of the ECX (through the PTCs and ECX warehouses) improves market transparency (through certified weighing equipment, standard grades, and price information). As the existing informal institutions lacked a mechanism for market transparency, the ECX provided complementary institutional arrangements. These appear to have reduced transaction costs and improved farmers' beliefs about the opportunistic behaviour of traders. As a result, it seems trust is being built up between farmers and traders: farmers are entering into relational contracting slightly more, and obtaining credit from traders substantially more, although it is

still early days for firm conclusions. The findings of this chapter have an interesting link with the literature on customary and formal law. Aldashev et al. (2012a) argue that under certain conditions the modern law can act as an outside anchor or a "magnet", pulling the custom in a direction favourable to marginalised groups. Cecchi and Melesse (2014) test this in Ethiopia and find that even if participants do not use the modern law, the mere fact they have this option changes the behaviour of customary judges. A similar process may be happening with the PTCs. Even if farmers do not use these, the mere fact that they have this option may change the behaviour of traders. In this way also, formal institutions complement informal ones.

Chapters five and six on traders find that the ECX has substituted informal institutions that existed among traders. Chapter five, using the framework of Ahlerup et al. (2009), illustrates nicely Stiglitz' prediction discussed in chapter one, that as a formal institution develops, several functions of the social network capital will become less useful, and some of the network of interpersonal relations gets dispensed with (Stiglitz 2001). The value of social network capital with its personal relation declines, replaced by formal contracts. Chapter five finds that as trade in sesame is increasingly governed by the formal ECX institution, rather than informal institutions, the social (network) capital of traders is changing: traders appear to have broadened their trading network, rely more frequently on traders with whom they do not have social relations, and have reduced the provision of credit that cements personalised relationships. They also have lower levels of trust in the intentions and capabilities of their trading partners, and attach less weight to trust.

Chapter six delves a bit deeper into the consequences of the change in social capital, analysing the interrelationship between credit, social capital, working capital and performance (amount of sesame purchased). Social capital is important for obtaining credit, which increases a traders' working capital. However, using social capital to obtain credit can also be restricting: it means traders have a few trusted trade partners, which may limit their ability to buy from other traders. It is the small traders at the upstream end of the trade network who are most constrained by social capital, because they need to assemble small amounts of sesame from a large number of trade contacts, but also need credit most. The ECX has decreased social capital and made trade credit less common although its importance did not decrease, putting small traders in a bind. The pre-existing informal institutions between traders might have been more effective for small traders. Substituting pre-

existing informal arrangements may therefore lead to unintended consequences, which leads us to the next section.

7.4   policy recommendations: intended and unintended consequences

This thesis provides various answers to the policy problem Fafchamps and Gabre-Madhin were tackling. The short answer is that both were right. Gabre-Madhin has stated that the goal of the ECX was not to eliminate traditional markets around the country, but to build up these informal markets by adding technology and systems to bring about more transparent, more efficient, and more reliable trading (Gabre-Madhin 2012, p. 6). This thesis shows that many of the intended consequences of the ECX have been achieved, finding that it has increased market transparency for farmers and reduced their transaction costs, and that it has reduced disagreements among traders. It is important that the ECX, the Ethiopian government and international donors keep focusing on these objectives, and do not see the means to achieve these goals, i.e. setting up and running commodity exchanges as a goal in itself.

However, Fafchamps was right in that there are always unintended consequences. This thesis finds that the ECX has led to an erosion of social capital among traders. This is not always a bad thing: farmers note there is less collusion among traders, for instance. However, the erosion of social capital could, in theory, attenuate or reverse the potential welfare gains associated with the expansion of formal institutions (such as commodity exchanges). For example, Dixit (2004) compares the outcomes of relational and formal contracting, and demonstrates that opportunities created by formal contracting may undermine the scope for relational contracting. But even in the absence of such outcomes, it is important for policy makers to realise that formal institutions have an effect on informal institutions, and that the expansion of formal contracts, by new regulations or policies, may invite the erosion of norms and informal rules in the same or adjacent domains of human interaction. It seems unlikely that the ECX will come to a halt at some near point in the future, but there are some signs (described in chapter two) that it is not always operating optimally, and is prone to the rent-seeking behaviour of local managers. This is a troubling facet in itself, but combined with declining social capital among traders, it poses a real risk, as trust is crucial for markets to function: both trust in market institutions and trust between trading partners. One of the

consequences of the erosion of social capital seems to be that traders provide less trade credit to each other, which especially hurts small traders. The ECX and the government of Ethiopia should therefore ensure that traders trust and benefit from the ECX.

In this respect, the ECX and the Ethiopian government should be troubled by the fact that although the ECX and the PTCs are contributing to market transparency, they are regarded with suspicion by farmers and traders. Chapter four finds that the PTCs are not the favoured market outlets of farmers. I argue that the reason may lie in the fact that farmers in Ethiopia have long viewed government-run institutions with suspicion, based on negative experiences with the communist Derg regime and the government's control over cooperatives. Traders initially did not use the ECX and view the heavy involvement of the government in establishing and running the ECX with suspicion. Gabre-Madhin, then CEO of the ECX was well aware of this, stating she was troubled by the "perception that because the Government of Ethiopia sponsored ECX and fully owns it, ECX cannot be a free market, that it must be an instrument of control and a typical, bureaucratic, state-owned enterprise, and that it must be a monopoly" (Gabre-Madhin 2012, p. 15). She has refuted this criticism, explaining that the ECX is a unique public–private partnership, sponsored by Ethiopia's government (with donors) while its members obtain the private benefits.

This may be true, but if the work of North et al. (2009; 2013) is taken seriously, and Ethiopia is seen as a "Limited Access Order", for which chapter two provides reasonable justification, it should be accepted that the ECX will probably function differently than its counterparts in developed countries (or "Open Access Orders"). Pretending that there is no difference between the institutional environments of the US and Ethiopia, and that the ECX is just like the Chicago Board of Trade, only in a poor country, misses the crucial point North et al. (ibid), are trying to make. In a Limited Access Order, the political and economic systems are not independent; politics and economics are intimately intertwined. The Ethiopian government is therefore likely to remain heavily involved in the ECX and sesame trade in general. It is telling that it has made the ECX mandatory for Ethiopia's two main lucrative export crops (coffee and sesame), while it has left grains to traditional markets (despite the fact that grains are the "classic"

commodity exchange crops).[37] International donors who are interested in supporting the establishment of commodity exchanges in other African countries, based on the ECX model, should take this into account. Their best hope is that governments take on a coordinating role, reducing uncertainty and providing solutions to coordination and enforcement problems, as many Asian governments have done (Gollwitzer Franke & Quintyn 2012; Mbeng Mezui et al. 2013).

However, to take up this role, Ethiopia's government will need to see traders as reliable partners and collaborate with them.. The perception held by many in Ethiopian society that traders are untrustworthy might be linked to the history of traders in Ethiopia described in chapter two. Historically, trade was seen as an inferior profession, practiced by outsiders or members of the lower tiers of society. Although this has changed, with an increasing number of Ethiopians of different backgrounds becoming involved in trade, negative perceptions have persisted. It seems that the many functions traders perform remain invisible to policy-makers. The Ethiopian Commodity Exchange Authority (ECEA) states in its working paper on sesame that "in line with the goals and objectives of the Ethiopia Commodity Exchange (ECX), relentless efforts have to be made to reduce market chains" (Abera 2011, p. 22). "Cutting out the middleman" has mistakenly become a synonym for making value chains or markets more efficient or effective (Arya et al. 2015; Sharma et al. 2013). If this aim is pursued without recognising the various important functions traders and intermediaries perform in value chains and markets, but purely based on negative beliefs about traders, it is likely to backfire and lead to the "unintended consequences" Fafchamps warns about. Instead of focusing on cutting out traders and intermediaries, the Ethiopian government should focus on further increasing market transparency, while supporting and cooperating with traders. This is also emphasised by Mbeng Mezui et al. (2013) in their guidebook on African commodity exchanges.

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[37] Especially in coffee there have been several "unintended consequences" because coffee is, basically, not suited for a commodity exchange. Gabre-Madhin addressed these as CEO (Gabre-Madhin 2012) and various modifications were made, but the ECX remained mandatory for coffee.

