An empirical assessment of Fairtrade: A perspective for low- and middle-income countries?*

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Abstract

This paper presents the first cross-country empirical evidence on the determinants of participation in Fairtrade and the impact of the export of Fairtrade certified products on agricultural growth in low- and middle-income countries. Using the number of certified producer organizations per country in 2006-2010 as a proxy for Fairtrade exports, estimation results indicate a small but significantly positive effect on the growth rate of per capita value added in agriculture that is largest in upper middle income countries. Given the particularly poverty-reducing effect of agricultural growth, we find empirical evidence that Fairtrade certification is indeed able to deliver its core values, but misses to target the very poor.

Keywords: Fairtrade, agriculture, growth, poverty
JEL Codes: D3, O1

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1 Introduction

Being a consumer concerned with sustainable consumption, the purchase of Fairtrade (FT) certified products seems to be one possibility to support marginalized producers in the global South.[1,2] The FT model offers farmers and agricultural workers in the South higher prices, a per unit FT premium, stable market links, and assistance in finance and development, while consumers in the North are able to satisfy their need for socially and ecologically responsible consumption (Raynolds, 2000; Becchetti and Rosati, 2005; Granville, 2009).

Since the early 2000s the Fair Trade movement has become increasingly popular among consumers as an alternative form of socially regulated trade (Raynolds, 2012). According to Fairtrade Labelling Organizations International (FLO), FT sales increased over the period 2003 to 2010 from 830 million to 4.9 billion Euro, corresponding to an average annual growth rate of 25 percent. The four largest products by value, coffee, bananas, cocoa and flowers, generated more than 80 percent of FT sales.[3] In 2010, 905 certified producer organizations represented 1.15 million farmers in 63 developing countries. The largest number of certified producers can be found in Latin America (509 out of 905), while 60 percent of smallholders and workers are employed in African producer organizations. The FT premium paid to producer cooperatives in 2010 amounted to 51.5 million Euro (54 Euro on average per member/worker) and was spent, e.g. on business development, production and quality improvements, cash payments to members, educational and environmental programs (Kilpatrick, 2011).

In the World Development Report *Agriculture for Development* the World Bank (2008) emphasizes the importance of agriculture for development and poverty reduction. The main pathways out of poverty include improvements in productivity, profitability and sustainability of smallholder farming in developing countries by, among others, enhancing access to financial services and reducing risk exposure, advancing producer organizations' performance, and providing environmental services.

Positive effects of FT on marginalized producers have been emphasized in FT reports (Krier, 2008; Smith, 2009; Boonman et al., 2011; Kilpatrick, 2011) and several case studies. Participation in FT coffee trade networks reduces producers' exposure and thereby vulnerability to low coffee prices, significantly raises income, reduces the dropout rate from school, and increases the probability of treatment in the case of illness (Bacon, 2005; Arnould et al., 2009). Certification also creates advantages through facilitating access to credit and cooperative services. FT cooperative membership can be seen as institutional surrogate providing marginalized farmers with conditions for the development of contractual arrangements neces-

[1] Northern countries are consumer countries (Europe, USA, Canada, Japan, Australia and New Zealand), Southern countries comprise all countries that (are eligible to) supply Fair Trade products (Boonman et al., 2011; FLO, 2011).

[2] "Fairtrade" exclusively refers to the certification schemes of Fairtrade Labelling Organization International (FLO), while "Fair Trade" refers to World Fair Trade Organization (WFTO) certification (WFTO and FLO, 2011). For simplicity we use "Fair Trade" as a general umbrella term when we refer to the concept of equal exchange in general.

[3] Eligible product categories are cane sugar, cereals, cocoa, coffee, fibre crops, flowers and plants, fresh fruit, herbs and herbal teas and spices, honey, nuts, oilseeds and oleaginous fruits, prepared and preserves fruits and vegetables, sport balls, tea and vegetables (Kilpatrick, 2011).

sary to export and hedge against price volatility (Berndt, 2007; Valkila, 2009).

However, the question whether the purchase of FT certified products indeed supports marginalized producers is a disputed topic. Critics raise three main issues: i) inefficiency of the transfer, i.e., only a small fraction of the higher price paid by consumers reaches the producers in the South, ii) distortion of markets due to a price floor, iii) lock in effect in unproductive activities (Yanchus and de Vanssay, 2003; Mann, 2008; Sidwell, 2008).

The efficacy of participating in FT has not yet been tested in a cross-country setting, only in case studies built on qualitative interviews (Witkowski, 2005). While these studies provide important insights into the micro-level consequences of FT certification, their results can not be generalized due to omitted country specific factors. The main contribution of this paper is thus to provide an econometric analysis that i) sheds light on the determinants of smallholders' participation in FT on a country-level, and ii) allows to analyze the impact of FT certification on growth in the agricultural sector. We set up a data set on the number of FT certified producer organizations per country over the period 2006 to 2010 and analyze the determinants of participation in FT (extensive margin) and the extent of certification (intensive margin) employing a zero-inflated negative binomial (ZINB) model. In a next step we specify a model inspired by an "aid-growth" framework where we use the number of producer organizations to proxy the share of FT exports in order to test for a possible causal effect of FT on agricultural growth (Collier and Dollar, 2002; Hansen and Tarp, 2001; Dalgaard et al., 2004; Christiaensen et al., 2011).

The remainder of this paper is organized as follows: Section 2 gives an overview of the literature on the system and the effects of FT certification, and the relevance of agriculture for development. Section 3 sets up the ZINB model, describes the data and presents results on the determinants of the extensive and intensive margin of participating in FT. Section 4 formalizes a growth model that accounts for FT certification, presents estimation results and provides robustness checks. The final section 5 summarizes the results and concludes.

2 Literature Review

For a better understanding of the rather complex FT system, we provide a short overview of the history of FT and its core principles. As FT refers to different certification and remuneration schemes, we summarize briefly the notions relevant for the empirical analysis. Finally we resume the existing literature, contrast supporting and rejecting opinions, and analyze the potential of FT as means to reduce poverty via agriculture.[4]

2.1 A brief history of Fair Trade

The Fair Trade idea roots in the cooperative movement in 19^{th} century Italy and UK, and was revived by religious and political movements promoting alternative trade in the UK and

[4] We concentrate on the economic effects on producers/producer countries in the global South. For Papers on (Northern) FT consumers and their behavioral incentives, see Raynolds (2002); Moore (2004); Becchetti and Rosati (2005); Steinrücken and Jaenichen (2007); Granville (2009); Witt (2011); Starr (2009).

US in the 1950s and 1960s. International development agencies and religious organizations started to assist Southern producers in production and export to reduce unequal exchange and poverty (Low and Davenport, 2005; Gendron et al., 2009; Boonman et al., 2011).[5]

Until the late 1980s, mainly products from the craft sector were sold in World Shops or by specialized retailers.[6] The recession-driven decline in demand in the global North in the early 1980s, a lack of marketing strategies and increasing competition lead to a drop in Fair Trade craft sales (Tallontire, 2000; Low and Davenport, 2005). At the same time falling coffee prices, triggered by the dismantling of the International Coffee Agreement in 1989, required new income strategies for marginalized farmers. In this context, the Dutch development agency Solidaridad introduced the first Fair Trade label "Max Havelaar" to gain access to mainstream distribution channels. The idea spread rapidly across Europe and North America, resulting in the foundation of certification agencies in 19 countries. In 1997, these country-initiatives established the Fairtrade Labelling Organizations International (FLO) in Bonn, Germany, to unite the labelling initiatives under one umbrella organization and to establish common certification standards. Since then Fair Trade has grown from a response to declining coffee prices to a certification system covering a wide range of agricultural products, ensuring social and ecological standards of production (Low and Davenport, 2005; Steinrücken and Jaenichen, 2007; Valkila, 2009).

2.2 Fair Trade principles

According to the official definition, "Fair Trade (or "Fairtrade") is, fundamentally, a response to the failure of conventional trade to deliver sustainable livelihoods and development opportunities to the people in the poorest countries of the world; this is evidenced by the two billion of our fellow citizens who, despite working extremely hard, survive on less than $2 per day"(WFTO and FLO, 2009, p.5).

The core principles of Fair Trade are market access for marginalized producers, sustainable and equitable trading relationships, capacity building and empowerment, consumer awareness raising and advocacy, the perception of FT as a "'social contract", and adherence to the standards of the International Labour Organization (ILO) (WFTO and FLO, 2009). The two major certification organizations advocating these principles are the World Fair Trade Organization (WFTO, formerly IFAT) and the Fairtrade Labelling Organizations International (FLO). The former certifies handicraft and artisan goods, the latter focuses on commodity crops as coffee or bananas, but also high-value agricultural products as flowers (Leclair, 2002; Boonman et al., 2011). In the empirical section of this paper we concentrate on FLO-certified goods, i.e. we consider only agricultural products.

Producers, eligible for FLO certification, must be organized democratically in small producer organizations, contract production schemes or hired labor organizations (e.g. for flowers

[5] For a comprehensive review of the history of the FT see Tallontire (2000); Fridell (2004) and Low and Davenport (2005).

