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Food processing, transformation, and job creation: The case of Ethiopia's enjera markets

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ABSTRACT

Given the importance of agriculture in developing economies, food processing industries often dominate the industrial sector when considering employment and value addition in these settings. For example, it is estimated that the food processing industry in Ethiopia employs 1 million people, around 2 percent of the economically active population. However, the way this food processing industry is changing and how it functions is little understood. Based on a unique survey, we study the case of markets in urban Ethiopia for commercial ready-to-eat enjera, the traditional staple pancake of the country. We find that commercial enjera markets are quickly growing, employing more than 100,000 people in urban Ethiopia. Moreover, enjera is now being prepared by mixing flour from locally produced teff with that of imported rice, thus absorbing an important part of the rapidly growing rice imports (almost 200 million USD in 2015) in the country, and leading to higher profits for those enterprises engaged in this type of mixing. Increasing numbers of enjera-making enterprises (EMEs) – which mostly employ women – are emerging. Further, we note upscaling by those enjera-making enterprises that supply the growing urban food service sector. Larger enjera-making companies have better quality, different procurement mechanisms and technologies, and higher value-added. These findings are important for the policy debates in Ethiopia on food systems transformation, employment and job creation, and international trade.

I. INTRODUCTION

Agricultural markets are quickly changing in developed and developing countries alike (Pingali 2007; Reardon and Timmer 2007, 2012; Paarlberg 2013).[1] In developing countries, an important cause of this food system transformation is the rapid growth of cities along with the parallel rapid emergence of an urban middle class (Tschirley et al. 2015). It is estimated that more than half of the world population was living in cities in 2010, an increase of 30 percent since the 1950s (UN Population Division 2010). The growth of cities leads to higher commercial flows of agricultural produce from urban to rural areas as well as to changes in the types of food consumed, and, therefore, marketed. Urban populations often have significantly different diets than rural ones and are willing and able to spend more money on food. Reardon et al. (2015) argue that the shares of cities in commercial food markets in developing countries are significantly higher than their urban population shares per se, given that the majority of the residents of cities rely on these markets for their food requirements. Urban food markets have therefore often become the most important markets for farmers in many developing countries.

A number of issues with respect to food system transformation have been examined in these urban markets. First, there is a large body of literature on the modern retail revolution in developing countries and the extent to which this revolution is reforming food markets and agricultural supply chains (Reardon et al. 2003; Reardon and Timmer 2012; Assefa et al. 2016). Second, branded and packaged foods are expanding rapidly (Reardon et al. 2014) – annual growth rates of retail sales of packaged food products in developing countries are estimated to be much higher than in developed countries (Regmi and Gelhar 2005).[2] Third, urbanization also is often associated with different diets and an increasing share of food eaten away from home, i.e., in restaurants (Regmi and Meade 2013; Zhou et al. 2015; Smith et al. 2014).

With a transforming food industry sub-sector, processed foods are also becoming relatively more important in the food consumption of urban households (Scholliers 2015; Sheely 2008). However, little attention has been given to this topic in the literature (for an exception, see Tschirley et al. 2015).[3] In this research in Ethiopia, we show that food processing dominates its (relatively small) industrial manufacturing sector – making up 60 percent of its value added, and it is estimated that almost 1 million people are employed in food processing enterprises in the country. However, we know little about the way this sector functions and how it is changing.

In this paper, we look specifically at the commercial production of enjera – Ethiopia's staple pancake – and at the emergence of enjera-making enterprises and the resultant changes in how this staple food is prepared for consumption in many urban households. These changes have important implications for gender relations, employment, and trade. Urban

[1] Developing countries are registering rapid increases in food retail sales, while developed countries are seeing a rise in sales of products that meet more stringent consumer demands for variety, food safety, and quality (Regmi and Gelhar 2005; Asfaw 2008). Developing countries are expected to largely account for future growth in food demand, resulting from more rapid increases in population, per capita food consumption, growing incomes, and urbanization than in developed countries. These developments are expected to have important implications on the agricultural sector as well as on nutrition in these countries (Reardon et al. 2009; Popkin 2014).

[2] There is little understanding, however, about the extent to which these brands deliver improved quality and safety in these settings (Minten et al. 2013; Asfaw 2008; Hawkes 2008).

[3] Moreover, this research has mostly looked at the impact on nutrition and obesity (e.g. Monteiro et al. 2013; Gomez and Ricketts 2013).

Ethiopia presents an interesting case study, given its rapid urbanization rates and the fast economic and income growth that has occurred over the last decade (World Bank 2015b). All this has led to quickly changing agricultural and food landscapes.

Based on a unique primary survey, together with secondary data, we study the commercial enjera markets in three cities in Ethiopia, the capital, Addis Ababa, and two secondary cities, Dire Dawa and Nekemte. We have four major findings.

1. Commercial enjera markets are quickly growing in all cities and an increasing number of consumers are buying enjera instead of preparing it themselves.[4] We estimate that the retail value of purchased enjera in urban areas in Ethiopia made up around 250 million USD in 2015.
2. Enjera is increasingly being prepared by mixing flour prepared from domestically produced teff with that prepared from imported rice, thus absorbing an important part of Ethiopia's rapidly increasing rice imports - 200 million USD in 2015.
3. Enjera preparing micro-enterprises and retailers that mostly employ women are rapidly emerging, resulting in an estimated 100,000 people in urban Ethiopia being employed in such activities.
4. Finally, we note upscaling processes in those enjera-making enterprises that supply the growing food service sector as well as export markets. These larger enjera-making companies have different procurement mechanisms, utilize different production technologies, and realize higher profits.

The rapid emergence and the changes in these commercial enjera markets seem to be associated with the growth of Ethiopian cities and the rise of the food service industry – such as institutions, hotels, and restaurants – linked to increasing out-of-home food consumption. Moreover, there appear to be important income effects associated with these changes, with rising opportunity costs for women, who traditionally prepare enjera at home, resulting in increasing use of these commercial markets by relatively richer consumers. The impact of commercial enjera production on trade seems to be linked to the changing price ratios of different cereals, with the relative prices of imported rice significantly declining compared to those of other local cereals, as well easier access to export markets for prepared enjera because of better air transport links between Ethiopia and the rest of the world.

These findings are important for the policy debates on food system transformation in Ethiopia in at least three important ways.

1. As the economies in developing countries grow and urbanization takes off, greater attention towards off-farm agricultural activities is required. These activities have important impacts on employment, prices, and, therefore, on the food security for both urban and rural populations. Rapidly emerging small and medium-scaled agri-businesses in this off-farm segment are rising in importance, but often neglected in debates on African food system transformation (Reardon et al. 2015).
2. Urban markets are rapidly growing and will increasingly shape agricultural and food economies in these countries. These markets should be taken into consideration as, increasingly, cities are becoming engines of agricultural and food system transformation (e.g. Vandercasteelen et al. 2016).
3. As agricultural economies and cities develop, along with changes in diets and food preferences, international trade often becomes more important because of easier accessibility to cities for food imports (Rakotoarisoa et al. 2011), but also as a source of exports, as revealed in this case study. More attention therefore should be paid to international trade factors in transforming food markets.

The structure of the paper is as follows. We discuss the datasets used in Section 2. In Section 3, we give an overview of the food processing sector and enjera markets in Ethiopia. We present the results of the survey in Section 4 and subsequently describe the functioning of enjera sellers and enjera-making enterprises in Section 5. In Section 6, we look at the productivity and employment characteristics of these enterprises. We explore some drivers for the identified changes in Section 7. We finish with a review of our conclusions and some policy implications in Section 8.

[4] This is a surprising new development given the traditional taboo on purchasing enjera (Alemayehu 2016).

2. DATA

We fielded primary surveys in three cities in Ethiopia – Addis Ababa, Dire Dawa, and Nekemte. Addis Ababa is the capital and the largest city of Ethiopia. Based on the population and housing census of 2007, it was estimated that 2.74 million people resided in Addis Ababa (CSA 2008). Based on CSA projections, this number was about 3.3 million in 2015 (CSA 2014).[5,6] However, this is likely an underestimation, given that there are a large number of undocumented inhabitants. For our study, Dire Dawa represents tier two cities in Ethiopia. It is located in the east of the country with an estimated population in 2007 of 340,000 inhabitants. Finally, Nekemte represents smaller, tier three cities. It is located in the western part of the country and had 75,000 inhabitants in 2007. While the selection of these cities was not random, we believe that they provide a good representation of prepared enjera markets in cities of different sizes in Ethiopia.

To select a representative sample of enjera sellers, enjera-making enterprises, and mills, we relied on a stratified sampling scheme. In Addis Ababa, based on a map of the city, we created five geographical strata with two neighboring similar sub-cities in each stratum. We then randomly selected one sub-city from each stratum, giving us in total five sub-cities to work with. Next, we obtained from the city's Trade and Industry Office complete lists of formal food outlets in each sub-city.

In each selected sub-city, four *kebeles*[7] were selected randomly. Within the selected *kebeles*, two *ketenas* were selected randomly. The sampling scheme was set up as follows. First, at the *kebele* level, all flour mills and large (defined as having five or more *mitads*, the baking plates needed to prepare enjera) and small (3 to 4 *mitads*) enjera wholesalers were surveyed. Second, at the *ketena* level, a census of all informal microsellers of enjera (*gulits*) and enjera retailers was done. Based on this census, a sample of these enjera sellers was randomly selected for interviewing. The survey was conducted in December 2015.