7.5   measuring informal institutions: limitations and recommendations

Measuring institutional change takes time. The ECX has had several direct impacts on informal institutions but may also have (more indirect) impacts that will emerge over a longer time period, making causal inferences more difficult and increasing the need to control for confounding factors. The time lag between the creation of the ECX and the ex post measurements of this thesis is short, and attribution is far from perfect because a proper control group does not exist – the ECX affected all participants in sesame trade. A partial solution to this is to construct data sets that include groups affected by the ECX in different degrees. In an ideal scenario, panel data are used to control for unobserved, time invariant, individual heterogeneity. Lab-in-field experiments may provide additional support for findings, as such set-ups minimise identification issues. Cecchi and Melesse (2014) provide an example of a lab-in-field experiment to test the interaction between formal and informal dispute resolution institutions.

The research in this thesis relies heavily on survey data and quantitative methods. The data and quantitative analyses occasionally provided counter-intuitive results, but were of limited use to answer why. Having visited Ethiopia several times, during which I talked to farmers and traders, I also learned that in-depth interviews are likely to result in contradicting information and opposing viewpoints as well. Every time I was in Ethiopia, I felt I had only scratched the surface. Asking over a thousand farmers the same question may reveal more than asking one farmer a thousand questions. Nonetheless, there is added value in additional anthropological and social research that traces changes in farmers' and traders' views, beliefs, and relationships during the institutional change in Ethiopia's sesame markets.

Using a quantitative approach to measure rather obscure concepts such as trust and social capital is not easy, yet important. At the time of writing these conclusions, a search on Google Scholar for "trust" resulted in over 2.6 million sources, while "social capital" produced almost 1.2 million. As discussed in chapter three, there is no unique definition of trust (or of social capital for that matter), and there is no consensus on how to measure it. The literature of New Institutional Economics (NIE) is useful in thinking about these nebulous concepts. The rigorous concepts of Aoki (2001), combined with the theory of NIE scholars such as North (1990) and Greif (1994; 2006) on the importance of beliefs in institutional development, were instrumental in the choice of Likert scales to measure beliefs

7

(e.g. perceptions of trustworthiness) in a quantitative manner. It is somewhat surprising that Likert scales are not used more often to measure trust perceptions, especially because the most commonly used definition of trust is the belief (or expectation) about someone else's behaviour. This thesis shows Likert scales can be a rather useful and rigorous method for measuring trust.

The framework of Das and Teng (2001) is useful in distinguishing the difference between trust perceptions about opportunistic behaviour ("goodwill trust") and trust perception about someone's ability ("trust in ability"). The realisation that farmers or traders may not trust a trader to pay because of these two reasons (i.e. either he is untrustworthy, or short on cash) is an important distinction to make. However, because this thesis focuses on informal institutions, and relatedly, social capital, the first definition (goodwill trust) plays a more important role in the analysis.

7.6   further research

This thesis provides several avenues for subsequent research, first on institutional change and second on the effectiveness of the ECX. With respect to the first level, this thesis finds that improved market transparency seems to increase farmers' trust in traders, leading to more relational contracting and credit relations. Little research has been conducted on improving market transparency, which not only includes prices information, but also includes standardised weights and grades. Most research has been conducted on the impact of price information, e.g. on the improved bargaining positions of farmers, market participation, and price fluctuation (e.g. David-Benz et al. 2011; Svensson & Yanagizawa 2010; Aker 2010; Muto & Yamano 2009). To my knowledge very little research has linked this to trust relationships between farmers and traders (but see Molony 2008). Further research could explore whether the relationship between increased market transparency and trust perceptions exists in other settings. Experimental research might be useful to test whether increasing market transparency leads to changed perceptions among farmers and traders. Follow-up research in Ethiopia may confirm that farmers' perceptions of and trust in traders has continued to improve as a result of the ECX. This could be identified by using the Likert scales for trust perceptions, but also by the number of farmers who engage in relational contracting, or credit relations.

In general, agricultural traders are a crucially important yet chronically under-researched set of actors, especially small traders (e.g. see Sitko & Jayne 2014). Fafchamps made an important contribution with his seminal book on market institutions in sub-Saharan Africa (Fafchamps 2004), which greatly improved the understanding of the informal institutional arrangements of traders that underpin African markets. This thesis discovered the importance of making a distinction between different types of traders in research on traders. Small traders use different strategies than large traders, for instance with respect to social (network) capital. More research is needed not only on the function and roles traders perform, but also on the different institutional arrangements used by different traders in order to better understand how institutions that underpin agricultural markets may be improved.

With respect to the second level, on the effectiveness of the ECX, there are several suggestions to make, as very few, if any studies have been done on the impact of the ECX on farmers or traders. Studies by Robbins (2011) and Coulter (2012) being the exceptions (the study by Coulter was never officially published). Renkow & Slade (2013) state that an evaluation of the ECX is urgently needed. I agree, especially because the ECX is being touted as the model for other African commodity exchanges (Mbeng Mezui et al. 2013). The focus of this thesis is on the interaction of the ECX and informal institutions and therefore limited in its scope to assess whether the ECX has achieved all of its objectives. However, this thesis may provide a building block for follow-up work to answer questions that are still open.

First, an important topic is whether the ECX has led to improved marketing margins for both farmers and traders. This is not just about farmers obtaining higher prices, which the ECX claims to have achieved (Gabre-Madhin 2012), although this is an interesting question. Assessing marketing margins takes a broader view as measuring margins indicates how much has been paid for the processing and marketing services applied to the product at a particular stage in the marketing process (Wohlgenant 2001). Taking into account the cost of the marketing services provided by the ECX will provide a more informative assessment than only the prices farmers receive.

Second, the issue of market information provided by the ECX is an area that should be explored more thoroughly. One topic is whether the ECX, through its price information system, has led to more arbitration opportunities for traders,

7

and therefore less price variation between markets and in time. Another topic is how market information is and should be provided to farmers. The ECX has relied heavily on ICT for disseminating price information. This thesis finds that the ECX has not yet been successful in providing accessible price information to farmers. This thesis also finds that different types of farmers want different types of market information. Further research should be focused on how the ECX can deliver timely and relevant market information to farmers, few of whom have electricity and almost none of whom have a mobile phone.

Third, it would be useful to explore other formal institutions that aim to achieve similar objectives as the ECX. Such research is important because the alternatives may be less costly than the proposed commodity exchanges in Africa. As Robbins (2011, p. 5) stated in his review of commodity exchanges in Africa: "it seems likely, that so much faith was invested in the new top-down, commodity exchange-based system to deliver country-wide reforms, that funding for the nuts and bolts of a basic agricultural market system has been crowded out". No official figures are available on what the costs of establishing and running the ECX have been. A report by the African Development Bank estimates that costs were above US$50 million, with some estimates exceeding US$100 million (Mbeng Mezui et al. 2013). The designed, formal markets in Tanzania (the so-called MVIWATA markets) are an interesting alternative of a more basic agricultural market system.[38] Several wholesale markets (e.g. for maize, fruits and vegetables, and fish) were established in Tanzania by not only building the infrastructure, but also by imposing market rules enforced by an elected market board and by increasing transparency through mandatory weighing scales, keeping records of prices on a blackboard. There are many similarities between the objectives of these markets and those of the ECX and especially the PTCs. Follow-up research may take on similar questions raised in this thesis, focusing on how formal market institutions impact pre-existing informal institutions in Tanzania.

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[38] The MVIWATA markets have not been evaluated thoroughly either, except for a short study commissioned by MVIWATA (MVIWATA 2013), which provides preliminary evidence that the markets have provided several benefits for traders and farmers.

APPENDICES

appendix 1 addressing endogeneity through bioprobit estimation

An appropriate instrument requires that it is not correlated with the disturbance terms in the equation of interest as it would yield a biased and inconsistent instrumental variable estimator (Murray 2006). Tests of overidentifying restrictions address this: if and only if an equation is overidentified, can it be tested whether the excluded instruments are appropriately independent of the error process. The regression analysis is not overidentified, and I could not perform a test such as the Sargan-Hansen test of overidentifying restrictions. However, deviations from the exclusion restriction may have only small influences upon precision when the instruments are strong (Conley et al. 2010), which can be tested. An appropriate instrument also requires that it is not strongly correlated with the suspected endogenous variable; if not, it would have a larger mean square error than OLS. A rule of thumb for checking the strength of an instrument is using the first-stage F statistic: when there is a single endogenous regressor, a first-stage F above 10 indicates that the instrument is strong (Stock & Watson 2003, p. 315). More precise statistics and critical values for detecting weak instruments are provided by Stock and Yogo (2005).