[6] World Shops are specialized on Fair Trade products, and until the 1990s mostly run by volunteers. These "not for profit" organizations (Krier, 2008, p.27) sell Fair Trade products, and organize informative and educational activities.

or bananas, which are usually grown on large farms and require permanent harvesting). The size of the FT producer organizations varies considerably, with the smallest comprising around 10 members, and the largest more than 70,000. 50 percent of all producer organizations have less than 300 members. Nine out of the ten largest producer organizations can be found in Africa, where the largest share of FT-labor is employed (Kilpatrick, 2011).

The FLO (2007*b*) guarantees certified producer organizations a floor price (FT minimum price) plus a price premium per unit sold to a FT customer. If the market price exceeds the minimum price, then the market price plus the price premium applies (see Figure A1 in the Appendix). Up to 60 percent of the purchase price should be pre-financed to the producer organizations, serving as pre-export lines of credit.[7]

FT premium income is intended for collective use by producer organizations and limited to socio-economic purposes at the community or cooperative level, such as investment in organizational development, production and processing, loans for individual/family needs, educational and environmental projects, communal infrastructure, health facilities and women's programs. In 2010, the average FT premium received per producer organization was 80,000 Euro (54 Euro per member/worker), and around 60 percent of total premium income were allocated to banana and coffee producers.

It should be emphasized that successful certification is driven by demand. A supplier can obtain FT certification only if she obtained a letter of intent from a wholesaler or retailer to purchase her product at the FT price. On average, only 30 percent of a cooperative's production are sold to FT markets, while the rest goes to conventional markets (Bacon, 2005; Booth and Whetstone, 2007; Mann, 2008).

2.3 Pro and contra Fair Trade

Coffee was the first commodity traded under the FT label, thereby initiating FT standards for agricultural products, and shows the highest market share of FT relative to conventional production (Raynolds, 2009).[8] It is one of the few internationally traded commodities that is produced mainly by small-scale farmers (Utting-Chamorro, 2005). Consequently, the majority of (empirical) studies analyzes coffee farmers in Latin and Middle America.[9]

Bacon (2005) investigates a sample of 228 small-scale coffee producers in northern Nicaragua in a livelihood vulnerability framework. Participation in alternative coffee trade networks (FT, organic, direct to roaster) is able to reduce exposure and vulnerability to low coffee prices, even if many FT certified cooperatives sell up to 70 percent of the harvest to conventional markets. In a follow-up study, Bacon et al. (2008) find that in households selling to FT markets, children show higher primary school attendance rates and women work more days on coffee farms. Also, more water purification systems and soil and water conservation

[7] Price setting differs slightly across products, but follows basically the scheme illustrated in Figure A1 in the Appendix. For details concerning the FLO certification process for different types of producers, please see FLO (2013).

[8] The Dutch organization Fair Trade Organisatie started importing coffee from Guatemala in 1973 (Gendron et al., 2009).

[9] See Nelson and Pound (2009) for a literature review and a meta-study on the impact of FT certification on coffee farmers.

practices were installed. On average, six days more of technical assistance, easier access to pre-harvest credit and better contact to development programs of non-governmental organizations (NGOs), including scholarships, education, coffee quality training, and micro credit programs were reported.

More formally, Arnould et al. (2009), using survey data for Nicaragua, Guatemala and Peru, compare in an analysis of variance socioeconomic indicators as educational attainment, health status and income of FT and conventional coffee producing households.[10] Results from a sample of 1,269 of FT and comparable non-FT coffee farmers in 2004-2005 indicate a significant increase in income, a reduction in the dropout rate from school, and an increase in the probability of receiving treatment in the case of illness for the FT households.

A more critical perspective is drawn by Valkila (2009) who compares conventional, FT and organic FT coffee producers in Nicaragua in 2005-2008. Even under low-intensity organic farming, FT certification increases income when the market price is below the FT price floor, but during high-price periods FT farmers are restricted to lower income due to lower output relative to conventional production. However, the interviewees appreciate the stable prices and the resulting reduction in income fluctuations, and are aware of possible harmful consequences of inorganic fertilizers to health and environment.

FT certification enhances cooperation with NGOs, who assist farmers in the certification process by providing training and finance, and encourages the formation of producer cooperatives. Cooperative membership creates opportunities by pooling resources, access to credit and development projects, and strengthens producers' positions in negotiations with suppliers or the local administration. The economic, social and ecological aspects of FT promote local and regional rural development, which in turn is expected to reduce poverty (Bacon et al., 2008; Valkila, 2009; Wilson, 2010; Center for Evaluation, 2012).

In contrast to the (empirical) micro-level studies, a theoretical analysis reveals a disequilibrium: Firstly, asking for an above-market price without delivering extra (physical) product quality will cause oversupply and a welfare loss. The price floor enables inefficient producers to stay in the market even if marginal costs exceed marginal revenue at world market prices (Mann, 2008). The FLO responds to the problem of potential oversupply by demand-induced producer registration, such that the finalization of certification depends on demand of importers (Booth and Whetstone, 2007).

Secondly, a transfer in the form of a price floor and a price premium is inefficient relative to a direct transfer. Anecdotal evidence for coffee says that only 10 percent of the higher price paid by consumers reaches the producers. Besides causing price distortions, consumers not only pay a higher price, but also carry the costs from a suboptimal level of aggregate production, caused by oversupply of FT commodities (Yanchus and de Vanssay, 2003; The Economist, 2007; Sidwell, 2008; Lindsey, 2004).

Thirdly, in a specific factors model where land is specific to agricultural production, an in-

[10] The coffee producers in the study are certified from Fair Trade USA, who resigned from the FLO standards in 2011 in favor of a more 'market-oriented' US certification agency applying a less strict certification regime. Under the Fair Trade USA regime, a ten percent share is sufficient to qualify for the FT label, and compliance to ILO standards was dispensed on behalf of large plantations (Raynolds, 2012; FLO, 2012).

crease in the return to FT certified factors will lead to a decrease in the return to non-certified factors, as all producers compete for limited resources as water or electricity (Yanchus and de Vanssay, 2003). More general, Sidwell (2008) criticizes the FT model for assuming that poor farmers must always remain farmers. Rewarding inefficient producers for unproductive activities reduces the incentives to diversify and modernize, creating a poverty trap for smallholders. Finally, those who cannot apply for FT certification, i.e. landless people, and those who are not able to meet the standards, i.e. the very poor and unskilled, are excluded from FT by its very construction.

2.4 Agriculture and development

According to the World Bank (2008) World Development Report *Agriculture for Development*, three out of four poor people in developing countries live in rural areas, most of those two billion people depend on agriculture for their livelihoods. On average, growth in the agricultural sector turned out at least twice as effective in reducing poverty as growth in the rest of the economy. The impact of agriculture on poverty is thus on average larger than its share in the economy as a whole. Moreover, agricultural growth is a precondition to broader, economy-wide growth (Bresciani and Valdés, 2007; Bezemer and Headey, 2008; World Bank, 2008; de Janvry and Sadoulet, 2009; Christiaensen et al., 2011).

Agricultural growth affects poverty via i) enhancing the labor market (employment and wage effects), ii) increasing smallholders' incomes (plus indirect income effects through growth multipliers), and iii) by affecting real food prices. Concerning the first channel, if agriculture uses unskilled labor intensively, and given integrated rural and urban labor markets, then agricultural growth can increase wages in rural and urban areas and thereby reduce poverty. Growth based on high value-added crops with robust forward linkages facilitates these labor market effects. When a large share of the population is self-employed in agriculture, the second channel via small-farm income growth and resulting multiplier effects are powerful factors in poverty reduction. The effect of decreasing food-prices on rural (and urban) poor, in turn, will only exhibit poverty-reducing effects if agricultural growth has permanent effects on food prices. In small open economies, however, food prices are mostly determined by movements of the real exchange rate (Bresciani and Valdés, 2007).

To what extent does the concept of FT meet the requirements for effective poverty reduction? FT sales grew on average by 25 percent per year, but the small size of the FT sector relative to conventional agriculture makes any significant effect on the labor market and overall economic growth hardly measurable on a country-level. Also, as FT cooperative membership is restricted to smallholders, employment possibilities of unskilled labor are limited to harvest hands, with wages set by national minimum requirements. Nevertheless it has been shown that the FT minimum price and the price premium indeed increase smallholders' incomes and reduce uncertainty from price volatility (Bacon, 2005; Bacon et al., 2008; Arnould et al., 2009). Finally, effects of FT certification via the food-price channel are unlikely as FT certified goods, usually high-value crops produced for the export market, are (usually) not

required to meet nutritional needs of rural (and urban) poor.[11] Altogether, if we are able to observe any positive effect of FT certification on poverty, we expect it to arise via the second channel by increasing smallholders' incomes.

Poor rural households need to connect to (trade-induced) economic growth, which is more easy if the source of growth is locally close (Christiaensen et al., 2011). With respect to the heterogeneity among (rural) poor in their net trading positions, the World Bank (2008) considers market oriented smallholder farming as the most effective strategy to connect smallholders to economic growth and to reduce poverty. A more pro-poor design of agriculture includes decentralized development projects and increased access to markets, public goods, and institutions for an effective use of the available assets, as well as environmental protection and hedging possibilities against climate shocks. Smallholder participation can be enhanced by technical assistance and collective action through producer organizations (de Janvry and Sadoulet, 2000; World Bank, 2008). Collective action from producer organizations can help to correct market imperfections, such as high transaction costs or missing credit markets. They help obtaining necessary information, to reach quality standards or to pool labor and financial resources in order to sell to new domestic or international markets (Markelova et al., 2009). Private outside assistance is often required for producer organizations to operate successfully - such as the FT network. It combines local producer action with outside assistance that provides access to high-value export markets in exchange for a certification fee.