A similar strategy was followed in Dire Dawa and Nekemte. In total, information was obtained for 243 mills, 345 enjera sellers, and 214 enjera-making enterprises. When share estimates for different types of outlets were made for the cities as a whole, appropriate sampling weights were calculated and used for extrapolation

We also used a number of secondary data in the analysis. First, we exploited the Ethiopian Household Consumption and Expenditure Survey (HICES) dataset from the past four rounds: 1995/96, 1999/00, 2004/05, and 2010/11. In total, 11,678, 17,320, 21,560, and 27,831 households were interviewed over the four periods, respectively. The HICES data were collected by the Central Statistical Agency (CSA) (MoFED 2013). Sampling for the surveys began by stratifying the country into rural and urban areas. After that, enumeration areas were selected using a probability proportional to size approach. To compute representative estimates from this data, we use sampling weights based on selection probabilities provided by CSA. Notably, data collection methods for the HICES have differed over the years, which warrants some caution in the interpretation of the data over time (Stifel and Woldehanna 2014). Second, we also used data from surveys that CSA conducted both on large and medium scale (CSA 2012) and on small scale (CSA 2015) manufacturing enterprises.

3. FOOD PROCESSING AND ENJERA MARKETS IN ETHIOPIA

To set the scene on food processing in Ethiopia, we rely on two manufacturing enterprises surveys conducted by CSA. In 2010/11, CSA surveyed large and medium-scale manufacturing firms, defined as those that employ 10 or more people and use electricity-driven machineries. Based on this survey, 686 firms were identified as being involved in the manufacturing of food products and beverages, employing more than 67,000 people (Table 3.1). Of these employees, two-thirds are men and one-third are women. By sub-sector, the most important in terms of employment are firms involved in grain milling (10,077 persons engaged), baking (14,917), and the production of sugar and sugar confectionery (15,273).

In 2013/14, CSA looked at small-scale manufacturing firms, defined as those that employ less than 10 people. Such firms are significantly more important in terms of employment than the larger firms as nationally they engage 1.7 million people, out of which 52 percent is involved in food processing (Table 3.1). Twenty-one percent of these firms manufacture beverage or food products, with the production of bakery products being particularly important, with more than 220,000

[5] The population of Addis Ababa was growing at a rate of 2.1 percent per year between 1994 and 2007 (CSA 2008). If the same growth momentum is assumed to have persisted during the last couple of years, the population would have surpassed the 3 million mark in 2012.

[6] However, that number is disputed and some researchers estimate Addis Ababa's population to be significantly larger (e.g. UN-Habitat 2008).

[7] *Kebeles* are the second administrative level for the city under a given sub-city (recently *kebeles* have been re-organized to *woredas* with slight changes in geographical coverage). *Ketenas* are the next more local administrative level.

people employed in baking enterprises. Grain milling accounts for 31 percent of people employed in small-scale manufacturing industries with more than 540,000 people engaged. In contrast with larger firms, more females are engaged in such smaller firms, making up almost half of the permanent employees of such firms. Overall, it is estimated that almost one million people are engaged in food processing in Ethiopia (bottom Table 3.1), or around 2 percent of the economically active population of the country (defined as those aged 15 to 64 years).

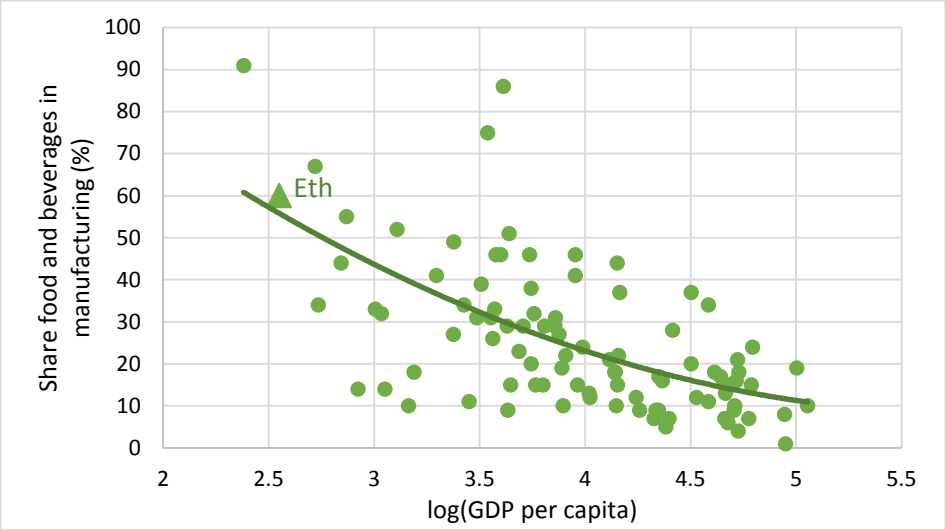
Table 3.1: The food processing sector in Ethiopia

	Number of establishments	Number of persons engaged	Of which permanent	
			Male	Female
Large and medium scale manufacturing firms (2010/11)				
Total	2,170	175,698	95,211	52,037
Manufacturing of food products and beverages	686	67,471	38,134	18,612
Share (%)	*31.6*	*38.4*	*40.0*	*35.8*
Production, processing and preserving of meat, fruits, and vegetables	10	2,716	1,890	579
Manufacture of…				
… vegetable and animal oils and fats	34	1,198	743	198
… dairy products	24	1,867	1,165	509
… grain mill products	197	10,077	5,590	2,419
… prepared animal feeds	11	601	375	136
… bakery products	247	14,917	6,619	7,696
… sugar and sugar confectionery	31	15,273	8,897	1,303
… macaroni and spaghetti	20	1,855	1,230	569
… other food products	29	2,522	973	624
… distilling, rectifying and blending of spirits	18	1,886	1,079	739
… wines	2	524	353	171
… malt liquors and malt	10	6,049	4,398	1,021
… soft drinks and production of mineral water	53	7,986	4,822	2,648
Small scale manufacturing firms (2013/14)				
Total	116,604	1,744,544	532,859	445,209
Manufacturing of food products and beverages	60,860	913,798	269,354	239,945
Share (%)	*52.2*	*52.4*	*50.5*	*53.9*
Manufacturing of food products, except grain mill services	25,430	373,259	116,458	110,102
Share (%)	*21.8*	*21.4*	*21.9*	*24.7*
Production, processing and preserving of meat, fruits, and vegetables	269	3,271	1,162	1,238
Manufacture of…				
… vegetable and animal oils and fats	720	7,487	3,082	2,640
… bakery products	14,218	221,301	69,754	65,760
… cocoa, chocolate and sugar confectionery	29	320	134	115
… other products	10,195	140,881	42,326	40,349
Manufacture of grain mill services	35,430	540,539	152,896	129,843
Share (%)	*30.4*	*31.0*	*28.7*	*29.2*
Total food processing sector	61,546	981,269	307,488	258,557

Source: Authors' calculations based on CSA (2012; 2015)

Next, we place the numbers associated with food processing in the manufacturing sector of Ethiopia within an international context. Figure 3.1 illustrates how the share of the food processing sector – measured as the share of the value-added in manufacturing that comes from food, beverages, and tobacco – is related to the GDP per capita of a country, based on data for 94 countries available for 2011. We see that the share of food processing in the manufacturing sector shows a strong negative relationship with increasing GDP per capita. For the poorest countries in the dataset, food processing makes up 60 percent of value added in the manufacturing sector. When countries get richer, products of the manufacturing sector become more diverse. For the richest countries, the share of food processing drops to about 10 percent. In this cross-country comparison, Ethiopia is shown to have among the highest share of food processing in value added in the manufacturing sector – 60 percent in 2011.

Figure 3.1: Share of food, beverages, and tobacco processing in total value added manufacturing by national GDP per capita, 2011



Source: Authors' calculation based on United Nations Industrial Development Organization (International Yearbook of Industrial Statistics) and World Bank (World Development Indicators).

Within the food processing sector, we look in particular at the case of enjera production. In CSA's classification, enjera production fits under the manufacturing of bakery products. Enjera is the traditional pancake that is used as a staple in most of Ethiopia as well as in Eritrea. Its main ingredient is usually teff flour, but the flour of other cereals is used as well.[8] It is prepared by mixing the flour with water and a starter that contains yeast to begin the process of fermentation and then letting the mixture ferment for a number of days. The resultant fermented batter is then baked on an electric plate (electric *mitad*) or on a clay plate heated by wood (*mitad* on wood*)*. Several enjera usually are made at the same time in order to be consumed over a number of days.[9] A variety of stews, salads, or even spaghetti are served on enjera, which is characterized by a slightly sour taste.

While a large number of Ethiopian households prepare their own enjera, commercial enjera markets are expanding. Table 3.2 shows the share of different types of teff and teff products in the average consumption basket over time, based on HICES data. We see that expenditures on enjera increased rapidly between 1996 and 2011. We further see a significant change in the quantity consumed.[10] While HICES data show that most enjera is purchased, it is not entirely clear from these surveys if the enjera was purchased in a ready-to-eat form or if these purchases involved the purchase of raw inputs. Caution in the interpretation of these numbers as a measure of the size of the enjera market is therefore warranted.

[8] Teff is a unique cereal because, unlike other cereals, it is part of the grass family (e.g. maize and wheat belong to the *Poaceae* family). Compared to other cereals, teff is hardy and able to withstand adverse weather conditions and is therefore considered a lower risk crop (Fufa et al. 2011). Teff is grown at middle elevations between 1,800 and 2,200 meters above sea level in regions where there is adequate rainfall. These characteristics, together with its ease of storage, seemingly explain the sustained importance of teff in Ethiopia. Teff is also valued for its fine straw, which is used for animal feed as well as for other purposes, such as mixing with mud for building. It accounts for 22 percent of the cultivated area. In 2013/14, it was estimated that about 6.6 million smallholders were involved in the production of teff – 43 percent of all farmers in the country. On the consumption side, teff makes up as much as 12 percent of all food expenditures. By any standards, teff is an important crop for farm income as well as for food security in Ethiopia.