For instrument used, I assume that farmers who are inherently inquisitive will collect market information but do not necessarily have a more negative perception of traders. To measure this trait, which cannot be measured directly, a dummy variable was composed from two other variables that are related to obtaining information. The first variable is whether farmers have information on the production potential of cash crops, the second is whether farmers have information on quality standards of sesame. Farmers who have information on both were scored as being inherently inquisitive. Farmers who have information on only one or on none of these variables were scored as non-inquisitive farmers. The Heckman 2SLS procedure was used to obtain the results for the first stage regression and the F statistic, which is 13.9, above the critical value provided by Stock and Yogo (2005). This findings suggests that Infodummy is a sufficiently strong instrument, implying that any deviations from the exclusion restriction will have only small influences upon precision (Conley et al. 2010).

Greene (2008, p. 827) suggests that when both the dependent variable and the endogenous variable are binary, a bivariate probit model can be used. It is less clear what model is best if both the dependent variable and the endogenous

variable are ordered categorical data. Buscha and Conte (2010) suggest that a semi-ordered bivariate probit model is appropriate when the dependent variable is ordered with more than two choices and the endogenous variable is binary (see also Greene & Hensher 2010). Bivariate ordered probability models can be derived from the latent variable model. Assume that two latent variables

$$y^*_{1i} = x_{1i}\,\beta_1 + \varepsilon_{1i}$$
$$y^*_{2i} = x_{2i}\,\beta_2 + \gamma y^*_{1i} + \varepsilon_{2i} \tag{1}$$

where β_1 and β_1 are vectors of unknown parameters, γ is an unknown scalar, ε_1 and ε_2 are the error terms, and subscript i denotes an individual observation. The explanatory variables in the model satisfy the conditions of exogeneity such that $E(x_{1i}\,\varepsilon_1) = 0$ and $E(x_{2i}\,\varepsilon_2) = 0$

A user-written Stata program (bioprobit) by Sajaia (2009) allows the estimation of a two-equation ordered probit model by means of the general Full-Information Maximum Likelihood Estimates (FIML) algorithm. The option for clustering according to village (kebele) is chosen for the standard errors. Details of the bioprobit regression are available from the author upon request. For the dummy variables, the marginal effects need to be calculated to obtain more information on the size of the effects. However, there is still no conventional agreement on what exactly should be analysed: Greene and Hensher (2010) state that for a bivariate model, it is not obvious what margin is of interest. Partial effects for this model are complicated functions of the parameters regardless of how they are defined. Therefore, we only provide the coefficients and significance levels. The direction and significance levels correspond with those of the ordered probit model.

Table 28: Summary of ordered probit model and bioprobit model

	Ordered probit			Bioprobit
	dPr(B=1) negative perception	dPr(B=2 neutra perception	dPr(B=3 positiv perception	Coefficient
Market information				
NoMrktInfo	0.157***	0.111***	-0.268***	-1.031**
	(0.040)	(0.017)	(0.050)	(0.459)
NoTransp	0.147**	0.094***	-0.241***	-0.620***
	(0.067)	(0.016)	(0.077)	(0.196)
TravelTime	0.000	0.000	-0.001	-0.001
	(0.000)	(0.000)	(0.001)	(0.002)

	Ordered probit			Bioprobit
	dPr(B=1) negative perception	dPr(B=2) neutral perception	dPr(B=3) positive perception	Coefficient
Experience with traders				
TraderUnexp	0.090**	0.106**	-0.196**	-0.487**
	(0.036)	(0.047)	(0.081)	(0.203)
NoTraderChoice	-0.045	-0.053	0.097	0.242
	(0.033)	(0.033)	(0.066)	(0.160)
PriceDiff	0.003**	0.004***	-0.007***	-0.017***
	(0.001)	(0.001)	(0.003)	(0.007)
Price	-0.231**	-0.274***	0.505**	1.249**
	(0.106)	(0.100)	(0.202)	(0.503)
Revenue	-0.001***	-0.002***	0.003***	0.007***
	(0.000)	(0.000)	(0.001)	(0.002)
PriceFail	-0.050***	-0.051***	0.101***	0.254***
	(0.018)	(0.016)	(0.033)	(0.079)
PriceQual	-0.081***	-0.095**	0.176***	0.436***
	(0.023)	(0.041)	(0.062)	(0.163)
PriceQuan	-0.142**	-0.168**	0.310**	0.759**
	(0.062)	(0.082)	(0.141)	(0.370)
Environmental and institutional factors				
LstLoss	-0.052***	-0.063***	0.115***	0.286***
	(0.016)	(0.024)	(0.039)	(0.099)
EthnConfl	0.033	0.033	-0.066	-0.167
	(0.069)	(0.057)	(0.126)	(0.311)
HealthProb	-0.044**	-0.050***	0.093***	0.230***
	(0.017)	(0.012)	(0.029)	(0.067)
FoodShort	0.010	0.013	-0.023	-0.060
	(0.024)	(0.031)	(0.054)	(0.133)
Drought	0.027**	0.033**	-0.060**	-0.152**
	(0.011)	(0.017)	(0.027)	(0.066)
Personal characteristics				
Region	0.076	0.090	-0.166	-0.422
	(0.076)	(0.100)	(0.175)	(0.432)
Gender	-0.001	-0.001	0.003	0.002
	(0.011)	(0.013)	(0.024)	(0.061)
Age	0.001	0.001	-0.001	-0.003
	(0.001)	(0.001)	(0.001)	(0.003)
Land	0.002	0.002	-0.005	-0.011
	(0.002)	(0.002)	(0.004)	(0.011)
Edu	0.014	0.017	-0.031	-0.075
	(0.014)	(0.015)	(0.029)	(0.070)
CropDiv	-0.036*	-0.043*	0.079*	0.199*
	(0.021)	(0.025)	(0.046)	(0.115)
NoMrktInfo				
Infodummy				0.392***

Bioprobit:
Wald chi2(22) = 158.69
Log pseudolikelihood = -857.75286
Prob > chi2 = 0.0000
Rho: 0.220 (s.e.: 0.213; 95% Conf. Interval: -0.2124493 0.5807508)
LR test of indep. eqns. : chi2(1) = 0.32 Prob > chi2 = 0.5728

The Wald test rejects the null hypothesis of exogeneity (rho=0), which means that the error terms in the structural equation (probit) and the reduced-form equation for the endogenous variable (instrumented regression) are correlated, leading to the conclusion that NoMrktInfo is in fact endogenous. However, because rho is not very large (0.22) NoMrktInfo is only be weakly endogenous.

appendix 2 addressing endogeneity through lewbel's method

Because the choice of the "infodummy" instrument is debatable and other appropriate external instruments are not available, I apply Lewbel's (2012) method to identify endogenous variables. This method enables the identification of endogenous regressors when the chosen instrumental variables are weak or non-existent. The method can also be used to increase the efficiency of the estimates of existing instrumental variables. According to Lewbel (2012) identification can be achieved if errors display some heteroskedasticity and if regressors exist that are uncorrelated with the product of these heteroskedastic errors. The method generates instruments by first regressing each endogenous variable on all exogenous variables and a constant. The residuals from these auxiliary regressions are then multiplied by each exogenous variable in mean-centred form. The product of the residuals with the exogenous variables in mean-centred form generates the external instruments. With new external instruments generated, the method allows Sargan-Hansen tests of orthogonality in case of exact identification with standard external instruments. I use the ivreg2h program for STATA to apply Lewbel's method, which produces three sets of estimates: the standard 2sls (IV) estimates, estimates with only generated instruments, and estimates using both generated and excluded instruments. I show the results with only generated instruments, leaving out possible weak instruments. I assume that NoMrktInfo is endogenous, price is endogenous, and both NoMrktInfo and Price are endogenous. I could not use the option cluster by village (kebele) because the number of clusters was insufficient to calculate robust covariance matrix singleton dummy variable (dummy with one 1 and N-1 0s or vice versa). Instead, the robust option was chosen. Table 29 presents the results.