From the literature survey we expect that FT certification on average increases participants' incomes via the FT minimum price and related cooperative services, such as technical assistance in production and marketing or access to education and medical treatment. To isolate the effect of FT certification on growth in the agricultural sector, we first need to identify the determinants of the extensive and intensive margin of FT certification across countries. If we are able to observe a positive effect of FT certification on agricultural growth, we allege, ceteris paribus, that FT reduces rural poverty, since growth originating in agriculture has been shown particularly poverty-reducing.

3 Determinants of Participation in Fairtrade

3.1 Empirical Model

According to the FLO (2011), producers from 143 countries with low or medium development are eligible to apply for FT certification. Table A1 in the Appendix lists the countries approved.[12] When we look at Table A1 the question arises, why, e.g. South Africa has 45 FT certified producer organizations (FTPOs) or Zimbabwe 8, while neighboring Namibia and Botswana do not have any.

[11] Considering the heterogeneity among (rural) poor in their net trading positions (net consumers/producers of food), Christiaensen et al. (2011) emphasize that conventional poverty and inequality measures do not necessarily reveal the actual impact of changing food prices on the poor.

[12] Please note that this list also includes high-income countries such as Argentina or Saudi Arabia. For consistency, we nevertheless stick in our analysis to the geographical scope defined by the FLO (2011).

We are interested in identifying the determinants of the number of FTPOs and set up a pooled cross-section model

$$FTPO_{i,t} = \mathbf{x'}_{i,t}\boldsymbol{\beta} + \mathbf{z'}_{i,t-1}\boldsymbol{\delta} + \boldsymbol{\eta_r} + \xi_t + \varepsilon_{i,t}, \tag{1}$$

where $\mathbf{x'_{i,t}}$ and $\mathbf{z'_{i,t-1}}$ are vectors including contemporaneous and lagged explanatory variables that are likely to affect the number of FTPOs, $\boldsymbol{\eta_r}$ are regional and ξ_t time fixed effects, and $\varepsilon_{i,t}$ an idiosyncratic error term for country i in year t, with $i = 1, ..., N$ and $t = 1, ..., T$. Equation (1) implicitly contains the determinants of the extensive and intensive margin of FT certification. We assume that these two decisions are based on different processes, where participation might hinge on geographical circumstances facilitating horticulture, while the count outcome may depend on the economic and institutional environment.

The standard choice to model a two-stage problem with count data and a non-negligible share of zeros (80 out of 143 eligible countries) is the zero-inflated negative binomial (ZINB) model, a modification of the (zero inflated) Poisson model that allows for overdispersion. The two parts of the model are a binary model that predicts the probability of belonging to the group without FTPOs and a negative binomial model that gives the determinants of the event count conditional on the predicted outcome of the participation decision. The expected count is expressed as a combination of the two processes (Burger et al., 2009; Greene, 2009).

The ZINB model assumes that some of the zero counts are produced by a different data generating process than the remaining counts, including some of the "other" zeros. While, e.g., the zero FTPO-count in Mongolia is likely to be driven by unfavorable climate conditions for horticulture, the non-existence of FTPOs in Myanmar is probably related to years of political and economic isolation. The model is able to distinguish between these two latent groups in the sample, where one has strict zero count (Mongolia), while the other has a non-zero probability of positive counts (Myanmar) (Burger et al., 2009). The two processes generating a zero or a positive count are given by

$$\begin{aligned}
\Pr(FTPO_{i,t} = 0|\mathbf{x_{i,t}}, \mathbf{z_{i,t-1}}) &= \psi_{i,t} + (1 - \psi_{i,t})\left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu_{i,t}}\right)^{\alpha^{-1}} \\
\Pr(FTPO_{i,t}|\mathbf{x_{i,t}}, \mathbf{z_{i,t-1}}) &= (1 - \psi_{i,t})\frac{\Gamma(FTPO_{i,t} + \alpha^{-1})}{FTPO_{i,t}!\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu_{i,t}}\right)^{\alpha^{-1}}\left(\frac{\mu_{i,t}}{\alpha^{-1} + \mu_{i,t}}\right)^{FTPO_{i,t}}
\end{aligned} \tag{2}$$

with $FTPO_{i,t} = 1, 2, \ldots$ and $\mu_{i,t} = \exp(\mathbf{x'}_{i,t}\boldsymbol{\beta} + \mathbf{z'}_{i,t-1}\boldsymbol{\delta} + \boldsymbol{\eta_r} + \xi_t)$. The proportion of zeros $\psi_{i,t} = F(-\mu_{i,t})$ is added to the distribution of $FTPO_{i,t}$ and the other frequencies are reduced by the corresponding amount, leading to a finite mixture with a degenerate distribution whose mass is concentrated at zero (Long, 1997; Cameron and Trivedi, 2007). We parameterize $\psi_{i,t}$ with a probit transformation such that $\psi_{i,t} = \Phi(-\mu_{i,t})$ follows a standard normal distribution. Finally, the joint log likelihood function is given by

$$\ln L = \sum_{t=1}^{T}(\sum_{i=1}^{N} 1(FTPO_{i,t}=0)\ln(\psi_{i,t}) + (1-\psi_{i,t}))\left(\frac{\alpha^{-1}}{\alpha^{-1}+\mu_{i,t}}\right)^{\alpha^{-1}})+$$
$$\sum_{i=1}^{N}(1-1(FTPO_{i,t}=0))\ln((1-\psi_{i,t}) + \ln\Gamma(\alpha^{-1}+FTPO_{i,t}) - \ln\Gamma(FTPO_{i,t}+1)-$$
$$\ln\Gamma(\alpha^{-1}) + \alpha^{-1}\left(\ln\frac{\alpha^{-1}}{\alpha^{-1}+\mu_i}\right)^{\alpha^{-1}} + FTPO_{i,t}\ln\left(\frac{\mu_{i,t}}{\alpha^{-1}+\mu_{i,t}}\right)^{\alpha^{-1}}). \tag{3}$$

The ZINB model resembles a Heckman (1979) selection model, which corrects for the probability of FT certification in the outcome equation, but there are conceptual and practical differences: A two-part model as the ZINB assumes conditional independence of the selection equation and the count outcome (Burger et al., 2009). Following Puhani (2000), a low correlation between the error terms of the selection and the outcome equation is an indicator of conditional independence. In our case, we observe $\rho = 0.03$ using probit estimation for the participation decision and OLS estimation for the outcome. Although not fully comparable, results using the log-normal Heckman selection model point to an insignificant inverse Mills ratio and support the assumption of conditional independence. Moreover, a two-part model is designed to predict actual outcomes rather than potential outcomes (Madden, 2008). Since we observe all FT certified producer cooperatives across countries, we are interested in the actual determinants of the extent of FT certification.

Besides conceptual differences, also practical issues exist: The Heckman (1979) model requires exogenous exclusion restrictions for the selection process to avoid collinearity of the regressors and the inverse Mills ratio in the outcome equation. As for instrumental variables it is usually rather troublesome to identify variables that affect only the participation decision but not the outcome. Furthermore, the two-part model is less restrictive as it does not place distributional assumptions on the error term (Leung and Yu, 1996; Madden, 2008; Cameron and Trivedi, 2009). Both, the conceptual reasoning and the stringent assumptions of the Heckman model, support the application of the ZINB model.

3.2 Data and Variables

The number of FTPOs per country and year is regressed on a set of time-varying lagged explanatory variables $\mathbf{z}_{i,t-1}$ (to avoid contemporaneous feedback effects), time-varying predetermined $\mathbf{x}_{i,t}$, and exogenous time-invariant explanatory variables. Data on the number of FTPOs for the years 2006, 2007 and 2010 is taken from FLO reports[13], missing values for 2008 and 2009 were imputed by calculating the country-specific growth rate of FTPO from 2007 to 2010 (rounded off to whole numbers). The FLO does not report production or employment figures of FTPOs on a country-level, compelling us to use this very general proxy of FT certified exports.

[13] FLO (2007*a*,*b*); Kilpatrick (2011).

We control for agricultural and geographic characteristics, assuming that the share of arable land in total land area and country size in terms of population positively affect both, the extensive and intensive margin of FT participation. Rural population density (rural population divided by arable land in square kilometers) proxies the number of smallholders and thus labor productivity (capital intensity) of the agricultural sector, where higher rural population density corresponds to lower capital intensity. Similarly, the share of arable land in total land area also indicates to some extent labor (capital) intensity of the agricultural sector, but might reflect also geographical characteristics (desert, alpine areas), the import penetration of the agricultural sector or the degree of urbanization (FAO, 2007). We include both measures to control for a country's agricultural diversity or specialization patterns, e.g. the dualistic agricultural sector in Brazil, where we simultaneously observe capital and labor intensive agricultural subsectors (Lindsey, 2004; Poulton et al., 2010).