[9] Enjera generally has a shelf life of about three days.

[10] Enjera is especially bought in urban markets. Based on the HICES of 2011, it was estimated that enjera made up 9 percent of all food expenditures, amounting to 14.81 USD per capita per year. As estimated by the Central Statistical Agency, 15.2 million people were living in urban areas in 2012. The size of the commercial enjera market in urban areas was as high as 225 million USD in 2012, i.e., more than the value flower exports from the country during that year (187 million USD), and is usually considered one of the success stories for Ethiopian agricultural exports in the last decade. Given the growth of cities and positive link of income growth with purchases of enjera, as shown in HICES data, the size of the sector likely exceeded 250 million USD in 2015, the time of the survey that is the basis for this paper.

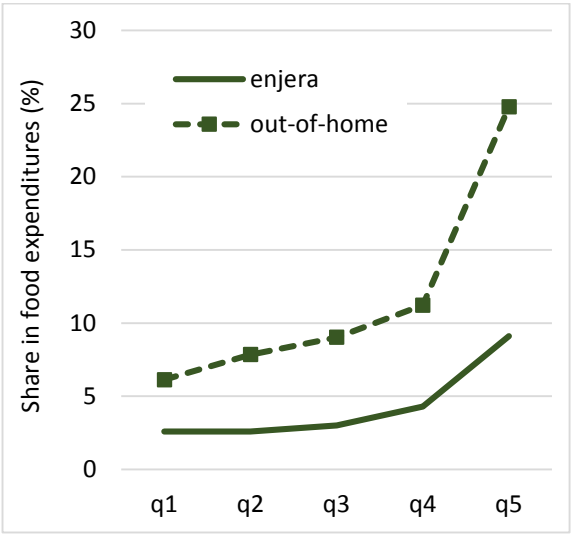
Table 3.2: Food consumption and real per capita expenditures of teff grain and teff enjera, 1996 to 2011

	1996		2000		2005		2011	
	Birr	Share (%)	Birr	Share (%)	Birr	Share (%)	Birr	Share (%)
Real per capita expenditures (birr/capita/year)								
White teff	16	21.9	18	22.0	17	25.4	18	20.0
Mixed teff	22	30.1	28	34.1	18	26.9	19	21.1
Red teff	31	42.5	32	39.0	22	32.8	19	21.1
Enjera	5	6.8	5	6.1	9	13.4	34	37.8
Total teff	73	100.0	82	100.0	67	100.0	90	100.0
Consumption (kg/capita/year)	**kg**	**Share (%)**	**kg**	**Share (%)**	**kg**	**Share (%)**	**kg**	**Share (%)**
White teff	5	20.0	6	19.4	7	25.9	8	27.6
Mixed teff	8	32.0	11	35.5	8	29.6	9	31.0
Red teff	11	44.0	13	41.9	10	37.0	10	34.5
Enjera	2	8.0	3	9.7	3	11.1	7	24.1
Total teff	25	100.0	31	100.0	27	100.0	29	100.0

Source: Authors' calculations based on HICES

We further note, based on the HICES data, that it is especially the relatively rich urban population who buy enjera in ready-to-eat form (Figure 3.2). This indicates that rising incomes in Ethiopia have likely led to the expansion of the ready-to-eat enjera market. An important further development in this regard is the rise of the share of food eaten away from home, estimated in 2011 to be 16 percent of the urban food budget, i.e., twice as high as expenditures on vegetables and fruits. Moreover, we see a strong gradient by poverty quintile. The poorest quintile spends 6 percent of its food budget on food eaten away from home, compared to 25 percent for the richest quintile. Increasing incomes in urban Ethiopia have likely also led to the emergence of a rapidly growing food service sector. Similar trends on increasing incomes resulting in higher out-of-home food consumption have been noted in other developed and developing countries.[11]

Figure 3.2: Share of enjera and out-of-home expenditures in total food expenditures in urban areas, by poverty quintile



Source: Authors' calculations based on HICES, 2011

Note: q1=poorest; q5=richest quintile.

4. OPERATION OF ENJERA SELLERS AND ENJERA-MAKING ENTERPRISES

We start our analysis of the survey data with descriptive statistics on enjera sellers and on enjera-making enterprises. As discussed in the description of how the sample of enjera sellers was chosen, we distinguish between large and small

[11] For example, Smith et al. (2014) note that food eaten away from home increased from 10 to 49 percent of total food expenditures in the US between 1900 and 2010 and that similar fast changes are seen in this area in a number of quickly transforming economies such as India, China, and Mauritius.

wholesalers, retailers, and *gulits*, informal microsellers of enjera. An estimate of the total number of each of these four types of enjera outlets and the numbers of each type in the study sample in the three cities studied are shown at the top and bottom of Table 4.1, respectively. By total number, enjera retailers are the most important of all outlet types, as well as by share of total enjera sales, in all three cities. We especially see a large number of enjera retailers in Addis Ababa, with almost 9,000. Enjera sales by retailers make up 70, 62, and 38 percent of all enjera sold in Addis Ababa, Dire Dawa, and Nekemte, respectively. The relatively lower importance of retailers in Nekemte compared to the other cities is compensated for by a higher share in sales by *gulits*. The sales made by wholesalers as a share of total enjera sales varies between 28 (Dire Dawa) and 39 percent (Nekemte). The share of total sales made by the larger wholesalers – those with more than five *mitads* – is highest in Dire Dawa.

Table 4.1: Enjera sellers, descriptive statistics

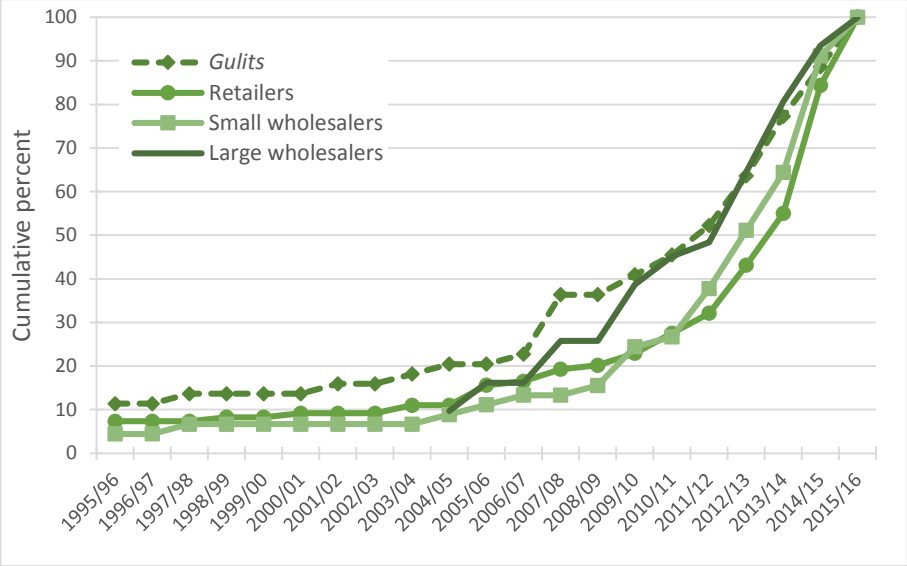
		Large wholesalers		Small wholesalers		Retailers		*Gulits*	
	Unit	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Estimated total enjera sellers									
Addis Ababa	number	139		184		8,688		517	
Dire Dawa	number	4		4		311		45	
Nekemte	number	4		14		96		66	
Share of commercial enjera sales in city									
Addis Ababa	percent	20.1		6.5		70.1		3.4	
Dire Dawa	percent	24.9		3.2		62.3		9.6	
Nekemte	percent	11.9		26.9		38.4		22.8	
Enjera seller									
Male	percent	55.0		29.0		33.0		9.0	
Age	years	38.2	12.6	35.7	12.0	37.0	10.8	36.9	10.9
Level of education (years of schooling)	number	11.8	3.7	8.4	4.1	7.1	4.5	3.5	3.9
Number of years in business	Years	5.1	3.6	5.4	6.7	4.6	6.1	7.7	10.1
Share cooperative	percent	64.5		36.4		6.2		0.0	
Share of enjera in total sales of outlet	percent	77.7	27.6	86.1	26.6	49.2	42.0	95.9	14.4
Share of sellers that make enjera themselves	percent	100.0		95.2		45.8		100.0	
If bought enjera, bought from …	percent								
- one supplier	percent			75.0		91.1			
- different suppliers	percent			25.0		8.9			
Regularity of buying enjera:									
- daily	percent			50.0		89.4			
- once every two days	percent			0.0		9.8			
- once every three days	percent			50.0		0.8			
Share of seller in sales of the supplier	percent			60.0	46.9	25.9	39.2		
Observations	number	31		45		225		44	

Source: Authors' computations based on enjera survey

Table 4.1 further shows that the majority of the sales outlets are run by women, e.g., 91 percent of the *gulit* sellers are women. The exception to this is the larger wholesalers where men run 55 percent of such outlets. Notably, cooperative firms are relatively important in this larger wholesale category as 65 percent of these enterprises have a cooperative structure. We further see a strong link of managers' education levels with the size of the operation. The operators in *gulit* enjera outlets had on average 3.5 years of education. This compares to 7.1 years for retailers, 8.3 years for small wholesalers, and 11.8 years for the large wholesalers. No significant differences in the start-up dates are noted between the different enterprises, and most of the enjera sellers are relatively new to this business. For example, 90 percent of the wholesalers and retailers have been less than 10 years in business (Figure 4.1). This compares to 80 percent for the *gulits*. Furthermore, the business operation of wholesalers is less diverse compared to retailers, as the majority of their total sales income is attributed to sales of enjera. For retailers, enjera sales make up just below 50 percent of their total turnover. Moreover, most enjera sellers make the enjera that they sell themselves, except for the enjera retailers where only 46 percent reported doing so. The rest

of the enjera retailers relied on purchases for their enjera supplies. For those retail outlets that purchased enjera, 91 percent of them reported buying their supply daily from one supplier.