Stata provides several test statistics. First the underidentification test (Kleibergen-Paap rk LM statistic): if H0 is not rejected, then underidentification is an issue. This is not the case for any of the three models. The weak identification test (Cragg-Donald Wald F statistic) shows that the generated internal instruments are sufficiently strong; for market information, it is below the 10% maximal IV relative bias, for price it is even below 5% maximal IV relative bias, and for the two combined it is again well below the 20% maximal IV relative bias. If H0 is rejected then over-identification is an issue. The Hansen J statistic is used to test

overidentification of all instruments. In this case, none of the three models suffer from overidentification

The reported model coefficients show that the three indicators for market information remain highly significant, in line with the earlier results. In addition, no transport remains significant, and travel time becomes significant, although the effect is small. These outcomes simply provides additional support for the main result that a lack market information increases the negative perception that farmers have about traders.

Table 29: Summaries of Ordered Probability Model and GMM model with Lewbel's method (generated instruments only).

	Ordered probit	Lewbel's method (with generated instruments and IV infodummy for NoMrktInfo)		
	significance levels	NoMrktInfo endogenous	Price endogenous	NoMrktinfo & price endogenous
Constant		0.080	1.638***	-0.128
		(0.354)	(0.397)	(0.255)
Market information				
Mrktinfo[a]	***	-0.147*	-0.429***	-0.151*
		(0.087)	(0.074)	(0.078)
NoTransp[a]	***	-0.174***	-0.384***	-0.203***
		(0.055)	(0.081)	(0.053)
TravelTime	**	-0.001***	-0.001*	-0.001***
		(0.000)	(0.000)	(0.000)
Experience with traders				
TraderUnexp[a]	***	-0.194***	-0.268***	-0.202***
		(0.045)	(0.059)	(0.118)
NoTraderChoice[a]	***	0.111***	0.127**	0.141***
		(0.042)	(0.059)	(0.177)
PriceQual[a]	***	0.132***	0.253***	0.044***
		(0.043)	(0.058)	(0.042)
PriceQuant[a]	***	0.145	0.504***	0.042*
		(0.106)	(0.125)	(0.101)
PriceDiff	***	-0.005**	-0.010***	-0.007***
		(0.002)	(0.003)	(0.002)
Price	***	0.404***	0.749***	0.566***
		(0.154)	(0.192)	(0.112)
Rev	***	0.002***	0.003***	0.002***
		(0.000)	(0.001)	(0.000)

	Ordered probit	Lewbel's method (with generated instruments and IV infodummy for NoMrktInfo)		
significance levels		NoMrktInfo endogenous	Price endogenous	NoMrktinfo & price endog.
Environmental and institutional factors				
Region[a]		-0.178	-0.293	-0.091
		(0.151)	(0.178)	(0.112)
CropDiv	*	0.109***	0.077	0.074
		(0.037)	(0.056)	(0.034)
Drought[a]		-0.038	-0.106***	-0.037
		(0.050)	(0.062)	(0.050)
Ethnconfl[a]		-0.054	-0.180	-0.064
		(0.111)	(0.163)	(0.110)
FoodShort[a]		0.032	-0.036	0.035
		(0.047)	(0.063)	(0.046)
HealthProb[a]	**	0.072*	0.107*	0.068*
		(0.042)	(0.059)	(0.040)
Lstloss[a]	***	0.076*	0.165***	0.073*
		(0.042)	(0.058)	(0.041)
PriceFail[a]	*	0.053	0.151**	0.067
		(0.047)	(0.067)	(0.045)
Personal characteristics				
Age		-0.001	-0.002	-0.001
		(0.002)	(0.003)	(0.002)
Edu		-0.041	-0.042	-0.056 *
		(0.033)	(0.044)	(0.033)
Gender[a]		-0.040	0.041	-0.041
		(0.079)	(0.092)	(0.078)
Land		-0.002	-0.003	-0.001
		(0.003)	(0.004)	(0.003)
NoMrktinfo endogenous				

Underidentification test
(Kleibergen-Paap rk LM statistic): 83.574; Chi-sq(22) P-val = 0.0000
Weak identification test
(Cragg-Donald Wald F statistic): 13.392
(Kleibergen-Paap rk Wald F statistic): 12.036
Stock-Yogo weak ID test critical values:

5% maximal IV relative bias 21.41
10% maximal IV relative bias 11.40
20% maximal IV relative bias 6.20
30% maximal IV relative bias 4.39
10% maximal IV size 71.85
15% maximal IV size 37.57
20% maximal IV size 25.90
25% maximal IV size 20.01

Source: Stock-Yogo (2005). Reproduced by permission. Critical values are for Cragg-Donald F statistic and i.i.d. errors.
Hansen J statistic (overidentification test of all instruments): 41.416
Chi-sq(21) P-val = 0.0106

appendix 3 online references

Questionnaires used for farmerssurveys in 2009 and 2012 and trader surveys in 2010 and 2012 available at
https://www.researchgate.net/profile/Gerdien_Meijerink

Additional regression analyses linked to chapter 5 available online (paywalled) at Food Policy website:
http://www.sciencedirect.com/science/article/pii/S030691921400089X

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appendix 4 test statistics for chapter 6

Test statistics for 2010

purchase (log of amount purchased) with sharecredit as credit variable	purchase (log of amount purchased) with credit_yn as credit variable	purchase (log of amount purchased) with oftencredt as credit variable
Underidentification test (Kleibergen-Paap rk LM statistic): 55.265 Chi-sq(37) P-val = 0.0272	Underidentification test (Kleibergen-Paap rk LM statistic): 49.337 Chi-sq(37) P-val = 0.0845	Underidentification test (Kleibergen-Paap rk LM statistic): 55.014 Chi-sq(40) P-val = 0.0573
Weak identification test (Cragg-Donald Wald F statistic): 3.564 (Kleibergen-Paap rk Wald F statistic): 8.875 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.54 10% maximal IV relative bias 10.81 20% maximal IV relative bias 5.82 30% maximal IV relative bias 4.09 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.	Weak identification test (Cragg-Donald Wald F statistic): 1.367 (Kleibergen-Paap rk Wald F statistic): 2.295 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.54 10% maximal IV relative bias 10.81 20% maximal IV relative bias 5.82 30% maximal IV relative bias 4.09 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.	Weak identification test (Cragg-Donald Wald F statistic): 2.748 (Kleibergen-Paap rk Wald F statistic): 3.950 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.59 10% maximal IV relative bias 10.81 20% maximal IV relative bias 5.80 30% maximal IV relative bias 4.07 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
Hansen J statistic (overidentification test of all instruments): 44.566 Chi-sq(36) P-val = 0.1548	Hansen J statistic (overidentification test of all instruments): 34.433 Chi-sq(36) P-val = 0.5432	Hansen J statistic (overidentification test of all instruments): 36.617 Chi-sq(39) P-val = 0.5791

Test statistics for 2012

purchase (log of amount purchased) with sharecredit as credit variable	purchase (log of amount purchased) with credit_yn as credit variable	purchase (log of amount purchased) with oftencredit as credit variable
Underidentification test (Kleibergen-Paap rk LM statistic): 99.530 Chi-sq(73) P-val = 0.0213	Underidentification test (Kleibergen-Paap rk LM statistic): 54.661 Chi-sq(40) P-val = 0.0611	Underidentification test (Kleibergen-Paap rk LM statistic): 58.011 Chi-sq(40) P-val = 0.0326
Weak identification test (Cragg-Donald Wald F statistic): 4.059 (Kleibergen-Paap rk Wald F statistic): 7.787 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.81 10% maximal IV relative bias 10.77 20% maximal IV relative bias 5.66 30% maximal IV relative bias 3.92 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.	Weak identification test (Cragg-Donald Wald F statistic): 4.706 (Kleibergen-Paap rk Wald F statistic): 12.535 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.59 10% maximal IV relative bias 10.81 20% maximal IV relative bias 5.80 30% maximal IV relative bias 4.07 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.	Weak identification test (Cragg-Donald Wald F statistic): 6.946 (Kleibergen-Paap rk Wald F statistic): 10.740 Stock-Yogo weak ID test critical values: 5% maximal IV relative bias 20.59 10% maximal IV relative bias 10.81 20% maximal IV relative bias 5.80 30% maximal IV relative bias 4.07 Source: Stock-Yogo (2005). Reproduced by permission. NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
Hansen J statistic (overidentification test of all instruments): 87.592 Chi-sq(72) P-val = 0.1020	Hansen J statistic (overidentification test of all instruments): 44.956 Chi-sq(39) P-val = 0.2365	Hansen J statistic (overidentification test of all instruments): 46.722 Chi-sq(39) P-val = 0.1849

The underidentification test and the overidentification test show that there are no problems for these regression results. However, the weak identification tests show that the generated instruments are rather weak.