Initial GDP (in 2006) and initial GDP squared, the growth rate of GDP per capita, trade openness (imports plus exports in GDP), and official development assistance (ODA) in GDP describe the level of economic development. As measure of institutional quality we use the World Bank's rule of law index for its focus on contract enforcement and property rights, which we assume to be particularly relevant for establishing and maintaining business relations.

A high share of resource rents in GDP is expected to reduce the extensive and intensive margin of participation in FT due to employment opportunities related to this (rural) non-farm sector. Finally, given the religious origins of the very early FT movement and anecdotal evidence telling that Christian organizations promote the idea of FT, assist smallholders in the certification process and help to establish contact to Northern customers, we assume that predominantly catholic countries have a higher probability and number of FTPOs. For descriptive statistics, and a detailed description of the data and its sources, see Tables A2 and A4 in the Appendix.

We are able to cover 118 out of 143 eligible low- and middle-income countries covering the period 2006 to 2010, resulting in 586 country-year observations. The sample consists of 309 observations (52 percent) with a zero and 277 with a positive count and covers 62 out of 63 countries with FT certified producers (only Timor-Leste is missing). The broad country coverage should allow us to draw a representative picture of the determinants of the extensive and intensive margins of FT certification.

3.3 Estimation Results

Table 1 shows the results for the negative binomial estimation of the count outcome (intensive margin) and the probit estimation of the participation equation (extensive margin). The coefficients of the former represent the average marginal effect on the log count of FTPOs, and the average marginal effect on the probability of belonging to the always zero group for the latter. Columns (1) and (2) report the estimation results of the full sample, Columns (3) and (4) exclude the years 2008 and 2009 to judge the impact of the imputation of the missing FTPO data.

For the probit estimation in Column (2), the probability of belonging to the always zero

group significantly decreases when a country is predominantly catholic and increases with the share of arable land in total land area. Initial income exhibits an U-shaped relationship suggesting that lower middle-income countries have the highest probability of FT certification. For the sample excluding the years 2008 and 2009 (Column (4)) we find a similar pattern, but now resource rents significantly increase and country size (population) decreases the probability of zero FTPOs and the quadratic GDP term turned insignificant.

In the outcome equation in Columns (1) and (3) the log FTPO count significantly increases with rural population density, the share of arable land in total land area and country size. As for the participation decision, we observe a significant inverse U-shaped effect of initial GDP. In contrast to the full sample, resource rents have a significantly positive impact on the log count when we exclude the years 2008 and 2009.

For both samples we find a significant dispersion parameter α indicating that the conditional mean and variance differ significantly, thus rejecting a Poisson distribution. The Voung test (not reported) confirms that a proportion of zeros is inflated by an additional mechanism and suggests that the ZINB model is the most appropriate choice.

Table 1: *ZINB: Determinants of extensive and intensive margin of FT*

	Full sample		Short sample		Full sample[1]		Short sample[1]	
	(1) Neg.Bin	(2) Probit	(3) Neg.Bin	(4) Probit	(5) Neg.Bin	(6) Probit	(7) Neg.Bin	(8) Probit
log(rur. pop. den)$_{t-1}$	0.2967*	0.1101	0.3395***	0.0586	0.3306***	0.0472	0.2655**	0.0369
	(0.1562)	(0.0950)	(0.1282)	(0.0498)	(0.1119)	(0.0307)	(0.1162)	(0.0333)
GDP growth p.c.$_{t-1}$	0.5102	0.2028	-0.7442	-0.0898	-0.8219	0.1558	0.9128	-0.1328
	(1.9785)	(0.3905)	(2.9838)	(0.4967)	(1.5239)	(0.2598)	(2.6924)	(0.4642)
log(ODA/GDP)$_{t-1}$	0.2682	0.0096	0.2866	0.0179	0.3272**	0.0405	0.2629	0.0502
	(0.1963)	(0.0321)	(0.1880)	(0.0485)	(0.1624)	(0.0402)	(0.1666)	(0.0488)
log(Trade/GDP)$_{t-1}$	0.1732	-0.0611	0.0764	-0.0609	0.0903	-0.0364	0.1058	-0.0733
	(0.3211)	(0.0543)	(0.3096)	(0.0415)	(0.2737)	(0.0771)	(0.2962)	(0.0688)
Catholic	-0.3672	-0.4131**	-0.3567	-0.5030**	-0.2894	-0.2661***	-0.1419	-0.3398**
	(0.3311)	(0.2008)	(0.3421)	(0.2277)	(0.2872)	(0.0636)	(0.3327)	(0.1458)
log(Res. r./GDP)$_{t-1}$	0.2021	0.2660	0.3382*	0.2760***	0.5106***	0.2556***	0.4754***	0.2757***
	(0.1721)	(0.2066)	(0.1916)	(0.0650)	(0.1252)	(0.0393)	(0.1373)	(0.0365)
Rule of Law	0.1268	-0.2096	0.1476	-0.1139	0.2701	-0.1008**	0.2617	-0.1390**
	(0.2214)	(0.1302)	(0.2091)	(0.0964)	(0.2278)	(0.0459)	(0.2101)	(0.0666)
log(Arable land)	0.2887**	0.0622**	0.2753**	0.0739**	0.4636***	0.0819***	0.4295***	0.0796**
	(0.1283)	(0.0248)	(0.1235)	(0.0356)	(0.1150)	(0.0302)	(0.1208)	(0.0327)
log(Pop.)	0.8374***	-0.1023	0.6986***	-0.1225***	0.4626***	-0.1429***	0.4893***	-0.1456***
	(0.1733)	(0.1054)	(0.1292)	(0.0456)	(0.0978)	(0.0206)	(0.1154)	(0.0260)
log(GDP p.c. 2006)	5.9691***	-1.2036**	5.7983***	-0.5753	3.9699***	-0.6948**	4.4816***	-0.6883**
	(1.1477)	(0.5395)	(1.1485)	(0.4392)	(1.0202)	(0.3003)	(1.0690)	(0.3260)
log(GDP p.c. 2006)^2	-0.3921***	0.1052**	-0.3763***	0.0565*	-0.2571***	0.0670***	-0.2985***	0.0677***
	(0.0874)	(0.0518)	(0.0813)	(0.0318)	(0.0716)	(0.0205)	(0.0767)	(0.0216)
Overdispersion α	-1.0299***		-0.8831***		-1.3284***		-1.1564***	
	(0.2901)		(0.2674)		(0.2829)		(0.2765)	
Pseudo Log L.	-930.420		-577.842		-795.694		-486.118	
AIC	1950.840		1233.683		1686.071		1052.235	
N	586		351		556		339	
N zero	309		182		309		182	

Notes: The dependent variable for the probit model is zero/one, and for the negative binomial model it is the actual FTPO count.* p<0.10, ** p<0.05, *** p<0.01; robust standard errors in parenthesis are clustered at the country level. Coefficients represent average marginal effects on the probability of a zero-count (participation equation) and the log count of FTPOs (outcome equation). N zero refers to the number of observations with a zero count in the participation equation. All regressions include dummies for Sub Saharan Africa, Middle East and North Africa, South Asia, South East Asia, Pacific, Latin America and the Caribbean and year dummies. [1]Excludes outlying observations.

Table 2 compares the actual data and the predicted probability and the predicted FTPO count

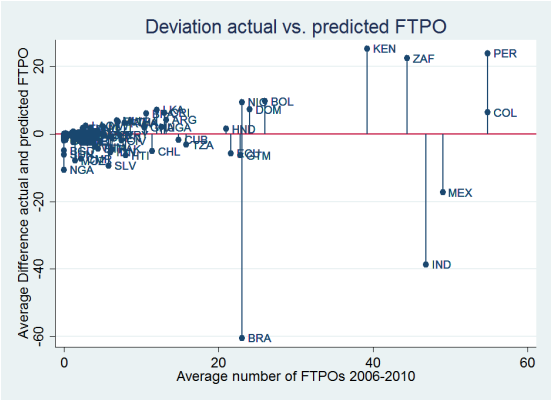
based on the estimation in Columns (1) and (2). The predicted probability of a zero FTPO count is 49 percent, slightly below to the actual probability of 52 percent, and the average difference between the actual and the predicted count is smaller than 1. Figure 1 displays these deviations, where for countries below the zero line the predicted count exceeds the actual number of FTPOs, and vice versa for countries above the zero line. On the left side of Figure 1 we find, e.g. Nigeria, which is an example of how the ZINB model distinguishes between the two data generating processes: although Nigeria does not have FTPOs, the probit model predicts a positive probability, i.e. Nigeria is a "wrong zero" and - given the explanatory variables - we would expect to observe around 10 FTPOs.

In general, our specification predicts the count outcome well for low numbers of FTPOs. However, the deviations of the predicted values (and the residuals) increase if the average number of FTPOs surpasses 39, despite accounting for heteroskedasticity by clustering standard errors at the country level. As the predictions are based on a broad set of economic, historic, cultural and geographical characteristics, we classify countries with an average FTPO count exceeding 39 as outliers and exclude them subsequently from our regressions.