Figure 4.1: Start-up years of enjera sellers by seller category, cumulative percent



Source: Authors' calculations

In our subsequent analysis, we primarily focus on the 214 enterprises in our sample that make their own enjera for sale, what we designate as enjera-making enterprises (EME), noting the often strong integration of their enjera making with retailing activities. Table 4.2 shows the importance of the different types of enterprises in total enjera production in the study cities. It illustrates that small EMEs dominate enjera production in all three cities. Ninety percent of the enjera-making activities of smaller EMEs are carried out in private houses. This compares to 51 percent and 23 percent of medium and large EMEs, respectively, operating out of private houses. We further note that about 20 percent of all EMEs, both large and small, have received support from government through loans. Support from NGOs, on the other hand, has mostly focused on larger enterprises: Thirty-nine percent of the largest EMEs declared that they received support from an NGO. This compares to 7 percent for the smallest ones.

Finally, employment generation by the EME and retailing sector is substantial. It is estimated that more than 30,000 people are involved in enjera-making or retailing in these three cities. Since a quarter of Ethiopia's urban population lives in these three cities, extrapolation of these numbers - assuming similar rates of commercialization of enjera - implies that over 100,000 people in urban Ethiopia are involved in enjera-making or retailing. It can therefore be considered one of the most important employment generating sectors in Ethiopia's cities.

Table 4.2: Descriptive statistics for enjera-making enterprises

		Large		Medium		Small	
	Unit	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Total number of enterprises, estimate							
Addis Ababa	number	139		172		7,413	
Dire Dawa	number	4		4		281	
Nekemte	number	4		14		93	
Share of commercial enjera-making in city							
Addis Ababa	percent	23.4		7.0		69.6	
Dire Dawa	percent	29.5		3.8		66.8	
Nekemte	percent	15.6		35.4		49.0	
Employment in enjera-making enterprises							
Addis Ababa		1,929		1,218		15,322	
Dire Dawa		129		34		373	
Nekemte		22		67		178	
Operations							
Number of years in business	Years	5.1	3.6	5.4	6.7	5.1	6.9
Number of mitads	number	10.3	7.2	3.4	0.5	1.3	0.5
Cooperatives, share	percent	63.0		41.0		8.2	
Operate out of private house, share	percent	22.6		51.1		89.5	
Government loan taken, share	percent	20.7		18.6		19.2	
Received support from NGO, share	percent	38.7		15.9		7.3	
Observations	number	27		40		147	
Total employment in enjera making and retailing in city, estimate							
Addis Ababa		1,929		1,242		27,535	
Dire Dawa		129		34		373	
Nekemte		22		67		218	

Source: Authors' computations based on enjera survey

To further understand the importance of commercial enjera markets, owners of teff mills were questioned in the three study cities about the share of each type of customer in their businesses and how the pattern of customers has changed in the past ten years. It is in the mills where the overwhelming majority of cereals are sold and milled (Minten et al. 2016). The results presented in Table 4.3 illustrate the high share of the customers of these mills that are direct consumers, buying teff directly from the mill and then processing it in their homes. The share of such direct consumers in the total turnover of the mills was estimated to be 82, 70, and 68 percent in Addis Ababa, Dire Dawa, and Nekemte, respectively. Own production of enjera by individual households is still dominant. The share of restaurants and institutions that buy directly from the mills is shown not to be very high, and it seems that they mostly rely on the EMEs as their source of supply of enjera.[12] While teff flour sellers and supermarkets are taking off in Ethiopia, their share as customers of teff mills is still tiny and the overall turnover in these sub-sectors is rather insignificant.

The share of EMEs in the total sales of teff at these mills varies between 16 percent in Addis, 27 percent in Nekemte, and 30 percent in Dire Dawa, as estimated by the mill owners. When we assess the share of EMEs in the customer base of these mills over time, as reported by long-standing mill owners, we note a relative increase over time. Given the long-term recall nature of this question, caution in interpretation is however warranted. Nonetheless, we note an increase in the share of EMEs in the customer base of the teff mills studies over the past ten years in all three cities – by 4 percentage points in Addis Ababa, 11 in Dire Dawa, and 3 in Nekemte. This increase in the share of EMEs in the mills' turnover, combined with an increase in the number of mills (e.g., a 50 percent increase in the case of Addis (CSA 2012, 2015)) in all of these cities, illustrates the fast growth of these EMEs in urban Ethiopia in the last decade.

[12] It is to be noted that it could have been possible that these institutions would buy directly from wholesale markets but their share there has been shown to be small as well (Minten et al. 2014).

Table 4.3: Change over ten years in make-up of customers of teff mills in study cities, by category, percent share

	Addis Ababa		Dire Dawa		Nekemte	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
10 years before the survey (recall)						
Consumers	86.2	16.3	79.4	23.6	72.5	22.5
Enjera wholesalers	2.7	9.4	5.0	20.6	6.0	8.4
Enjera retailers	7.0	10.7	11.3	12.5	8.0	7.3
Gulits	2.0	5.2	3.0	5.5	10.2	13.8
Institutions	0.3	2.1	1.1	4.7	0.0	0.0
Restaurants	1.8	4.5	0.2	1.2	3.0	7.2
Supermarkets/mini-markets	0.0	0.0	0.0	0.0	0.0	0.0
Teff flour sellers	0.0	0.0	0.0	0.0	0.5	2.1
Total	100.0		100.0		100.0	
Number of observations	93		20		23	
At time of survey						
Consumers	82.4	19.9	69.6	20.7	68.1	25.8
Enjera wholesalers	3.8	10.4	3.7	16.2	7.5	15.5
Enjera retailers	8.9	11.2	21.4	17.3	10.1	10.3
Gulits	2.4	7.4	4.8	8.0	9.4	11.5
Institutions	0.2	1.4	0.0	0.0	0.3	1.7
Restaurants	2.2	7.1	0.5	2.0	4.3	7.9
Supermarkets/mini-markets	0.0	0.4	0.0	0.0	0.0	0.0
Teff flour sellers	0.0	0.0	0.0	0.0	0.3	1.7
Total	100.0		100.0		100.0	
Number of observations	176		32		35	

Source: Authors' computations based on mill survey

In brief, we find that commercial enjera consumption in urban Ethiopia has increased significantly over the past ten years and that EMEs are quickly emerging to supply this market. In the next section, we look at procurement patterns – including the raw materials used – and sales practices of these EMEs.

5. PROCUREMENT AND SALES OF ENJERA-MAKING ENTERPRISES

Table 5.1 presents results on procurement and client sales by type of EME. To identify procurement patterns of EMEs, questions were asked about where teff, the major ingredient for the enjera, was acquired. The results overwhelming show how important mills are for obtaining the teff for enjera-making. The share of the mills as the source of teff is lowest for the medium EMEs (80 percent) and highest for the small EMEs (84 percent). Procurement mechanisms are slightly different for the larger EMEs, as they obtain relatively more of their supply directly from the wholesale market in the city or even from outside the city – 10 and 6 percent of the teff used was procured outside the city for large and medium EMEs, respectively. The emergence of these bigger EMEs might therefore lead to the establishment of different teff supply chains, thus cutting out middlemen in the teff value chain in the city.

The customers that these different EMEs serve differ widely. As Table 5.1 shows, direct consumers make up 86 percent of the clients of the small EMEs. This share declines to 38 percent for medium EMEs and 42 percent for the large ones. Restaurants especially are major clients of the larger EMEs. They make up 43 percent and 39 percent of the large and medium EMEs, respectively. This compares to restaurants making up 5 percent of sales for the smallest EMEs. Enjera retailers only make up 13 percent and 17 percent of the turnover of large and medium EMEs, respectively. Table 5.1 further illustrates again the relatively limited importance of modern retail outlets in the ready-to-eat enjera market.[13]

[13] The linkages of these relatively larger companies with the emergence of modern retail is rather typical in these markets (Reardon et al. 2009).

Table 5.1: Procurement and sales by size category of enjera-making enterprise, percent of total

	Large		Medium		Small	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Procurement of teff						
From inside city						
From wholesale market, on truck	4.1	18.6	2.3	15.1	0.0	0.0
From wholesale market, trader based there	3.0	14.0	6.8	25.5	0.0	0.0
From cereal shops	0.0	0.0	6.8	25.5	4.6	21.1
From mills that also sell cereals	81.5	35.7	79.5	40.8	84.1	36.7
Other place	0.0	0.0	0.0	0.0	9.3	29.1
From outside city						
At temporary market	3.7	14.7	4.5	21.1	1.3	11.5
Not at temporary market	7.7	25.7	0.0	0.0	0.7	8.1
Sales by customer category						
Consumers	41.7	42.7	37.7	36.2	85.7	29.6
Enjera retailers	13.2	29.9	17.0	27.2	6.3	21.1
Gulits	0.3	1.8	0.7	3.3	2.6	13.7
Institutions	0.1	0.4	0.9	4.7	0.0	0.0
Restaurants	42.5	39.3	37.1	35.6	5.2	17.1
Supermarkets/mini-markets	2.3	10.9	0.2	1.5	0.0	0.0
Others	0.0	0.0	6.7	19.7	0.5	6.6

Source: Authors' computations based on enjera survey

EMEs were further asked to indicate the share of different cereals that each uses for making enjera (Table 5.2). We note striking differences based on size of the EME with seemingly stronger emphasis on quality for the inputs used in enjera-making by the relatively larger EMEs.