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SAMENVATTING

Sesam is niet het eerste dat in je opkomt als je aan Ethiopië denkt, maar toch is sesam het op één na belangrijkste exportgewas van Ethiopië en een belangrijke cashcrop voor veel boeren. In de afgelopen decennia zijn de sesamproductie en export snel gegroeid. Sesammarkten in Ethiopië, net als veel andere Afrikaanse markten voor landbouwproducten, worden gekenmerkt door hoge transactierisico's en kosten. De meeste Afrikaanse markten worden bepaald door informele instituties die problemen van coördinatie (of informatie) en handhaving van afspraken proberen op te lossen. Eleni Gabre-Madhin, die uitvoerig Ethiopische graanmarkten had bestudeerd, heeft een grote rol gespeeld bij het oprichten van Ethiopië's eerste landbouwbeurs (de Ethiopian Commodity Exchange of ECX). De ECX zou een oplossing moeten bieden voor coördinatie en handhavings-problemen, en als doel hebben de transactierisico's en -kosten voor zowel boeren als handelaars te verminderen. De Ethiopische overheid heeft de ECX in 2008 opgericht voor een aantal gewassen, met inbegrip van sesam. Echter, toen duidelijk werd dat niet veel handelaars gebruik maakten van de ECX, heeft de overheid eind 2010 de ECX verplicht gesteld voor handel in sesam. Even later heeft de overheid de "primaire transactiecentra" of Primary Transaction Centres (PTCs) verplicht gesteld voor handelaars en boeren die sesam willen kopen en verkopen. De PTCs zijn gevestigd in de meeste dorpen en verschaffen prijsinformatie, kwaliteitsstandaarden en gecertificeerde weegschalen. De oprichting van de ECX vormt een belangrijke institutionele verandering in de sesammarkten in Ethiopië, maar waar nog niet veel onderzoek naar is gedaan. De ECX wordt beschouwd als een model voor andere Afrikaanse landen, en het is belangrijk om het effect dat de ECX heeft gehad beter begrijpen. Marcel Fafchamps, die met Gabre-Madhin werkte aan onderzoek naar Afrikaanse markten, is veel voorzichtiger geweest in het leveren van oplossingen voor het verbeteren van de Afrikaanse markten, en waarschuwde voor onbedoelde gevolgen.

Markten zijn belangrijk voor economische ontwikkeling, maar toch heeft de moderne hoofdstroom in de economie niet meer dan vluchtige aandacht gegeven aan markten als institutie. Echte markten, vooral die in Afrika, voldoen niet aan het beeld van de "perfecte markt" dat wordt gebruikt in de economische theorie. Om de rol van marktinstituties te begrijpen, zijn twee zaken belangrijk. De eerste is de rol en de complexiteit van de institutionele regelingen (zowel formeel als informeel)

die oplossingen bieden voor problemen van coördinatie (of informatie) en handhaving; de tweede is het mechanisme van institutionele verandering in de tijd. Een belangrijke vraag in de literatuur is hoe formele op informele instituties inwerken en veranderen.

Dit proefschrift behandeld deze vraag door te analyseren wat het het effect van de ECX (die kan worden gezien als een nieuwe formele, ontworpen institutie) is geweest op reeds bestaande sociale normen (de informele instituties) en de (spontane) informele institutionele verandering die de ECX heeft teweeggebracht. De vraag hoe formele instituties en informele instituties op elkaar inwerken heeft ook betrekking op de verschillende standpunten van Gabre-Madhin en Fafchamps. De ECX is succesvol als het bestaande informele instituties, waar nodig, kan aanvullen en minder effectief informele instituties kan vervangen op het gebied van coördinatie en handhaving. Als de ECX wil slagen, betekent het ook dat een kritische massa van actoren (d.w.z. handelaars en boeren) moet beginnen, zelfs al is dit geleidelijk, hun denkbeelden en activiteiten aan te passen om zo een nieuw evenwicht te vormen.

In hoofdstuk een identificeer ik twee belangrijke onderzoeksvragen die in dit proefschrift worden behandeld. Ten eerste, wat waren de reeds bestaande sociale normen, overtuigingen en informele instituties die gebruikt werden door boeren en handelaars vóór de ECX? Ten tweede, welke invloed heeft de formele, ontworpen institutie van de ECX op de informele institutionele regelingen (bijvoorbeeld sociaal kapitaal) gehad? Deze vragen worden geanalyseerd met behulp van vier datasets. Gegevens werden verzameld voor en nadat de ECX verplicht werd gesteld in 2010. Twee datasets werden verzameld door het interviewen van boeren in West Tigray en East Wellega (in 2009 en 2012). Nog twee datasets werden verzameld door middel van interviews met handelaars in verschillende markten in het noordoosten van Ethiopië (begin 2010 en 2012).

In hoofdstuk twee wordt achtergrondinformatie verstrekt over sesammarkten Ethiopië. Het biedt een historisch overzicht van het beroep van handelaars in Ethiopië, en beschrijft hoe traditioneel de handel werd gezien als een minderwaardige bezigheid, uitgevoerd door buitenstaanders of leden van de lagere klassen. Landbouw, daarentegen, werd gezien als het meest respectabele beroep. Hoewel dit is veranderd in Ethiopië (handel is een lucratieve bezigheid geworden die door verschillende leden van de Ethiopische samenleving is opgepakt), kunnen deze historische, culturele beelden verklaren waarom handelaars nog steeds gezien

worden als onbetrouwbaar. Sesam is een gewas dat goed groeit in ongunstige omstandigheden, het gedoogd droogte en arme gronden, waardoor het een belangrijke cashcrop is voor boeren die in achtergestelde gebieden van Ethiopië wonen (merendeels in het noordoosten). Het wordt geoogst aan het einde van het jaar, net voordat de peulen openspringen en de sesamzaden verstrooien.

Verschillende soorten handelaars (kleine verzamelaars of assemblers, groothandelaars, detailhandelaars, exporteurs) houden zich bezig met sesam handel, verzamelen kleine hoeveelheden uit afgelegen gebieden in Ethiopië, vervoeren deze via verschillende regionale markten naar Addis Ababa of export bestemmingen (via de haven van Djibouti). De complexiteit van de handel betekent dat handelaars verschillende tussenpersonen (brokers, selling, buying en consignment agents) inhuren die het bijeenbrengen van vraag en aanbod vergemakkelijken.

De ECX werd opgericht in 2008 en eind 2010 werd de ECX verplicht gesteld voor alle sesamhandel bestemd voor de export. De ECX is een "open outcry" markt, gevestigd in Addis Ababa, waar sesamcontracten worden verhandeld. De fysieke zakken sesam bevinden zich in gelieerde opslagplaatsen verspreid over Ethiopië, waar de sesam wordt gewogen en ingedeeld in kwaliteitsklassen. De ECX is ook gekoppeld aan de PTC's die zich in de meeste dorpen (kebeles) bevinden. Boeren en bevoegde sesamhandelaars (met licentie) zijn verplicht om op deze PTC's sesam te (ver)kopen. PTCs bieden onder andere prijsinformatie (via de ECX), standaard kwaliteitsklassen en weegschalen. Marktinformatie is een belangrijk onderdeel. Omdat de meeste boeren geen (mobiele) telefoon hebben, en vaak zelfs geen elektriciteit hebben, beschikken ze niet over actuele informatie over markten, inclusief prijzen. Uit de in dit proefschrift verzamelde sesamprijzen blijkt dat sesamprijzen een hoge mate van fluctuatie vertonen en dat prijzen verschillen tussen markten. Sesamprijzen stegen sterk in de afgelopen jaren, evenals de inflatie in Ethiopië.