Table 2: *Summary ZINB*

	Mean	Std. Dev.	Min	Max
Probit Model		Full sample		
Actual Probability	0.527	0.499	0	1
Predicted Probability	0.491	0.415	0	1
Correlation		0.842		
Neg. Binomial Model		Full sample		
Actual Count	5.858	11.949	0	82
Predicted Count	6.549	14.282	0	110.92
Correlation		0.785		
Neg. Binomial Model		Positive counts		
Actual Count	12.393	14.878	1	82
Predicted Count	13.162	18.481	0.020	110.92
Correlation		0.829		

Figure 1: *Actual vs. predicted FTPOs*



Columns (5) to (8) in Table 1 replicate the regressions for both samples without the countries identified as outliers in Figure 1. The results are in line with those obtained for the short sample including the outlying observations, apart for the rule of law and initial GDP in the participation decision. In Columns (6) and (8), the rule of law turned statistically significant at the five percent level and suggest that an improvement in the rule of law reduces the probability of zero FTPOs. For the short sample without the years 2008 and 2009 (Column (8)) we can confirm the U-shaped effect of initial GDP per capita. The turning point is reached at a per capita income level of 162 USD (measured in constant 2000 USD), and only a small number of countries in Africa, such as Ethiopia, Eritrea, Malawi or the Democratic Republic of Congo are below or around this level. If income per capita in 2006 was higher, the probability to observe a zero FTPO-count increases significantly.

The results for the log count in Columns (5) and (7) correspond qualitatively those obtained for the short sample in Column (3), and the exclusion of the six outliers improves the precision and the fit of our estimation. We find significantly positive effects of rural population density, country size in terms of population and the share of arable land in total land

area, indicating that the log count of FTPOs is higher when the agricultural sector is relatively labor intensive. In our preferred specification in Columns (6) and (7), the elasticity of the log of rural population density and the log FTPO count is 0.33, and by 0.46 percent for the log of population. According Dorward et al. (2004), high population density is also associated with lower per-unit costs in infrastructure, service provision and trade, enhancing the intensification of farming systems. Many problems of agricultural development in more marginal areas are outside the agricultural sector, e.g. a lack of roads and telecommunications infrastructure. Higher rural population density thus proxies labor-intensive farming, better infrastructure and network effects across communities that cause an increase in the number of FTPOs.

3.4 Robustness

Removing potentially influential observations has shown that our specification of the ZINB model fits the data very well, and it is robust to the imputation of the missing FTPO data. We thus choose the sample of Columns (6) and (7) in Table 1 to test the robustness of these findings. The first two columns in Table 3 replicate Columns (6) and (7) of Table 1, then we subsequently add variables that are suspected to influence our hypothesis. We first concentrate on the participation equation before we turn to the outcome equation.

Columns (4) and (6) test the hypothesis that catholic organizations promoted FT. We control for Spanish colonial history, as the largest number of FTPOs can be found in Latin America, and it might be the case that the catholic dummy does not capture the effect of being catholic, but of Spanish colonial roots. Similarly, we ask whether the effect of being predominantly catholic persists in an ethnically (religiously) fragmented environment. We find that former Spanish colonies are 29 percentage points more likely to have FTPOs, while ethnic fractionalization does not have a significant impact. The catholic dummy is not sensitive to the inclusion of additional control variables and remains significantly negative, i.e. the probability to observe FTPOs increases in a catholic country on average by 36 percentage points.

Following Collier and Hoeffler (1998) or Crespo Cuaresma et al. (2011), natural resource rents positively correlate with political instability and authoritarian regimes, thus the negative effect on FTPO in the selection equation might not be attributed to natural resources, but instead stem from political factors. Columns (8) and (10) therefore include the cumulative number of coups d'etat and revolutions since the 1940s and the Freedom House classification of political freedom (1 indicates a free and 3 a not free system). Neither for the number of coups d'etat and revolutions, nor for political freedom we find any significant impact on the extensive margin of FT, and also the coefficient estimate of resource rents remains almost unchanged. However, due to collinearity among measures of institutional quality, the rule of law turns insignificant when we control for political freedom.

The specification in Column (12) contains all additional control variables. Spanish colonial history remains significant, while the other regressors are not significantly different from zero, and also the quadratic initial income term turned insignificant. For all robustness checks of

Table 3: *ZINB: Determinants of extensive and intensive margin of FT*

	(1) Neg.Bin.	(2) Probit	(3) Neg.Bin.	(4) Probit	(5) Neg.Bin.	(6) Probit	(7) Neg.Bin.	(8) Probit	(9) Neg.Bin.	(10) Probit	(11) Neg.Bin.	(12) Probit
log(rur. pop. den)$_{t-1}$	0.3306***	0.0472	0.3313***	0.0756***	0.3453***	0.1019***	0.3276***	0.0870***	0.3337**	0.0851***	0.3611***	0.0620***
	(0.1119)	(0.0307)	(0.1042)	(0.0210)	(0.1078)	(0.0235)	(0.1168)	(0.0270)	(0.1438)	(0.0290)	(0.1063)	(0.0156)
GDP growth p.c.$_{t-1}$	-0.8219	0.1558	-1.0046	0.1788	-0.5830	0.2145	-1.0792	0.1099	-0.7814	0.0860	-0.8220	0.2034
	(1.5239)	(0.2598)	(1.5062)	(0.1183)	(1.4910)	(0.2330)	(1.7551)	(0.3422)	(1.5710)	(0.2551)	(1.4459)	(0.1858)
log(ODA/GDP)$_{t-1}$	0.3272**	0.0405	0.2855*	-0.0280	0.3323**	0.0508	0.2586	0.0401	0.3152*	0.0374	0.3432**	0.0378
	(0.1624)	(0.0402)	(0.1590)	(0.0193)	(0.1595)	(0.0332)	(0.1768)	(0.0561)	(0.1721)	(0.0366)	(0.1536)	(0.0424)
log(Trade/GDP)$_{t-1}$	0.0903	-0.0364	0.1680	-0.0506	0.1186	-0.0540	0.2017	-0.0307	0.1422	-0.0581	0.1467	-0.0673
	(0.2737)	(0.0771)	(0.2955)	(0.0649)	(0.2745)	(0.0598)	(0.3201)	(0.0785)	(0.2884)	(0.0589)	(0.3211)	(0.0927)
Catholic	-0.2894	-0.2661***	-0.2173	-0.3131***	-0.3062	-0.3639***	-0.2630	-0.3649***	-0.2734	-0.3710***	-0.2940	-0.2966***
	0.2872)	(0.0636)	(0.3050)	(0.0123)	(0.2784)	(0.0450)	(0.2896)	(0.0989)	(0.3021)	(0.0891)	(0.3036)	(0.0685)
log(Res. r./GDP)$_{t-1}$	0.5106***	0.2556***	0.4920***	0.2536***	0.5007***	0.2423***	0.5269***	0.2649***	0.5295***	0.2933***	0.5184***	0.2151***
	0.1252)	(0.0393)	(0.1409)	(0.0571)	(0.1330)	(0.0372)	(0.1295)	(0.0595)	(0.1295)	(0.0333)	(0.1478)	(0.0307)
Rule of Law	0.2701	-0.1008**	0.3119	-0.1945***	0.2575	-0.1377***	0.2746	-0.0900*	0.2533	-0.0526	0.1945	-0.1578***
	(0.2278)	(0.0459)	(0.2450)	(0.0444)	(0.2283)	(0.0457)	(0.2419)	(0.0494)	(0.2577)	(0.0404)	(0.2482)	(0.0487)
log(Arable land)	0.4636***	0.0819***	0.4281***	0.0527***	0.4707***	0.0865**	0.5006***	0.0940***	0.4848***	0.1126***	0.4876***	0.0626*
	(0.1150)	(0.0302)	(0.1173)	(0.0156)	(0.1134)	(0.0362)	(0.1293)	(0.0341)	(0.1216)	(0.0296)	(0.1316)	(0.0368)
log(Pop.)	0.4626***	-0.1429***	0.5306***	-0.0975***	0.4739***	-0.1172***	0.4852***	-0.1115***	0.4962***	-0.1263***	0.4851***	-0.0971***
	(0.0978)	(0.0206)	(0.0962)	(0.0215)	(0.0895)	(0.0168)	(0.1109)	(0.0234)	(0.1168)	(0.0271)	(0.0887)	(0.0233)
log(GDP p.c. 2006)	3.9699***	-0.6948**	3.8202***	-1.6727***	3.7674***	-0.8091***	3.9915***	-0.8161**	4.0936***	-0.9125***	3.8617***	-0.7840
	(1.0202)	(0.3003)	(1.0295)	(0.6425)	(1.0414)	(0.2560)	(1.0824)	(0.3401)	(1.1254)	(0.3165)	(1.0214)	(0.8481)
log(GDP p.c. 2006)^2	-0.2571***	0.0670***	-0.2528***	0.1363***	-0.2433***	0.0752***	-0.2657***	0.0749***	-0.2693***	0.0818***	-0.2496***	0.0730
	(0.0716)	(0.0205)	(0.0717)	(0.0485)	(0.0726)	(0.0172)	(0.0772)	(0..264)	(0.0821)	(0.0222)	(0.0705)	(0.0611)
Spanish Colony			0.0293	-0.2996***							0.0829	-0.2722***
			(0.3038)	(0.0185)							(0.2833)	(0.1015)
Ethn. frac.					0.1897	0.1359					0.1089	0.0913
					(0.4246)	(0.0846)					(0.5034)	(0.1066)
No. of coups							-0.0134	-0.0003			-0.0109	0.0037
							(0.0225)	(0.0106)			(0.0224)	(0.0053)
Political Freedom									-0.0753	0.0507	-0.0969	-0.0332
									(0.1720)	(0.0477)	(0.1762)	(0.0415)
Overdispersion α	-1.3234***		-1.2027***		-1.3283***		-1.2603***		-1.2576***		-1.3448***	
	(0.2829)		(0.2822)		(0.2907)		(0.2984)		(0.3145)		(0.3096)	
Pseudo Log L.	-795.694		-767.475		-773.905		-783.672		-786.481		-766.977	
AIC	1633.38		1580.95		1593.811		1611.344		1616.962		1585.954	
N	556		556		556		556		556		556	
N zero	309		309		309		309		309		309	

Notes: The dependent variable for the probit model is zero/one, and for the negative binomial model it is the actual FTPO count.* p<0.10, ** p<0.05, *** p<0.01; robust standard errors in parenthesis are clustered at the country level. Coefficients represent average marginal effects on the probability of a zero-count (participation equation) and the log count of FTPOs (outcome equation). N zero refers to the number of observations with a zero count in the participation equation. All regressions include dummies for Sub Saharan Africa, Middle East and North Africa, South Asia, South East Asia, Pacific, Latin America and the Caribbean and year dummies.

the participation equation the results show a significant impact of rural population density, i.e. the probability of zero FTPOs increases with the labor intensity of the agricultural sector.