We first discuss the main ingredient, teff. The share of use of the highest quality and most expensive teff grain, magna, is higher for the larger EMEs compared to the use made of magna teff by medium and smaller EMEs. For larger EMEs, magna teff makes up 20 percent of the mix for making enjera. This compares to 12 and 5 percent for the medium and small EMEs, respectively. White teff shows a similar pattern to magna teff. In contrast, we see the reverse for the lower priced mixed and red teff varieties. The mixed teff type of enjera makes up 38 percent of teff used within the smaller EMEs compared to only 11 percent for the larger ones.

Moreover, there is also significant mixing of teff flour with the flour of other cereals when making enjera. These mixing patterns with other cereals differ significantly between EMEs, as well as by cities. Overall, there is more mixing with different cereals other than teff by smaller EMEs. Mixing with rice is carried out more by the bigger EMEs. For every quintal (100 kg) of flour, the largest EMEs report using 10 kg of rice flour. This declines to 8.4 kg for the smaller EMEs. On the other hand, the smallest EMEs mix teff more with sorghum, and to a much lesser extent with maize and millet, i.e. the relatively cheaper cereals in Ethiopia.[14] The different mixing patterns lead to different input costs between large, medium, and small EMEs, the latter paying 91 percent of the cereal input costs of the large EMEs.[15] While we note this described pattern in all three cities, mixing with rice is especially common in Addis Ababa and is relatively less common in the smaller cities. For example, there is no mixing with rice reported in the city of Nekemte.

[14] This mixing with other cereals for enjera-making seems to partly explain the strong correlation of the teff price with other cereal prices as customers seemingly readily substitute into other cereals depending on relative price changes (Rashid 2011).

[15] It might be argued that EMEs might not reveal the truth about how they mix other cereals with teff. We however see similar mixing patterns reported by millers, except for Dire Dawa (see middle of Table 5.2).

Table 5.2: Mixing of other cereals with teff in making enjera, as reported by enjera-making enterprises

		Large		Medium		Small	
	Unit	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Magna teff, share	percent	19.5	37.2	11.9	31.4	4.9	20.0
White teff, share	percent	52.6	43.7	50.6	44.9	35.9	42.1
Mixed teff, share	percent	11.2	29.7	24.7	39.7	37.6	40.6
Red teff, share	percent	2.4	13.5	0.6	4.0	3.0	13.7
Rice, share	percent	10.1	9.3	8.7	10.1	8.4	10.4
Sorghum, share	percent	1.3	3.4	0.9	3.6	8.1	16.0
Wheat, share	percent	1.4	5.5	0.0	0.0	0.1	0.8
Maize, share	percent	1.4	3.5	0.9	3.0	1.9	5.6
Millet, share	percent	0.0	0.0	0.0	0.0	0.1	0.7
Other cereal, share	percent	0.0	0.0	1.7	11.2	0.1	0.9
Total, share	percent	100.0		100.0		100.0	
Share of rice (self-reported by enterprise)							
Addis Ababa	percent	10.9	9.9	11.5	10.4	13.1	10.8
Dire Dawa	percent	10.0	0.0	3.8	4.8	1.9	3.6
Nekemte	percent	0.0	0.0	0.0	0.0	0.0	0.0
Share of rice (reported by mill)							
Addis Ababa	percent					13.1	12.5
Dire Dawa	percent					7.0	5.8
Nekemte	percent					0.8	3.5
Cost of a quintal of flour for enjera-making using wholesale grain prices							
Overall	birr	1,636		1,596		1,530	
Addis Ababa	birr	1,660		1,619		1,554	
Dire Dawa	birr	1,605		1,566		1,498	
Nekemte	birr	1,521		1,485		1,391	

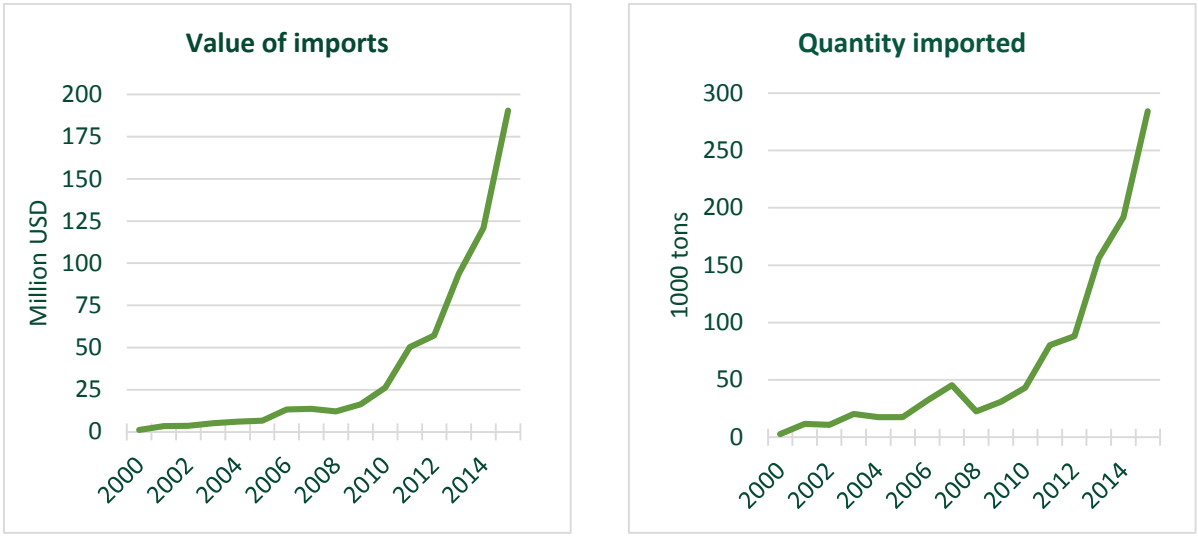
Source: Authors' computations based on enjera survey

Notably, rice flour has become very important for mixing with teff flour for enjera-making, especially in Addis Ababa. Taking into account the share of different sized EMEs in Addis Ababa, we estimate that for every quintal of flour, 12.5 kg of rice is being used. This is a relatively new phenomenon (Minten et al. 2014), with important implications for agricultural trade.[16] Figure 5.1 below illustrates that imported rice is rapidly increasing in importance in Ethiopia – rice imports were valued at almost 200 million USD in 2015. While not all rice is being used for enjera-making in urban areas, it however constitutes an important source of demand for imported rice. Minten et al. (2012) estimate that almost 250,000 tons of teff was annually being consumed in 2012 in Addis. Assuming 12.5 percent of teff is mixed with rice in Addis, that would explain almost 40,000 tons of rice imports being used for enjera-making in Addis alone, or about 15 percent of national rice imports. While changes in the composition of flour used to make enjera has significant impacts on the international trade balance of Ethiopia, it is also to be noted that the export markets for enjera are increasing, albeit limited in scale compared to the level of imports of rice (see Appendix 1).[17]

[16] This increasing consumption of rice puts Ethiopia in line with other African countries which depend increasingly on rice imports, especially for urban areas.

[17] It is also to be noted that local rice production has also significantly increased (Mohapatra 2012). However, it is seemingly less important to supply Addis with rice, as indicated in our key informant interviews.

Figure 5.1: Value and quantity of rice imports to Ethiopia, 2000 to 2015



Source: Comtrade

We therefore find significant heterogeneity in grain procurement and enjera sales patterns by the size of the EMEs, with the largest ones mostly focusing on institutional buyers and the smaller ones on direct consumers. We could deduce that the take-off of the institutional buyers, often seen in food market transformations (e.g. Reardon and Timmer 2012), is leading to structural changes in these markets. We therefore look in the next section at some elements of employment, productivity, and value added by size of EME.

6. EMPLOYMENT, PRODUCTIVITY AND VALUE-ADDED OF ENJERA-MAKING ENTERPRISES

We first look at employment and technology differences by type of EME (Table 6.1). The average number of people employed in EMEs amounts to 1.8, 6.8, and 15.7 for small, medium, and large EMEs, respectively. The majority of employees in these enterprises are women, often lower-skilled ones. Eighty-four percent of workers in small EMEs are women; this drops to 73 percent for the large EMEs. The smaller the EME, the higher the share of family laborers; 76 percent of small EMEs rely exclusively on family labor. As expected, when EMEs become bigger, there is much less reliance on family labor – only 10 percent of large EMEs rely on family labor exclusively. Enterprises were also asked about the level of salaries paid. The bigger the EME, the higher the salary. However, even for bigger enterprises, salaries are still relatively low, compared to international levels, at 1,073 birr/month, i.e., less than 50 USD.

Enterprises also were asked about the type of technologies used for enjera-making. Two types of *mitad*s are currently used: electric *mitad*s and *mitad*s on wood. Table 6.1 shows that there is a strong linkage between the size of the enterprise and the type of technology used. The majority of small EMEs rely on *mitad*s that are heated with wood with electric *mitad*s being less important. This is contrast with the larger enterprises where electric *mitad*s are much more common. For the largest EME, 7.1 electric *mitad*s are used on average compared to 3.1 *mitad*s that use wood. Capacity utilization of electric *mitad*s are on average lower than for *mitad*s on wood, except for the larger EMEs. EMEs were asked about why electric *mitad*s could not achieve full capacity. In response, they described that problems with the supply of electricity was an issue and the reason for not using electric *mitad*s the whole time[18]. *Mitad*s heated by wood are only used when there is lack of electricity.[19] Questions were further asked about why firms had not shifted to electric *mitad*s, a question especially relevant for the smaller firms as they rely relatively less on these electric *mitad*s. Most of these smaller EMEs perceived that the initial costs, as well as the running costs, for an electric *mitad*, were too high.