In hoofdstuk drie richt ik me op de sociale normen, overtuigingen en informele instituties in sesam markten in West Tigray en East Wellega voor ECX. Hoewel vertrouwen een voorwaarde is voor goed functionerende markten, blijkt uit deze studie dat dit vertrouwen over het algemeen ontbreekt bij de geïnterviewde boeren. De meeste boeren zien handelaars als opportunistisch en slechts zeer weinig boeren hebben een langdurige handelsrelatie met vertrouwde handelaars. Het hoofdstuk gaat in op de vraag waarom. Ik vind dat een gebrek aan marktinformatie is gekoppeld aan een negatief beeld over de betrouwbaarheid van

223

handelaars; zonder informatie vinden boeren het moeilijk om de betrouwbaarheid van handelaars bepalen. Ik analyseer de relatie tussen deze negatieve beeldvorming en het deelnemen aan markten, en vind een voorlopige indicatie dat boeren die een negatiever beeld van handelaars hebben minder deelnemen aan markten, en verkopen aan minder afzetkanalen. De implicaties voor beleid zijn dat door te investeren in marktinformatie, het vergroten van markttransparantie door certificerende weegschalen en het instellen van kwaliteitsklassen en normen, vertrouwen tussen boeren en handelaars kan worden bevorderd.

In hoofdstuk vier onderzoek ik of de nieuw opgerichte ECX via de gelieerde PTCs heeft geleid tot het verbeteren van transparantie in markten. Er wordt verondersteld dat een transparantere markt zal leiden tot lagere transactiekosten voor boeren. Het hoofdstuk bouwt voort op hoofdstuk drie, waarin de hypothese wordt gesteld dat betere marktinformatie zou leiden tot meer vertrouwen tussen boeren en handelaars. Ik vind bewijs dat de ECX succesvol is geweest in het verhogen van transparantie van de markt en het verminderen van transactiekosten. Ik betoog dat handelaars zich minder opportunistisch gedragen als gevolg van grotere markttransparantie en dat dit heeft geleid tot een verbeterd vertrouwensbeeld van boeren over handelaars en zelfs tot een lichte stijging van relationele contracten en een significante toename van krediet.

In hoofdstuk vijf onderzoek ik of de oprichting van de ECX en de formele controle en handhaving instituties de rol van sociaal kapitaal en vertrouwen in het Ethiopische segment van de sesam waardeketen heeft beïnvloed. Consistent met een eenvoudig theoretisch marketing model, suggereren de gegevens dat dit inderdaad het geval is. De handel in sesam wordt steeds meer beheerst door formele, in plaats van informele, instituties, en als antwoord hierop lijken handelaars hun handelsnetwerk te hebben verbreed, ze handelen vaker met handelaars met wie zij geen sociale relaties hebben, en verstrekken minder krediet dat persoonlijke relaties verstevigd. Ze hebben ook minder vertrouwen in de bedoelingen en mogelijkheden van hun handelspartners, en hechten minder gewicht aan vertrouwen. Beleidsmakers dienen zich derhalve er bewust van te zijn, dat uitbreiding van formele instituties tot een erosie aan normen en informele regels kan leiden (eventueel met dubbelzinnige welvaartsimplicaties).

In hoofdstuk zes analyseer ik handelskrediet dat een belangrijke bron van financiering is voor handelaars, met name in minder ontwikkelde landen. Het hoofdstuk maakt gebruik van de twee enquêtes onder 195 Ethiopische sesam

handelaars gehouden in 2010 en 2012, om het verband tussen prestaties, krediet en sociaal kapitaal te onderzoeken. Om krediet te verkrijgen, heeft een handelaar sociaal kapitaal nodig (een paar vertrouwde handelspartners), maar dit kan zijn vermogen om van andere handelaars te kopen beperken. Ik vind dat kleine handelaars, die aan het begin van het handelsnetwerk staan, krediet het meest nodig hebben, maar tegelijkertijd moeten ze ook kleine hoeveelheden sesam verzamelen door gebruik te maken van een groot aantal handelscontacten. De ECX, die na 2010 verplicht werd voor alle sesam handel, heeft tot gevolg gehad dat er minder handelskrediet wordt gegeven, hoewel het belang ervan niet is verminderd. De beleidsimplicaties zijn dat er betere kredietfaciliteiten beschikbaar zouden moeten zijn voor kleine handelaars, die meestal over het hoofd gezien worden in microkredieten en die meestal ook weinig contant geld ter beschikking hebben.

In het laatste hoofdstuk zeven bespreek ik de bevindingen van de vorige hoofdstukken en trek ik conclusies op twee niveaus. Het eerste niveau is de theoretische vraag over de institutionele veranderingen en hoe de oprichting van een formeel, ontworpen markt institutie informele markt instituties beïnvloedt. Ik ontdek, in lijn met onderzoek van Nieuwe Institutionele Economie (NIE), dat al bestaande (informele) institutionele regelingen vaak de introductie van een formele, ontworpen institutie ondermijnen. Sesamhandelaars vermeden de ECX voordat deze verplicht werd gesteld. Boeren geven aan dat de PTC's niet hun favoriete afzetkanaal is, en zij zouden waarschijnlijk ook de PTC's vermijden als ze niet verplicht waren er te verkopen. Als de ECX niet was verplicht gesteld door de overheid van Ethiopië, zou er waarschijnlijk weinig institutionele verandering zijn. Het verplicht stellen van beurzen houdt echter een risico in; effectieve informele instituties kunnen hierdoor worden vervangen door ineffectieve formele instituties.

In dit proefschrift concludeer ik ook dat de ECX reeds bestaande informele instituties zowel heeft aangevuld als vervangen. De ECX heeft informele instituties aangevuld door meer markttransparantie, vooral door het verstrekken van kwaliteitsnormen en weegschalen, die eerder ontbraken. Als gevolg hiervan zijn de overtuigingen van boeren over opportunistisch gedrag door handelaars veranderd; niet veel, maar wel significant. Daardoor zijn boeren (langdurige) relaties met handelaars begonnen en krijgen ze vaker krediet. Dit betekent dat er institutionele verandering is geweest, in termen van veranderde opvattingen en gedrag. De ECX heeft informele instituties tussen handelaars vervangen. Handelaars hebben minder

sociaal kapitaal en vertrouwen elkaar minder; informele instituties zijn vervangen door formele regels en contracten van de ECX.

Het tweede niveau is het meer praktisch niveau van de vraag of de ECX haar doelstellingen heeft weten te bereiken is, weerspiegeld in de verschillende standpunten van Eleni Gabre-Madhin en Marcel Fafchamps. In dit proefschrift vind ik bewijs dat Gabre-Madhin gelijk had dat de ECX meer markttransparantie zou kunnen brengen, transactiekosten voor boeren zou kunnen verminderen, en dat het conflicten tussen handelaars zou kunnen verminderen. Echter, Fafchamps had ook gelijk, er zijn altijd onbedoelde gevolgen. Het verlies van sociaal kapitaal en vertrouwen tussen handelaars is zo'n onbedoeld gevolg en een risico omdat vertrouwen belangrijk is voor markten. Een verder onbedoeld gevolg van het verlies van sociaal kapitaal is dat handelaars elkaar minder handelskrediet geven, wat vooral een negatieve invloed heeft op kleine handelaars.

De Ethiopische overheid moet het feit dat handelaars en boeren de ECX en PTC met argwaan aanschouwen, verontrusten. Deze argwaan kan worden verklaard door negatieve ervaringen in het verleden met door de overheid geleide organisaties in Ethiopië. De zware betrokkenheid van de Ethiopische overheid is verdedigd door Gabre-Madhin, die het een unieke publiek-private samenwerking noemde. Echter, in het licht van het werk van North et al., over samenlevingen die kunnen worden gekarakteriseerd als "limited access orders", is de verstrengeling van economische en politieke organisaties te verwachten. Een optimistische visie is dat de Ethiopische overheid een coördinerende rol op zich neemt, onzekerheid verminderd en oplossingen kan bieden voor coördinatie en handhaving problemen, zoals veel Aziatische overheden hebben gedaan. Echter, als de Ethiopische overheid zo'n coördinerende rol op zich neemt, moet het handelaars gaan zien als betrouwbare partners, en ze niet met achterdocht beschouwen, zoals zij heeft gedaan in het verleden, en nog steeds doet. In plaats van het streven om tussenpersonen te elimineren, moet de overheid de verschillende belangrijke functies handelaars en en tussenpersonen erkennen en zorgen voor verdere ondersteuning.