In the outcome equation none of the additional explanatory variables is significantly different from zero, and they also do not have any impact on the other explanatory variables. Apart from Column (7), the estimation results provide evidence for a significantly positive effect of official development assistance (ODA) in GDP. As argued by Bacon et al. (2008), Valkila (2009) or Wilson (2010), NGOs play an important role in assisting smallholders in the certification process. The application for FT certification itself is rather complex and costly and often requires assistance to apply successfully.[14]

The coefficients of the quadratic initial GDP term are significantly different from zero in every specification and support the inverted U-shaped impact on the log FTPO count. Up to a certain point, the number of FTPOs increases with income since successful certification requires the payment of a fee (minimum 3,000 Euro). Depending on the set of regressors, the turning point at which the positive effect of initial GDP turns zero is at a per capita income level of around 2,600 US Dollar (measured in constant 2000 US Dollar). Countries exceeding this level of initial income have on average a smaller share of agriculture in GDP (5 vs. 21 percent) and a lower number of FTPOs (2.4 vs. 3.2).

Overall, following picture emerges from the ZINB model: FT certification is more likely in large, resource poor, catholic countries with a relatively capital intensive agricultural sector, a strong rule of law and Spanish colonial history. The coefficients of the quadratic initial income term, together with the positive effect of rural population density and the rule of law, suggest that lower-middle income countries have the highest probability of non-zero FTPOs.

Given a positive probability of certification, the largest number of FT certified producers can be found in large lower-middle income countries with a labor intensive agricultural sector. The share of official development assistance in GDP has a positive impact on the FT intensity, while Spanish colonial history, ethnic homogeneity, political stability and democracy play a minor role. The relationship between initial income and the number of FTPOs points to a problem inherent to the FT concept and reflects that the costs of certification may constitute a major entry barrier for smallholders from the poorest countries.

4 Growth Effects of Fair Trade

Having assessed the most important determinants of the extensive and intensive margin of participation in FT, we now consider whether FT can be associated with higher growth rates in the agricultural sector.

[14] Of course, official development assistance is not equivalent to the assistance given by NGOs, but the lack of data on the number of NGOs per country and year constrains us to the use of the share of ODA in GDP. Since Dreher et al. (2009) have shown that the location choices of NGOs positively correlate with those of official backdonors rather than complementing it, we are confident that the share of ODA in GDP relates sufficiently well to the number of NGOs within a country.

4.1 Empirical Model & Data

The literature review conveyed that the major global Fair Trade organizations consider FT as a specific type of development assistance, where consumers are willing to pay a higher price in order to provide the producer a "fair" price, a price premium, stable market links and cooperative services.

We thus set up a model related to the aid-growth framework established by Collier and Dollar (2002), Hansen and Tarp (2001) or Dalgaard et al. (2004) but use agricultural growth as dependent variable (Christiaensen et al., 2011) to answer the question whether the number of FTPOs has any significant impact on the growth rate of income in the agricultural sector. We specify a growth equation that tests the causal relationship between agricultural growth and the intensity of FT certification:

$$y^a_{i,t} = ftpo_{i,t-1}\boldsymbol{\beta} + \mathbf{x'}_{i,t}\boldsymbol{\gamma} + \mathbf{z'}_{i,t-1}\boldsymbol{\delta} + \boldsymbol{\vartheta_i} + \boldsymbol{\eta_r} + \xi_t + \varepsilon_{i,t}. \tag{4}$$

Agricultural GDP growth per capita $y^a_{i,t}$ is assumed to depend on the number of FT certified producer organizations lagged one year and the explanatory variables from the ZINB model in order to isolate the exogenous component of the FTPO count. The quadratic initial income term is replaced with initial income per capita in agriculture.

As the average FTPO comprises 300 members, we have to account for the fact that, e.g., ten average size cooperatives have a differential impact on the agricultural sector in Guatemala compared to Brazil. To establish a cross-country comparison we generate a country-specific measure of FT intensity by taking the log of the number of FTPOs plus one divided by the rural population, i.e. $ftpo_{i,t} \equiv \log((FTPO_{i,t} + 1)/\text{rur.pop.})$. Of course, our measure of FT intensity is only a crude proxy of the size of the FT sector in terms of export share or employment, but it is the only data available on a country level.

It has been argued that farmers supplying FT markets benefit via the price and the cooperative channel. We expect both channels to increase income in the agricultural sector, and especially for the cooperative channel it is reasonable to assume that the impact arises only with a time lag. If we observe a positive effect of a country's FT intensity on $y^a_{i,t}$, it is plausible to assume that FT helps to reduce (rural) poverty. Positive effects on poverty are expected to arise via and increase with the share of rural population participating in FT, access to new export markets, and spill-over effects from agricultural to non-agricultural growth (World Bank, 2008; Christiaensen et al., 2011). However, if the critics of the FT system are right we should see a negative effect and FT certification will increase poverty by reducing agricultural growth.

Equation (4) is estimated with different estimation methods, with random effects (RE) estimation serving as the benchmark (identical to OLS on the pooled cross-section with robust standard errors clustered at the country level). A two-way error component model (FE) allows to address a possible correlation of country- and year-specific effects and the explanatory variables. Furthermore we use Arellano and Bond (1991) difference GMM (AB) and Blundell and Bond (1998) system GMM estimators (BB), taking lagged levels and lagged

levels and differences, respectively, as instruments to account for endogeneity arising from serial correlation and unobservable heterogeneity. The difference GMM estimator suffers from weak instruments in small samples if the lagged levels are only weakly correlated with the differenced regressors, while the system GMM estimator can be biased if they are correlated with the country fixed effects (Hauk and Wacziarg, 2009).

For the GMM estimation we treat lagged $ftpo$, rural population density, official development assistance, trade openness and resource rents as predetermined variables, while we assume the share of arable land in total land area, the log of population, the rule of law and the catholic dummy to be exogenous. These variables together with the landlocked dummy serve as exogenous variables and overidentfying restrictions and allow to test the exogeneity of the instruments. All regressions include year dummies to capture period-specific shocks and a set of regional dummies to account for characteristics common to all countries within one particular region.

The unbalanced panel covers (up to) 95 of 143 eligible producer countries (see table A1 in the Appendix), where 49 countries (51 percent) have FTPOs. Kenya, South Africa, Peru, Chile, Mexico and India were excluded due to the unusually large number of FTPOs. Table A3 in the Appendix shows the descriptive statistics for this sample of up to 357 observations.

As it is a priori not clear how $ftpo$ it related to agricultural growth, we estimate four different specifications of the growth regression that are aligned to the aid-growth literature. More precisely we follow Clemens et al. (2011) and include i) current $ftpo$, ii) lagged $ftpo$, and iii, iv) a (current/lagged) quadratic $ftpo$ term to account for possibly nonlinear returns.

4.2 Estimation Results

Columns (1) to (4) of Table 3 report the results from random effects estimation of the four different specifications of equation (4). For every specification we observe a positive effect of current (lagged) $ftpo$ on agricultural growth that turns statistically significant at the 10 percent (5 percent) level when we include the quadratic $ftpo$ term, which is significant itself. This result is largely in line with findings from the aid-growth literature, where Clemens et al. (2011) find positive but insignificant impact of current and lagged aid on growth but a significant non-linear effect for current and lagged aid. The application of an aid-growth framework on the impact of FT certification on (agricultural) growth thus turns out as a feasible approach.

Given that the size of the coefficients remains relatively stable across specifications (1) to (4), and using Akaike Information Criterion as a model selection criterion, we choose the lagged quadratic specification in Column (4) as our preferred model. The empirical finding of increasing marginal returns to FT is plausible in the sense that if it is possible to establish comprehensive participation of smallholders experiencing benefits via the FT price and cooperative channels, we observe a significant and quantitatively larger effect compared to a situation where only few participate. Support in fields as product quality, technical training, women's participation or educational programs are likely to show positive effects only with a time lag and when conducted on a large scale. Together, we allege, these factors cause an

increasing effect of $ftpo$ on the growth rate of agricultural GDP per capita.