[18] Table 6.1 indicates that large EMEs are confronted with demand problems, while 9 percent of medium enterprises pointed to lack of demand as a main reason for production below full operating capacity.

[19] Lack of electricity has also been found in a number of other studies to be an important constraint in business operations in Ethiopia (Zhang et al. 2011; World Bank 2015).

Table 6.1: Employment and technology use by size category of enjera-making enterprises

		Large		Medium		Small	
	Unit	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Employment by enjera-making enterprise							
All people in enterprise from one family	percent	9.7	30.1	22.2	42.0	75.5	43.2
Family members (male)	number	0.6	1.1	0.5	0.8	0.2	0.6
Family members (female)	number	0.9	1.5	1.1	1.1	1.2	0.6
Permanent non-family workers (male)	number	2.2	3.7	0.6	1.2	0.1	0.9
Permanent non-family workers (female)	number	6.7	7.4	3.5	5.9	0.2	0.7
Temporary workers (male)	number	1.4	6.6	0.1	0.3	0.0	0.1
Temporary workers (female)	number	3.8	5.9	1.2	3.4	0.1	0.5
Total males	number	4.3	10.1	1.1	1.5	0.3	1.0
Total females	number	11.5	7.2	5.7	6.2	1.5	1.0
Total workers	number	15.7	14.9	6.8	6.3	1.8	1.4
Average monthly salary paid	birr	1,073	670	810	730	772	437
If payment per enjera, payment per enjera	birr	0.38	0.21	0.56	0.30	0.71	0.37
Technology							
Electric *mitad*	number	7.19	6.58	1.49	1.29	0.50	0.63
*Mitad*s heated by wood	number	3.13	3.56	1.96	1.46	0.83	0.71
Current value of an electric *mitad*	birr	983	611	953	550	899	645
Current value of a *mitad* heated by wood	birr	264	321	342	365	166	319
Capacity utilization of electric *mitad*s	percent	64.4	40.4	67.8	33.0	68.0	32.3
If not 100%, what is the reason:							
- lack of electricity	percent	89.5		45.5		43.8	
- lack of demand for enjera	percent	0.0		9.1		22.9	
- other	percent	5.3		22.7		12.5	
- combination	percent	5.3		22.7		20.8	
Capacity utilization of wood-heated *mitad*s	percent	57.0	40.7	69.3	37.4	78.4	32.9
If not 100%, what is the reason:							
- use them only when no electricity	percent	69.2		33.3		17.9	
- lack of demand for enjera	percent	15.4		22.2		41.0	
- other	percent	15.4		38.9		38.5	
- combination	percent	0.0		5.6		2.6	
If use wood only, why not shift to electric *mitad*s?							
-"Initial costs of electric *mitad* too high"	percent	100.0		37.5		75.9	
-"Running costs of an electric *mitad* too high"	percent	100.0		31.3		68.3	
-"Have no access to electricity required for *mitad*"	percent	0.0		31.3		36.1	
-"Do not know where to get electric *mitad*"	percent	0.0		0.0		1.2	
-"Wood heated *mitad* faster in producing specific quantity"	percent	100.0		43.8		27.7	

Source: Authors' computations based on enjera survey

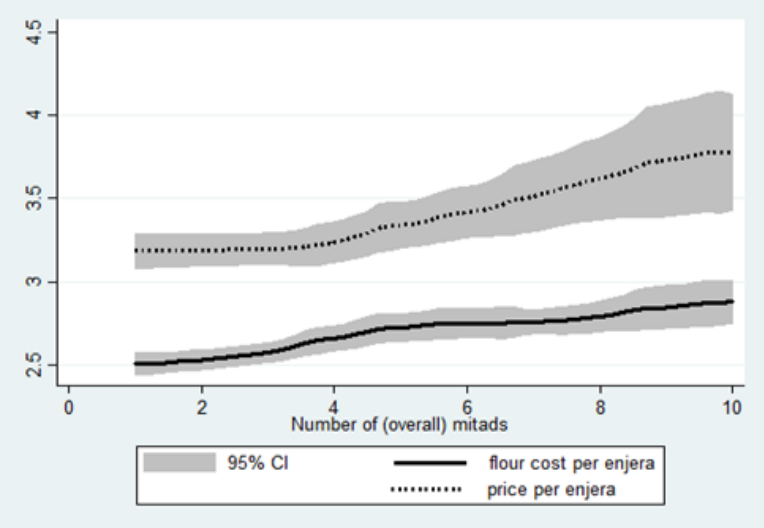
Table 6.2 presents productivity and profit figures for the three size categories of enterprises. The large EMEs produce about six times as many enjera per day as the EMEs in the small size category. As shown above, technology choices are different, with 60 percent of the enjera made by small EMEs produced on wood heated *mitad*s, while this drops to 36 percent for large EMEs. When flour costs and enjera prices are compared, larger profits are made by the larger EMEs that sell at relatively higher prices, but they also face slightly higher input costs, given their focus on quality (Figure 6.1). Quality appears to be rewarded in the market place, with the larger EMEs delivering more expensive and higher quality enjera. However, smaller EMEs may find it challenging to produce enjera with the appropriate quality and in the quantities required to participate in the these more demanding food service sector focused markets for ready-to-eat enjera.

Table 6.2: Productivity of enjera-making enterprises by size category

		Large		Medium		Small	
	Unit	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Average production of enjera per day	number	582.8	542.5	224.6	203.7	93.6	172.2
Price per enjera	birr	3.6	0.4	3.3	0.5	3.2	0.7
Enjera made on electric *mitad* in last month, share	percent	63.6	45.1	45.4	43.5	39.8	48.3
Enjera made on wood-heated *mitad* in last month, share	percent	36.4	45.1	54.6	43.5	59.5	48.4
Enjera per electric *mitad*/day	number	171.6	147.9	216.0	299.2	65.2	48.5
Cost of electricity per day per *mitad*	birr	176.2	183.1	38.4	44.6	17.6	17.5
Enjera per wood-heated *mitad*/day	number	189.6	112.7	95.5	47.2	93.8	110.5
Cost of wood per day per *mitad*	birr	89.2	56.7	69.4	66.5	42.5	25.9
Cost of flour per quintal	birr	1,634.0	106.2	1,575.1	200.2	1,128.6	672.6
Gross revenue per day	birr	1,983.2	2,003.5	856.9	988.0	290.5	629.1
Cost of flour per enjera	birr	2.7	0.2	2.6	0.3	2.5	0.4
Net revenue per day	birr	476.3	524.6	201.4	270.0	74.9	176.2
Net revenue per enjera	birr	0.82	0.40	0.65	0.52	0.62	0.58

Source: Authors' computations based on enjera survey

Figure 6.1: Sale price and cost of flour per enjera for enjera-making enterprises as a function of number of *mitad*s used



Source: Authors' computations based on enjera survey

To better understand the role of quality in these markets, the color of enjera was assessed by enumerators, along with price and other associated factors. In Table 6.3, we present the results of a multinomial regression where we examine the factors associated with the color of enjera, which is an important determinant of prices, as we see later on in this section. Specifically, we look at what type of cereals are associated with red enjera (the default in the regression), slightly white enjera, and very white enjera. We note that the very white enjera is associated with the use of flour with a higher composition of magna and white teff as well as rice. The white enjera types all are characterized by lower use of sorghum flour. Notably, the price of rice was lower than the price of white teff at the time of the survey and it is therefore a good substitute flour for magna and white teff flour in producing white-colored enjera.

Table 6.3: Factors associated with enjera color, results of a multinomial regression

Base=red enjera		Slightly white			Very white		
	unit	coeff.		z-value	coeff.		z-value
Red/mixed teff (default)							
Magna teff, share	percent	0.025	*	1.64	0.074	***	3.99
White teff, share	percent	0.004		0.96	0.037	***	3.27
Rice, share	percent	0.016		0.73	0.055	*	1.78
Sorghum, share	percent	-0.098	***	-5.25	-0.069	**	-2.03
Other cereals, share	percent	0.005		0.17	0.036		0.94
Intercept		1.610	***	4.12	-3.066	***	-2.73
Observations		269					
LR chi2(10)		112.62					
Prob>chi2		0.00					

***, **, *: significant at the 1%, 5% and 10% respectively

Source: Authors' computations based on enjera survey

We further run hedonic price regressions. Four specifications are presented, all estimated with robust standard errors. The results of the first short model in Table 6.4, which controls for the color of enjera and for a city dummy only, illustrate that the prices of very white and slightly white enjera are 23 and 17 percent higher, respectively, than red enjera. A second short model specification show that *gulit*s sell enjera at a price that is 29 percent below the prices of large wholesalers. A third and fourth specification, with more explanatory variables, illustrate that part of the difference in prices that is shown by the color of enjera is captured by the type of outlet. *Gulit*s sell enjera at lower prices, but when we control for quality differences – both color and grain composition – as shown in Specification 4 of Table 6.4, the price difference of the *gulit* with the large wholesaler becomes significantly smaller and drops to only 13 percent from 29 percent in the shorter model.