Ten aanzien van methodologische kwesties, stel ik in dit proefschrift dat het meten van institutionele verandering tijd kost; de ECX kan lange termijn effecten hebben die moeilijker te meten zijn. Dit proefschrift gebruikt data die kort na de oprichting van de ECX zijn verzameld. Het ontbreken van een goede controle groep maakt toewijzing van effecten (attributie) zeer moeilijk. Een gedeeltelijke

oplossing is om in de dataverzameling groepen toe te voegen die in verschillende mate beïnvloed worden door de ECX, om gebruik te maken van panel data en resultaten aan te vullen met data verzameld door experimenten. Ik heb in dit proefschrift zwaar geleund op survey data en kwantitatieve methoden, die echter contra-intuïtieve resultaten moeilijk kunnen verklaren. Meer diepte-interviews kunnen echter ook leiden tot tegenstrijdige informatie. Aanvullend antropologisch en sociaal onderzoek kan van waarde zijn om veranderingen in de opvattingen en relaties van boeren en handelaars te traceren tijdens institutionele verandering. Het meten van nogal onduidelijke begrippen als vertrouwen en sociaal kapitaal is niet eenvoudig, maar wel belangrijk. De literatuur en strikte begrippen van de Nieuwe Institutionele Economie (NIE) zijn nuttig in het denken over deze vage begrippen. Hoewel er verrassend weinig gebruik van gemaakt wordt in economisch onderzoek, zijn Likert-schalen een nuttig meetinstrument. Ook het onderscheiden van verschillende soorten van vertrouwen is belangrijk bij het meten ervan: er zijn aan de ene kant denkbeelden over opportunistisch gedrag ("trust goodwill") en aan de andere kant over iemands vermogen ("trust in ability").

Dit proefschrift biedt een aantal mogelijkheden voor nieuw onderzoek, (i) naar institutionele veranderingen en (ii) naar het beoordelen van de effectiviteit van de ECX en andere goederen beurzen. Met betrekking tot (i), zou het goed zijn als er vervolg onderzoek gedaan wordt naar de vraag of de in dit proefschrift gevonden relatie tussen toegenomen markttransparantie en vertrouwen ook bestaat in andere situaties. Ook is meer onderzoek nodig naar handelaars in landbouwproducten, die van cruciaal belang zijn maar waar te weinig onderzoek naar is gedaan. Vooral onderzoek naar de verschillende institutionele regelingen die verschillende soorten handelaars gebruiken, en hoe deze beïnvloed worden door veranderend beleid of institutionele verandering is een relatief onontgonnen maar belangrijk gebied. Wat (ii) betreft, zijn er verschillende suggesties voor verder onderzoek omdat er nog geen impact evaluatie van de ECX is gedaan. Dit is hard nodig, vooral omdat de ECX wordt aangeprezen als een model voor andere Afrikaanse landen. Ten eerste is er meer onderzoek nodig over de vraag of en hoe de marketing marges van boeren zijn verbeterd. Ten tweede is er verder onderzoek nodig naar de vraag of de prijs informatie die wordt verschaft door de ECX wordt gebruikt door handelaars voor arbitrage doeleinden (waardoor prijsschommelingen worden verminderd), en of deze nuttig is voor boeren die elektriciteit en mobiele telefoons missen. Ten derde zou het nuttig kunnen zijn om andere formele

institutionele regelingen te onderzoeken, die gericht zijn op het bereiken van dezelfde doelen die de ECX heeft gesteld, maar die minder kostbare, meer eenvoudige markten vertegenwoordigen. De MVIWATA markten in Tanzania zouden zo'n dergelijke alternatief kunnen zijn.

SUMMARY

Sesame is not what comes to mind first for most people when thinking about Ethiopia, yet it is Ethiopia's second largest export crop and an important cash crop for many farmers. In the past decades, sesame production and exports have grown rapidly. Ethiopia's sesame markets, like many other African agricultural markets, are characterised by high transaction risks and costs. Most African markets are governed by informal institutions that aim to solve problems of coordination (or information) and enforcement. Eleni Gabre-Madhin, having studied extensively Ethiopian grain markets, was instrumental in the establishment of Ethiopia's first agricultural commodity exchange (ECX). The ECX aims to provide a solution for coordination and enforcement problems, aiming to reduce transaction risks and costs for both farmers and traders. The Ethiopian government established the ECX in 2008 for several commodities, including sesame. However, when it became clear that not many traders were using the ECX, the government made the ECX mandatory for sesame trade in 2010. A little later, the government made Primary Transaction Centres, located in most villages with price information, grades and certified weighing equipment, mandatory for traders and farmers to trade sesame. The establishment of the ECX constitutes a major institutional change in Ethiopia's sesame markets, which has not been subjected yet to much research. The ECX is seen as a model for other African countries, and it is important to better understand the impact it has had. Marcel Fafchamps, who collaborated with Gabre-Madhin on research on African markets, has been much more careful in providing solutions to improving African markets, warning for unintended consequences.

Markets are important to economic development, yet modern mainstream economics has given no more than fleeting consideration to the market as an institution. Actual markets, especially those in Africa, do not fit the assumptions of "perfect markets" used in much of economic theory. To understand the role of market institutions, two areas are important. The first is the role and complexity of institutional arrangements (both formal and informal), that solve problems of coordination (or information) and enforcement; the second is the mechanism of institutional change over time. An important question in the literature is how formal and informal institutions interact and change.

This thesis addresses this question by examining the establishment of the ECX (which can be seen as a new formal, designed institution), its impact on pre-existing social norms and the (spontaneous) informal institutional change it has brought about. The question how formal institutions and informal institutions interact also relates to the different viewpoints of Gabre-Madhin and Fafchamps. The ECX will be successful if it can complement existing informal institutions where necessary and substitute less effective informal institutions in terms of coordination and enforcement. For the ECX to succeed, it also means that a critical mass of agents (i.e. traders and farmers) needs to begin, even if gradually, to modify their beliefs and actions to form a new equilibrium as a result of the ECX.

In chapter one, I identify two main research questions that are addressed in this thesis. First, what were the pre-existing social norms, beliefs, and informal institutions used by farmers and traders before the ECX? Second, what impact did the formal designed institution of the ECX have on informal institutional arrangements (e.g. social capital)? These questions are addressed by using four datasets. Datasets were collected before and after the ECX became mandatory in late 2010. Two datasets were collected by interviewing farmers in West Tigray and East Wellega (in 2009 and 2012). Another two datasets were collected by interviewing traders in various markets in the north-east of Ethiopia (in early 2010 and in 2012).

Chapter two provides background information on Ethiopia's sesame markets. It provides a historical overview of the trade profession in Ethiopia, which describes how traditionally trade was seen as an inferior occupation, performed by outsiders or members of the lower classes. Farming, by contrast, was seen as the most respectable occupation. Although this has changed in Ethiopia, with trade being a lucrative occupation, taken up by different members of Ethiopian society, these historical, cultural perceptions may hold a clue as to why traders are still seen as untrustworthy. Sesame is a crop that will grow in adverse circumstances, tolerating drought and poor soils, making it an important cash crop for farmers who live in unfavourable areas of Ethiopia (mostly in the north-east). It is harvested at the end of the year, just before its pods shatter all seeds. Various types of traders (small collectors or assemblers, wholesalers, retailers, and exporters) are engaged in sesame trade, assembling small amounts from remote parts in Ethiopia, transporting it via various regional markets to Addis Ababa or export destinations (via the port of Djibouti). The complexity of trade means that traders hire different

intermediaries (brokers, and selling, buying, and consignment agents), who facilitate in matching supply and demand. The ECX was established in 2008 and became mandatory for all sesame trade destined for export in late 2010. The ECX is an open outcry market place in Addis Ababa where sesame contracts are traded. The physical bags of sesame are located in affiliated warehouses across Ethiopia, where the sesame is weighed and graded. The ECX is also linked to Primary Transaction Centres (PTCs) that are located in most villages (kebeles). Farmers and licenced sesame traders are required to sell and buy sesame at these PTCs, which offer price information (through the ECX), standard grades and weighing equipment, amongst others. Market information is an important issue: as most farmers do not own a (mobile) telephone, and often even lack electricity, they have no current information on markets, including prices. The information gathered on sesame prices in this thesis demonstrates that sesame prices show a high degree of fluctuation and differences between markets. Sesame prices have surged in recent years, but so has inflation in Ethiopia.

In chapter three, I focus on the social norms, beliefs and informal institutions in sesame markets in West Tigray and East Wellega before the ECX. Although trust is a prerequisite for well-functioning markets, this trust is generally lacking among the interviewed farmers. Most interviewed farmers view traders as opportunistic and only very few farmers engage in long-term relational trading with trusted traders. The chapter addresses the question why. It finds that a lack of market information is linked to negative perceptions of traders' trustworthiness; without information, farmers find it difficult to verify traders' trustworthiness. I analyse the relationship between these negative perceptions and market participation, finding tentative evidence that farmers who have a more negative perceptions of traders tend to participate less in markets, selling to fewer market outlets. The policy implications are that by investing in market information and increasing transparency through certifying weighing equipment and setting quality grades and standards, trust between farmers and traders can be fostered.