In Columns (5) and (6) we estimate our preferred specification using two different estimation methods.[15] We account for country-specific unobserved heterogeneity using a two-way fixed effects model and Blundell and Bond (1998) system GMM estimation. The results for the Blundell and Bond (1998) GMM estimation closely resemble the baseline random effects estimation, while removing the country-specific heterogeneity in the two-way fixed effects estimation results in a large increase in the standard errors such that all explanatory variables turn insignificant.

Table 4: *Growth regressions*

	(1)	(2)	(3)	(4)	(5)	(6)
	RE				FE	BB
log(Rur. pop. den.)$_{t-1}$	0.0010	-0.0004	0.0014	-0.0002	0.0828	0.0002
	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0953)	(0.0043)
ODA (GDP)$_{t-1}$	0.0767**	0.0786**	0.0756**	0.0773**	-0.0199	0.0642**
	(0.0322)	(0.0324)	(0.0320)	(0.0324)	(0.0541)	(0.0311)
Trade$_{t-1}$	0.0167	0.0194	0.0171	0.0206	0.0301	0.0212
	(0.0175)	(0.0175)	(0.0175)	(0.0176)	(0.0771)	(0.0176)
Resource rents$_{t-1}$	0.0470	0.0495	0.0477	0.0515	0.1245	0.0575*
	(0.0370)	(0.0355)	(0.0367)	(0.0351)	(0.0936)	(0.0320)
Catholic	0.0017	-0.0051	0.0001	-0.0079		-0.0103
	(0.0198)	(0.0212)	(0.0201)	(0.0214)		(0.0209)
Rule of Law	0.0079	0.0067	0.0078	0.0064	-0.0159	0.0055
	(0.0094)	(0.0096)	(0.0094)	(0.0096)	(0.0422)	(0.0091)
Arab. land	0.0985*	0.0898*	0.1003*	0.0925*	1.2170	0.0971*
	(0.0533)	(0.0525)	(0.0537)	(0.0526)	(0.9103)	(0.0502)
log(Pop.)	0.0105*	0.0123**	0.0117**	0.0139**	0.0663	0.0149**
	(0.0056)	(0.0059)	(0.0058)	(0.0062)	(0.5526)	(0.0061)
log(agri. GDP p.c. 2006)	-0.0080	-0.0114	-0.0084	-0.0125		-0.0135
	(0.0120)	(0.0120)	(0.0119)	(0.0120)		(0.0117)
$ftpo_{i,t}$	0.0088	0.0709*				
	(0.0070)	(0.0367)				
$ftpo^2_{i,t}$		0.0021*				
		(0.0011)				
$ftpo_{i,t-1}$			0.0104	0.0820**	0.3781	0.0884**
			(0.0070)	(0.0358)	(0.2547)	(0.0362)
$ftpo^2_{i,t}$				0.0024**	0.0110	0.0025**
				(0.0011)	(0.0077)	(0.0011)
N	357	357	357	357	357	357
No. of Instruments						23
AIC	-634.22	-634.16	-634.65	-635.24	-750.51	

Notes: The dependent variable is the growth rate of GDP per capita in the agricultural sector (expressed in logs). RE: Random effects; FE: Two-way fixed effects; BB: Blundell and Bond (1998) GMM. *, **, *** indicate significance at the 10, 5, and 1 percent level. Robust standard errors clustered at the country level in parentheses. All regressions include dummies for Sub Saharan Africa, Middle East and North Africa, South Asia, South East Asia, Pacific, Latin America and the Caribbean and year dummies. BB uses orthogonal deviations to maximize the number of observations in a panel with gaps.

The Hausman specification test does not reject the null hypothesis of no systematic differences between the random and the fixed effects estimation and suggests that random effects esti-

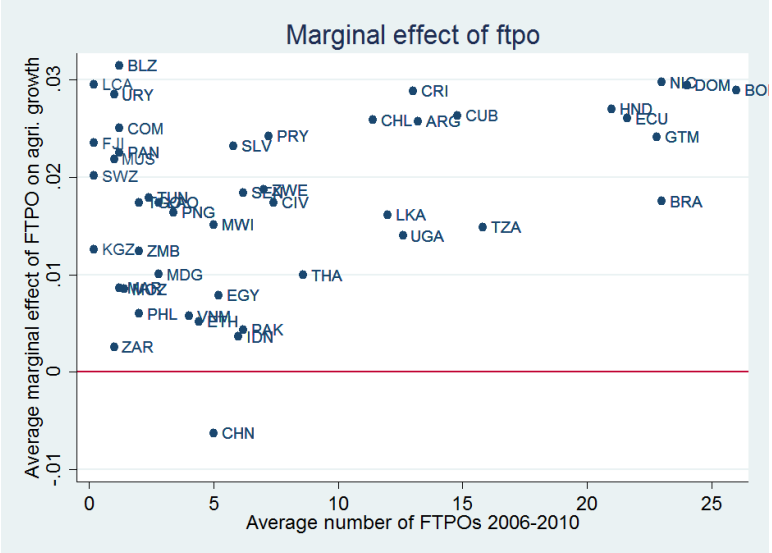
[15] For reasons of brevity we do not report the results of running OLS on the cross-section (Arellano and Bond (1991) system GMM estimation on the pooled cross-section) as they closely resemble those obtained for the random effects model (two-way fixed effects model).

mation is efficient. However, if the number of observations per country is small, the Hausman test typically to fails to reject the random effects model, even for a high correlation of the independent variables and the country-specific effect. For conservativeness, and given that growth regressions are usually estimated with a fixed effects model, we choose Blundell and Bond (1998) GMM estimation as our preferred method. Not only the coefficients in Column (6) in Table 4 quantitatively and qualitatively closely resemble the random-effects model (Column (4)), also unobserved unit heterogeneity and potential endogeneity of the independent variables is taken into account, motivating our choice.

For the regression in Column (6) we find that the quadratic $ftpo$ term is separately and jointly significantly different from zero at the 5 percent level. A one percent increase in the FT intensity $ftpo$ increases agricultural growth per capita by 0.018 percentage points on average. The coefficient is quantitatively small, but given the small share of FT in total agricultural production, this is not unexpected. Figure 2 displays the marginal effect of FT intensity on agricultural growth.

The estimates suggest that – holding rural population constant – an increase in the number of FT producer organizations by one (equivalent to a 25 percent increase in the average number of FTPOs for this sample) implies an average increase in the agricultural growth rate by 0.45 percentage points. As the average annual growth rate in the agricultural sectors is 0.6 percent, this increase in the number of FTPOs raises agricultural growth to 1.05 percent per year on average, corresponding to an implied elasticity of 3.

Figure 2: *Marginal Effect ftpo*



In contrast to many studies on official development assistance and economic growth, we find that the share of ODA in GDP significantly increases agricultural growth, although agriculture has been neglected by donors and developing countries' governments in the past decades

(Bezemer and Headey, 2008).[16] It cannot be ruled out that the aid-growth literature could find more robust results if it focusses on the agricultural sector instead of economy-wide growth when analyzing the effectiveness of aid, since most aid recipient countries strongly rely on agriculture and most of the poor live in rural areas. If the share of agriculture in total value added is small and given the time lag of spillover effects to other sectors, an (aid-induced) increase in agricultural growth must not necessarily show up as a significant increase in economy-wide growth (Christiaensen et al., 2011). Moreover, to find significant effects of both, FT and ODA, suggests that they target distinct fields of economic activity. Finally, we find a small positive effect of arable area in total land area and population size. This, however, may be be interpreted as a convergence effect in the sense that a large share of arable area in total land area corresponds to labor-intensive and thus a less developed agricultural sector.

4.3 Robustness Checks

Table 5 displays robustness checks of the lagged quadratic specification using Blundell and Bond (1998) GMM estimation. Column (1) replicates the baseline result from Column (6) in Table 4 and then we gradually include the additional control variables from the ZINB specification to see whether the effect of FT on agricultural growth is sensitive to characteristics of institutional quality. Finally, Columns (6) to (8) show the estimation results for the subsamples of low-, lower middle- and upper middle-income countries.[17,18]

The estimation results throughout show a significantly positive impact of the quadratic $ftpo$ term on agricultural growth. The parameter estimates are not sensitive to any of the additional control variables, suggesting that our FT measure does not capture growth effects that are actually related to institutional quality, cultural characteristics or political stability.

For the three subsamples we find positive estimates for the quadratic $ftpo$ term, which turns significantly positive at the 1 percent level for the group of upper middle-income countries (Column (8)). Compared to the baseline specification reported in Column (1), the coefficient increase almost threefold in magnitude, such that agricultural growth increases by 0.043 percentage points for a one percent increase in $ftpo$. Conditional on participation in FT, upper middle-income countries have the largest number of FTPOs (13.5 for upper middle-, 10.55 for lower middle-, and 6.84 for low-income countries), and FT intensity also has the largest effect on agricultural growth in the most developed countries in the sample. This result implies that the FT strategy indeed constitutes a viable development strategy, but those countries that are actually in the focus of the FLO concept are not the ones who benefit significantly, but instead smallholders in the most developed eligible countries.