Table 6.4: Hedonic pricing of commercial enjera

Dependent variable:		Specification 1			Specification 2			Specification 3			Specification 4		
Log of price per enjera	Unit	coeff.		t-value	coeff.		t-value	coeff.		t-value	coeff.		t-value
Red enjera color (default)													
White enjera	0/1	0.167	***	3.77				0.107	***	3.22	0.063	*	1.65
Very white enjera	0/1	0.229	***	4.81				0.162	***	4.51	0.090	**	2.23
Large wholesaler (default)													
Small wholesaler	0/1				-0.046		-1.58	-0.023		-0.79	-0.032		-1.15
Retailer	0/1				0.000		0.00	0.039		1.53	0.064	**	2.43
Gulit	0/1				-0.292	***	-4.23	-0.214	***	-3.44	-0.128	**	-2.17
Grain composition of enjera (red/mixed teff default)													
Magna teff, share	percent										0.0004		0.68
White teff, share	percent										0.0004		1.35
Rice, share	percent										-0.0003		-0.28
Sorghum, share	percent										-0.0064	***	-3.73
Other cereals, share	percent										-0.0021	**	-2.36
Cooperative	0/1				0.070	***	3.40	0.084	***	3.93	0.0846	***	3.75
Addis Ababa (default)													
Dire Dawa	0/1	-0.086	*	-1.78	-0.068		-1.55	-0.048		-1.22	0.033		0.66
Nekemte	0/1	-0.211	***	-7.09	-0.158	***	-5.63	-0.149	***	-5.22	-0.116	***	-3.45
Intercept		1.063	***	25.33	1.230	***	49.56	1.091	***	27.35	1.122	***	20.79
Number of observations		334			333			333			268		
R^2		0.25			0.35			0.38			0.48		

***, **, *: significant at the 1%, 5% and 10% respectively; robust standard errors

Source: Authors' computations based on enjera survey

Similarly, a large part of the price differences in enjera between cities can be traced back to differences in quality. When we do not control for quality, enjera prices are 7 percent lower in Dire Dawa (but not significant) and 16 percent lower in Nekemte (Specification 2 in Table 6.4). When we control for quality, there is no significant difference between Dire Dawa

and Addis, and the difference between Addis and Nekemte is reduced to 12 percent (Specification 4). More importantly, after controlling for the color of enjera and type of outlet, the composition of the flour has little additional effect on the prices charged for enjera, seemingly indicating that those outlets that substitute teff with rice make more profit, as long as the color of the enjera is not affected. (This is also confirmed by a production function analysis, presented in Appendix 2.) It is only in the case of mixing teff with sorghum that the prices charged are lower, possibly because of the lower shelf-life resulting from this mix. Finally, cooperatives charge higher prices no matter what specification is used.

7. DRIVERS FOR THE EMERGENCE AND GROWTH OF COMMERCIAL ENJERA MARKETS IN URBAN ETHIOPIA

The emergence and growth of commercial enjera markets in urban Ethiopia, as noted above, have important implications on employment, especially for women. A number of factors appear to be driving this change. First, the rise in opportunity costs of women. Women are increasingly participating in the workplace, and there is more intense competition in labor markets which in turn escalates salaries in the country (Bachewe et al. 2015). CSA data show that there was a real increase in the cost of domestic help by 60 percent between 2000 and 2015, which possibly explains why some households forego hiring domestic help, who would ordinarily make enjera for middle-class households, and rely on commercial markets for their enjera supply.

Second, the growth of cities, the take-off of employment in the services or manufacturing sectors, and income growth has all led to a higher share of the population relying on out-of-home consumption, giving impetus to the development of a food service industry, especially restaurants. Data from the national HICES in 1996 indicate that 3.8 percent of per capita expenditures in urban areas was apportioned to out-of-home food expenditures. This had increased to 16.0 percent by 2011.[20] While there are some comparability issues with the data collected by HICES over the years, it is apparent that the urban food service industry became significantly larger between 1996 and 2011. This industry is mostly supplied with the enjera it requires by the growing EME sector, which has provided the impetus for larger EMEs, in particular, to emerge.

Another major dynamic noted in the data is the steady rise in mixing teff flour with that of imported rice to make enjera. This is an important trend, given the implications for the country's international trade balance. A number of factors seem to have contributed to this. First, rice is replacing sorghum as a preferred cereal to mix with teff, because of its superior characteristics for the preferred whiteness and flexibility, as stated by a large majority of EMEs (Table 7.1).

Table 7.1: Perceptions of enjera quality when teff flour is mixed with that of other cereals, share of respondents

	Strongly disagree	Disagree	It depends	Agree	Strongly agree
a. "Mixing of teff with local rice improves the whiteness of the enjera"	4.1	14.3	2.7	51.4	27.6
b. "Mixing of teff with local rice improves the flexibility of the enjera"	11.4	28.0	5.5	40.1	14.9
c. "Mixing of teff with local rice improves the shelf-life of the enjera"	15.2	42.8	15.2	17.9	8.9
d. "Mixing of teff with imported rice improves the whiteness of the enjera"	1.5	13.7	7.6	46.4	30.8
e. "Mixing of teff with imported rice improves the flexibility of the enjera"	12.5	24.1	14.0	35.4	14.0
f. "Mixing of teff with imported rice improves the shelf-life of the enjera"	12.4	43.2	18.7	17.0	8.7
g. "Mixing of teff with sorghum improves the whiteness of the enjera"	29.2	40.6	11.5	16.0	2.8
h. "Mixing of teff with sorghum improves the flexibility of the enjera"	35.6	38.7	9.2	13.7	2.7
i. "Mixing of teff with sorghum improves the shelf-life of the enjera"	29.8	41.8	14.2	12.4	1.8
j. "There is increasing mixing of teff with other cereals as the price of teff has increased too high"	6.3	21.4	4.2	29.2	39.0

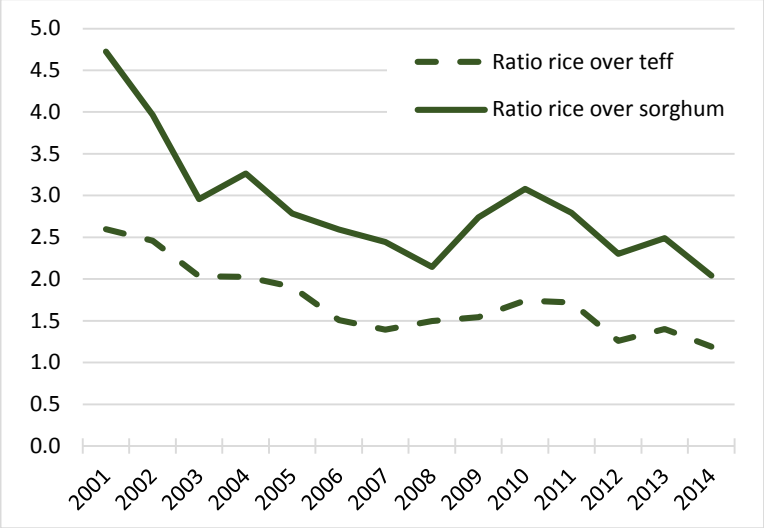
Source: Authors' computations based on enjera survey

Second, price changes of rice have led to improved price ratios compared with teff, as well as with sorghum. Figure 7.1 shows the evolution of these (retail) price ratios over time. While a kg of rice was worth about three kg of teff in the beginning of the 2000s, this ratio dropped to almost a one-to-one level in 2014, and even lower at the time of the survey. Similar trends are noted for sorghum. The improved relative price ratios of rice have likely been driven by international price

[20] Out-of-home expenditures also grew in rural areas from 2.2 percent in 1996 to 5.4 percent in 2011. At the national level, such expenditures per capita increased from 2.5 to 7.1 percent.

decreases, more competition in local larger markets, as well as the overvaluation of local exchange rates, which makes imports relatively cheaper than what they would have been under a more liberalized exchange rate regime.

Figure 7.1: Retail price ratios for rice compared to teff and sorghum, 2001 to 2014



Source: Authors' computations based on CSA's retail prices

8. CONCLUSIONS

Food retail markets are transforming rapidly in developing countries and processed foods are on the increase in local diets. On top of the well-studied nutritional impacts of these transformations, they have important implications on the structure and functioning of food supply systems in these countries, including on employment and on value addition in the agro-processing sector. However, there has been limited attention to this part of the transformation of the food systems in developing countries.

In Ethiopia, food processing industries are a major employer, with an estimated one million people engaged in the sector. Within this sector, we studied enterprises making enjera (the traditional staple pancake) and its retailing. Based on a unique primary survey, we have explored the functioning of commercial enjera markets in urban Ethiopia. There are three major findings from this study.

First, enjera markets are quickly transforming and a large number of people, especially in urban areas, now buy enjera instead of preparing it themselves. The size of commercial urban enjera markets is evaluated at 250 million USD per year, and it is estimated that more than 100,000 people in urban Ethiopia make their living in enjera-making enterprises or through the retailing of the enjera produced. This sector provides a high level of employment in Ethiopia, comparable to the much publicized flower export sector (e.g., Oqubay 2015; Schaefer and Abebe 2015). Moreover, the sector mostly employs women.

Second, there are important international trade implications with the emergence of these commercial enjera markets. Enjera is increasingly being prepared by mixing local teff with imported rice. This has important implications for food imports. The use of rice in enjera preparation is rapidly increasing, seemingly driven by international price decreases of rice as well as advantageous conditions for rice imports.[21] Moreover, formal export markets for enjera are expanding, currently accounting for 10 million USD in exports per year. Few people have considered the impacts of this developing export market for enjera.[22]

Third, while small micro-enterprise EMEs are quickly emerging, larger EMEs produce more enjera per day, use better technologies, have higher value addition and are more profitable. We show that these larger enjera-making enterprises are catering especially to the rapidly growing food service industry. We find that average urban consumers in Ethiopia already

[21] Due to overvaluation of the Ethiopian birr (World Bank 2015).