In chapter four, I examine whether the newly established ECX through its affiliated PTCs has led to improved market transparency. I hypothesise that market transparency will reduce transaction costs for farmers. The chapter builds on chapter three, which hypothesised that better market information would increase trust between farmers and traders. I find that the ECX has been successful in increasing market transparency and decreasing transaction costs. I argue that

traders are behaving less opportunistically as a result of market transparency, and this has improved farmers' trust perceptions about traders, slightly increased relational contracting, and significantly increased credit relations.

In chapter five I explore whether the creation of the ECX and its formal monitoring and enforcement institutions has affected the role of social capital and trust in the Ethiopian segment of the sesame value chain. Consistent with a simple theoretical marketing model, the panel data suggest this is indeed the case. Trade in sesame is increasingly governed by formal rather than informal institutions, and in response traders appear to have broadened their trading network, rely more frequently on traders with whom they do not have social relations, and have reduced the provision of credit that cements personalised relationships. They also have lower levels of trust in the intentions and capabilities of their trading partners, and attach less weight to trust. Policy-makers should therefore be aware that expanding formal institutions may invite the erosion of norms and informal rules in the same or adjacent domains of human interaction (possibly with ambiguous welfare implications).

In chapter six, I analyse trade credit, which is an important source of financing for businesses, especially in less developed countries. The chapter uses the two surveys of 195 Ethiopian sesame traders held in 2010 and 2012 to investigate the nexus between performance, credit, and social capital. To obtain credit, traders need social capital (a few trusted trade partners), but this may limit their ability to buy from other traders. The chapter finds that small traders at the upstream end of the trade network need credit most, but at the same time, they also need to assemble small amounts of sesame from a large number of trade contacts. The ECX, which became mandatory for all sesame trade after 2010, has made trade credit less common although its importance did not decrease. The policy implications are that better credit facilities should be available to small traders, who are typically overlooked in microcredit schemes and are usually cash-constrained.

In the final chapter, I discuss the findings presented in the previous chapters and draw conclusions on two levels. The first level is the theoretical question of institutional change and how the establishment of a formal, designed market institution impacted informal market institutions. The thesis finds evidence in line with research in the area of New Institutional Economics, that pre-existing (informal) institutional arrangements often undermine the introduction of a formal, designed institution. Sesame traders avoided using the ECX before it became

mandatory. Farmers stated that the PTCs are not their favoured outlet, and would probably also avoid them if they were not mandatory. If the ECX had not been made mandatory by the government of Ethiopia, there would probably have been little institutional change. Making commodity exchanges mandatory entails the risk, however, that effective informal institutions are replaced by ineffective formal ones.

This thesis also concludes that the ECX has both complemented and substituted pre-existing informal institutions. It complemented informal arrangements between farmers and traders by providing more market transparency, especially in the areas of quality standards and weighing equipment that were previously lacking. As a result, farmers' views that traders behave opportunistically have changed; not greatly, but significantly. As a result, farmers have started (long-term) relationships with traders and are receiving credit more often. This means there has been institutional change, in terms of changed beliefs and behaviour. The ECX has substituted informal arrangements between traders. Traders have less social capital and trust each other less; informal institutions have been replaced by formal rules and contracts of the ECX.

The second level is the more practical level of whether the ECX has been able to achieve its aims, reflecting the different viewpoints of Eleni Gabre-Madhin and Marcel Fafchamps. The thesis finds evidence that Gabre-Madhin was right that the ECX could bring about more market transparency and reduce transaction costs for farmers, and that it reduced disagreements among traders. However, Fafchamps was right that there are always unintended consequences. The loss of social capital and trust between traders is such an unintended consequence, and poses a risk, as trust is important to markets. A further unintended consequence of the loss of social capital is that traders provide less trade credit to each other, which especially affects small traders negatively.

The Ethiopian government should find the fact that traders and farmers view the ECX and PTC with suspicion troubling. This suspicion may be explained by negative experiences with government-run organisations in the past. The heavy involvement of the Ethiopian government has been defended by Gabre-Madhin, who called it a unique public–private partnership. However, in the light of the work by North et al. on societies, which can be characterised as "limited access orders", the intertwining of economic and political organisations is to be expected. An optimistic view is that Ethiopia's government may take on a coordinating role,

reducing uncertainty and providing solutions to coordination and enforcement problems, as many Asian governments have done. If the Ethiopian government takes on such a coordinating role, it should view traders as reliable partners, and not view them with suspicion, as it has done in the past, and still does. Instead of aiming to cut out middlemen, it should recognise the various important functions traders and intermediaries perform in markets and provide further support.

With respect to methodological issues, this thesis concludes that measuring institutional change takes time. The ECX may have longer-term impacts which will be more difficult to measure. The data used in this thesis was collected only shortly after the establishment of the ECX. In addition, the lack of a proper control group makes attribution far from perfect. A partial solution is to include groups that are affected by the ECX in different degrees, using panel data and complementing results with experimental data. This thesis relies heavily on survey data and quantitative methods, which are not always able to explain counter-intuitive results. More in-depth interviews may, however, also lead to contradicting information and therefore additional anthropological and social research may be of added value, to trace changes in farmers' and traders' beliefs and relationships during institutional change. Using a quantitative approach to measure rather obscure concepts such as trust and social capital is not easy, yet important. The literature and rigorous concepts used in the New Institutional Economics are useful in thinking about these nebulous concepts. Although used surprisingly infrequently in economic research, Likert scales are a useful measurement tool. Distinguishing the difference between trust linked to opportunistic behaviour ("goodwill trust") and trusting someone's ability ("trust in ability) is also an important distinction to make when measuring trust.

This thesis provides some avenues for new research, (i) on institutional change and (ii) on assessing the effectiveness of the ECX and other commodity exchanges. With respect to (i), it would be valuable to conduct follow-up research on whether the relationship found in this thesis between increased market transparency and trust perceptions also exists in other settings. In addition, more research is needed on agricultural traders, who are a crucially important yet chronically under-researched set of actors. Especially research on the different institutional arrangements used by different types of traders and how these change as result of policy or institutional change is a relatively unexplored but important area. With respect to (ii), there are several suggestions for further research as there

has never been an impact evaluation of the ECX. Such an evaluation is urgently needed, especially because the ECX is being touted as a model for other African countries. First, more research is needed on whether and how marketing margins of farmers have improved. Second, research on whether the price information provided by the ECX is useful to traders for arbitration purposes (reducing price variation) and useful to farmers who lack electricity and mobile phones. Third, it would be useful to explore other formal institutional arrangements that aim to achieve similar objectives as the ECX, but represent less costly, basic agricultural market systems. The MVIWATA markets in Tanzania may be such alternatives.

CURRICULUM VITAE

Gerda Willemien (Gerdien) Meijerink was born on October 26, 1967 in Utrecht. She lived in India (1967–1972) and Sri Lanka (1979–1981) and finished her secondary school in Enschede in 1985.

Following a gap year in 1986, she began to study economics at Rotterdam Erasmus University, but switched to agricultural economics at Wageningen University in 1988, graduating in 1994 with an MSc thesis on a cost benefit analysis of the Taï National Park in Côte d'Ivoire.

Gerdien worked as a research consultant from 1994 to 1996, taking on various projects for the WWF, the Ministry of Foreign Affairs, and the Ministry of Agriculture and others. In 1996 she joined the International Service for National Agricultural Research (ISNAR), part of CGIAR, located in The Hague as a research associate. In 2001 she started working for the Agricultural Economic Institute of Wageningen University and Research (LEI-WUR) as a researcher, becoming the head of the International Policy group in 2013. Her work at LEI has focused on food security and local, regional, and international agricultural markets. She has conducted numerous research studies, e.g. for the Ministry of Economic Affairs, the European Commission, and various international organisations. She has presented her work at numerous scientific and other conferences.

Gerdien started as an external PhD candidate at the Development Economics Group in 2008. As part of her PhD research, she has presented papers at various scientific conferences (at EAAE, IAAE, and ISNIE) and followed several courses (at NAKE and Tinbergen graduate schools).

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