[22] However, as most of the exports are directed to areas where Ethiopian diaspora reside, as they are seemingly the largest consumers of these exported enjera. It might be that there is in important limit to the export growth of this type of product related to the size of the Ethiopian diaspora.

spend 16 percent on food eaten away from home, but that share is significantly higher for the relatively richer households, suggesting that further growth of this sector is highly likely with increasing incomes in the country.

These findings have a number of policy implications. First, as economies in developing countries grow and urbanization takes off, more attention needs to be paid to the off-farm aspect of agricultural value chains. These off-farm activities have important impacts on employment, as well as on prices and food security for both urban and rural populations. Rapidly emerging agri-food small and medium-sized enterprises in this off-farm segment add significant value, but they are often neglected in the African food debate (Reardon et al. 2015). Second, urban commercial food markets are rapidly growing and will increasingly shape agricultural and food economies in these countries. Third, as agricultural economies and cities develop, international trade is becoming more important as these cities are easier to access for food imports, as well as exports, as illustrated in this case study. More attention therefore should be paid to trade policies and their impact on African food systems and value chains. Finally, more focus is needed to stimulate local, import-substituting rice production, given the rapidly changing food preferences of the local population, as well as to help alleviate foreign exchange scarcity in the country.

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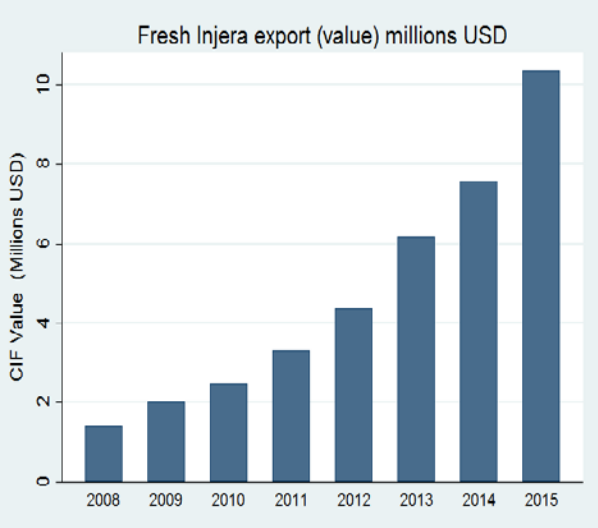
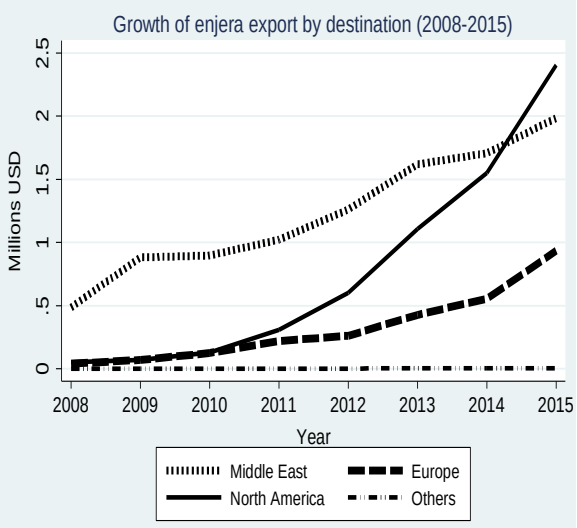
APPENDICES

Appendix 1: Enjera export markets

Figure A1 below shows how the value enjera exports from Ethiopia have evolved over time. Official exports of enjera in 2015 were valued at 210 million birr or 10 million USD. While the Middle East was the traditional region to which enjera was exported, North America received the largest share of enjera exports in 2015. Enjera exports to Europe are also quickly increasing. It seems that these exports are especially driven by demand from Ethiopians that migrated to these areas and that stay attached to the eating culture of their homeland.

Figure A1: Enjera exports from Ethiopia, by value, over time





Source: Ministry of Trade

The rapid take-off of enjera exports is seemingly linked with the increased number of direct flights from Addis to a number of international destinations. As enjera is highly perishable, short travel times are required, which makes air travel the only option for international trade. As Ethiopian Airlines has been rapidly expanding its international flight destinations, enjera exports have followed along the lines of these destinations. For example, in 2012/13 Ethiopian Airlines served 76 international destinations, rising from 54 destinations five years earlier - an increase of 41 percent. Moreover, Ethiopian Airlines also doubled the frequency of their flights to these destinations, and hence, significantly increased the number of miles traveled.

In parallel, some large EMEs have shifted their orientation from exclusively focusing on supplying enjera to the domestic urban market to increasingly producing enjera for export. Chief among these EMEs is Mama Fresh, which has developed a relatively sophisticated business model to supply enjera, as well as other components of Ethiopian cuisine, to a network of customers internationally. Text Box 1 provides more detail on the firm.

Text Box 1: Enjera exports: The case of Mama Fresh

Mama Fresh produces enjera, mostly for export. The firm started in 2003 as a company supplying the local market. It started exporting in 2011 and the company now focuses mostly on export markets. Local markets however still make up a quarter of its turnover. In the local market, they mostly supply local hotels. They also own a local shop where they sell enjera directly to consumers.

Mama Fresh exports mainly to the US (five times a week with about 3,000 pieces of enjera per shipment) but also to Norway, Sweden, and Germany. In the US, they own a distribution company that picks up the enjera from the airport and delivers the product to about 40 shops in the Washington, DC area. Most of their customers in Washington, DC are members of the Ethiopian diaspora resident there or are Ethiopian restaurants. Their products are branded and sold in packages of four or five enjera. The company is one of the biggest enjera exporters to USA, competing with four or five other companies in this line of exporting. Freight prices are a major factor in final prices charged for enjera in foreign markets. Currently, the freight prices to the US are 0.60 USD per enjera. To be able to export, the company requires a

health certificate and certificate of origin. Mama Fresh currently does not have ISO certification but is planning to obtain this in the near future. This would allow the company to extend their sales to supermarkets in USA.

On the procurement side, Mama Fresh purchases between five and six quintals of teff daily. For this, the company has entered into direct contracting with cooperative unions in the Debre Zeit region, which obtain teff grain from about 300 farmers in that area. The company started doing this in 2014. By operating in this way, the firm can better ensure quality. In order to maintain quality in their teff supply, Mama Fresh provides a price premium to suppliers of about 100 birr per quintal.

The company employs 84 employees, 95 percent of whom are women. Mama Fresh also employ five workers in USA. Their employees make on average 400 enjera per day per worker. If they produce more, they obtain a bonus. The company owns one flour mill itself and utilizes about 40 electric *mitad*s for enjera production. Given problems with the supply of electricity, the company also has a generator to ensure that operations continue during electricity blackouts.

Appendix 2: Factors associated with value addition in enjera-making enterprises

We explore the determinants of value addition in enjera-making enterprises. To do so, we run a stochastic production frontier model using the value-addition of an enterprise as the dependent variable (Table A1).

Table A1: Determinants of value added in enjera-making enterprises

Dependent variable: Value added of enterprise	Unit	coeff.	z-value
Labor			
Family labor (male)	log()	-0.140	-0.77
Family labor (female)	log()	0.431	2.17**
Non-family permanent labor (male)	log()	-0.050	-0.24
Non-family permanent labor (female)	log()	0.475	3.25***
Non-family temporary workers (male)	log()	0.027	0.06
Non-family temporary workers (female)	log()	0.243	1.85*
Number of total *mitad*s	log()	0.646	4.66***
Share of *mitad*s that are electric	percent	0.000	-0.07
Composition enjera (magna teff default)			
Share white teff	percent	0.000	0.02
Share mix teff	percent	0.002	0.60
Share red teff	percent	0.002	0.34
Share rice	percent	0.027	3.07***
Share sorghum	percent	0.006	0.75
Share wheat	percent	-0.009	-0.30
Share maize	percent	0.016	1.30
Cooperative	0/1	0.416	1.93*
Addis Ababa (Default)			
Dire Dawa	0/1	0.788	2.84***
Nekemte	0/1	0.130	0.48
Intercept		3.370	7.80***
Number of obs.			200
Wald $chi^2(16)$			172.22***
Usigma _cons		0.051	0.16
Vsigma _cons		-0.781	-3.29***

Source: Authors' computations based on enjera survey

We find that especially female labor, family or non-family, full-time or temporary, has quantitatively the biggest relation with additional output. A doubling of full-time family and non-family female labor leads to an increase of 40 and 52 percent in value added respectively. Temporary employment by women results in lower value added compared to full-time employment, but is still quite large at 27 percent. Male employment has little effect on value added, possibly because males are more involved in non-productive management, administrative and security tasks. A doubling of *mitad*s also leads to significant increases, leading to a 72 percent increase in value added. Using rice flour in the enjera batter – possibly without clients knowing – leads also to relatively higher value added. Interestingly, the shift to new technologies – electric *mitad*s – does not affect these figures. Finally, cooperatives have more value added than other types of company structures.

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The Ethiopia Strategy Support Program is an initiative to strengthen evidence-based policymaking in Ethiopia in the areas of rural and agricultural development. Facilitated by the International Food Policy Research Institute (IFPRI), ESSP works closely with the government of Ethiopia, the Ethiopian Development Research Institute (EDRI), and other development partners to provide information relevant for the design and implementation of Ethiopia's agricultural and rural development strategies. For more information, see http://www.ifpri.org/book-757/ourwork/program/ethiopia-strategy-support-program; http://essp.ifpri.info/; or http://www.edri-eth.org/.

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