[16] Bezemer and Headey (2008) summarize that the real global volume of assistance to agriculture decreased from US $6.2 in 1980 to US $2.3 billion in 2002 or from US $20 per capita to US $7 in 2001. This corresponds to a decline of agriculture's share in total aid from 17 to 3.7 percent. With the introduction of the Millenium Development Goals and their focus on social indicators, aid allocation shifted to social sectors in general.

[17] The FLO (2011) classifies countries with gross national income (GNI) per capita below US $875 as low-income countries, with US $876-$3,456 as lower middle-income, and $3,455 - $10,725 as upper middle-income countries. However, there geographical scope of the FLO also comprises countries with income per capita exceeding the maximum of US $10,725. For consistency, we follow the definition of the FLO (2011).

[18] As a further robustness check we run all growth regressions including the six countries discarded as outliers from the ZINB model without observing significant changes in the estimation results.

One possible explanation for this finding relates to Engel's law and the income elasticity of demand for agricultural products. As (Northern consumers) incomes rise, the growth in the intake of food and drinks will sooner or later stagnate, but not necessarily the expenditures, as demand for high value agricultural products is not income inelastic. Demand for high value agricultural goods as speciality coffee or exotic (organic) fruits depends on consumers' motivational forces as the consistency of self-image or the need for high self-esteem, and can trigger substantial consumer expenditures in high income countries. If trading opportunities for high value food exist, its production can provide some countries with important growth opportunities (Christiaensen et al., 2011; Witt, 2011).

Given that the ZINB model suggests that the probability of FT certification increases with the rule of law and up to a certain point also with income, it does not come as a surprise to see that upper middle-income countries benefit most from this additional demand. The estimation results show that the specialization in the production of high value agricultural products such as coffee, bananas or cocoa, in combination with a marketing strategy that connects Northern consumers to the producers in the South can cause a significant increase in income. However, this is only the case when the production structures are already relatively well developed, but it seems to be less effective for building up (agricultural) production structures from scratch.

As agriculture is significantly more effective in poverty reduction among the poorest due to larger participation of poorer households in agriculture (Christiaensen et al., 2011), we assume a FT induced increase in agricultural growth to show only a small contribution to poverty reduction. This result indicates that the FT concept misses to target people below the 2$-a-day poverty line, but instead generates income opportunities for smallholders in countries that already moved on from primarily agricultural production structures.

Nevertheless, the results of the empirical analysis need to be interpreted with care. Firstly, the measure of FT intensity is only a rough proxy of actual export or employment figures in the tiny FT sector, and moreover it covers only a short time horizon. Secondly, although we observe positive effects of $ftpo$ on agricultural growth throughout, significant effects can be found only if we allow for nonlinear marginal returns. Thirdly, the results seem to be driven by upper middle-income countries where the share of agriculture in GDP is relatively small. Given these weaknesses we do not want to overemphasize the estimation results. However, what can be confirmed is that there is no empirical evidence that participation in FT networks is harmful to agricultural growth. And as (ethical) consumers experience utility from the consumption of FT certified products, and smallholders and hired labor seem to enjoy an increase in income, the FT concept indeed constitutes an alternative way of outside assistance.

Table 5: *Growth Regressions: Robustness tests*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ftpo_{t-1}$	0.0859**	0.0921**	0.0861**	0.0839**	0.0873**	0.1813	0.0316	0.2217***
	(0.0368)	(0.0363)	(0.0366)	(0.0366)	(0.0354)	(0.1448)	(0.0407)	(0.0725)
$ftpo^2_{t-1}$	0.0025**	0.0027**	0.0025**	0.0024**	0.0025**	0.0059	0.0010	0.0068***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0049)	(0.0013)	(0.0023)
log(rur. pop. den.)$_{t-1}$	0.0003	0.0002	0.0001	-0.0003	-0.0005	-0.0157	0.0036	0.0039
	(0.0043)	(0.0043)	(0.0042)	(0.0043)	(0.0042)	(0.0189)	(0.0096)	(0.0069)
ODA (GDP)$_{t-1}$	0.0666**	0.0636**	0.0653**	0.0682**	0.0679**	0.0288	0.0989	-0.5641
	(0.0299)	(0.0316)	(0.0311)	(0.0320)	(0.0305)	(0.0420)	(0.1104)	(0.7192)
Trade$_{t-1}$	0.0202	0.0200	0.0190	0.0184	0.0219	0.0731*	0.0053	0.0057
	(0.0179)	(0.0187)	(0.0182)	(0.0180)	(0.0184)	(0.0399)	(0.0207)	(0.0331)
Resource rent$_{t-1}$	0.0639*	0.0661*	0.0627*	0.0639**	0.0706**	0.0516	0.1067***	0.0142
	(0.0327)	(0.0341)	(0.0329)	(0.0323)	(0.0341)	(0.0592)	(0.0372)	(0.0459)
Catholic	-0.0107	-0.0110	-0.0093	-0.0113	-0.0121	0.0021	0.0248	-0.0291
	(0.0210)	(0.0202)	(0.0234)	(0.0209)	(0.0227)	(0.0368)	(0.0226)	(0.0318)
Rule of Law	0.0043	0.0033	0.0060	0.0061	-0.0003	0.0760***	0.0100	-0.0093
	(0.0102)	(0.0071)	(0.0096)	(0.0094)	(0.0083)	(0.0155)	(0.0135)	(0.0100)
Arab. land	0.1110**	0.0995**	0.1005*	0.0928*	0.1040*	0.0200	0.1635**	0.0685
	(0.0503)	(0.0508)	(0.0520)	(0.0539)	(0.0547)	(0.0714)	(0.0645)	(0.0774)
log(Pop.)	0.0150**	0.0152**	0.0150**	0.0151**	0.0162**	0.0056	0.0016	0.0225**
	(0.0062)	(0.0062)	(0.0063)	(0.0062)	(0.0064)	(0.0148)	(0.0069)	(0.0103)
log(agri. GDP p.c. 2006)	-0.0123	-0.0121	-0.0119	-0.0129	-0.0134	0.0218	0.0090	-0.0527***
	(0.0126)	(0.0125)	(0.0125)	(0.0128)	(0.0130)	(0.0314)	(0.0138)	(0.0198)
No. of coups	-0.0009				-0.0011			
	(0.0010)				(0.0009)			
Political freedom		-0.0052			-0.0063			
		(0.0114)			(0.0114)			
Spanish Colony			-0.0026		-0.0024			
			(0.0169)		(0.0164)			
Ethn. frac.				-0.0141	-0.0197			
				(0.0240)	(0.0245)			
N	349	349	349	349	349	77	134	138
p-value (Hansen)	0.896	0.843	0.850	0.929	0.990	0.336	0.795	1.000
p-value AR(2)	0.555	0.551	0.552	0.550	0.551	0.209	0.837	0.685
No. of instruments	24	24	24	24	27	19	23	23

Notes: The dependent variable is the growth rate of GDP per capita in the agricultural sector (expressed in logs). *, **, *** indicate significance at the 10, 5, and 1 percent level. Robust standard errors clustered at the country level in parentheses. All regressions include dummies for Sub Saharan Africa, Middle East and North Africa, South Asia, South East Asia, Pacific, Latin America and the Caribbean and year dummies. Orthogonal deviations are used to maximize the number of observations in a panel with gaps.

5 Conclusions

The present paper provides a framework for the first cross-country assessment of the determinants of the extensive and intensive margins of FT certification, and analyzes the impact of FT certification on growth in the agricultural sector and thus on poverty. We therefore collected data on the number of producer organizations which obtained Fairtrade certification for agricultural products from Fairtrade Labelling International (FLO) in the period 2006-2010. This constitutes the first comprehensive data set that allows to compare Fairtrade activities across countries and time.

A zero inflated negative binomial (ZINB) model allows to disentangle the probability of FT certification (extensive margin) from the number of FTPOs (intensive margin). The estimation results suggest that FT certification is more likely in large, resource poor, catholic countries with Spanish colonial history and a low number of coups d'etat and revolutions. The probability of certification increases further with country size in terms of population, the capital intensity of the agricultural sector and the rule of law. The coefficients of the quadratic initial income term, together with the positive impact of rural population density (capital

intensity) and the rule of law, indicate that lower-middle income countries have the highest probability of non-zero FTPOs. Given a non-zero predicted probability of FT certification, the largest number of FTPOs can be found in large lower-middle income countries with a labor intensive agricultural sector. The share of official development assistance in GDP has a positive impact on the FT intensity and reflects a certain degree of cooperation across development institutions.

In order to obtain an estimate of the impact of FT certification on agricultural growth, we specify a growth regression that includes a country-specific measure of the FT intensity and the explanatory variables from the ZINB model. Estimation results provide empirical evidence that the number of FTPOs relative to a country's rural population has a positive impact on agricultural growth that is statistically significant if we allow for nonlinear marginal returns and a time lag.

The impact of FT on agricultural growth is largest in upper middle-income countries, while there are only little discernible links between FT and agricultural growth in lower middle- and low income-countries. Cooperative membership and collective producer action cause positive growth effects for countries in a rather advanced stage of development, while producers from low- and lower middle-income countries can not (yet) reap the benefits. A possible explanation may be found in the structure of demand for FT products, as the commodities demanded most (coffee, bananas and cocoa) are largely produced by upper middle-income countries. Further research should thus focus on disaggregated data (by product) in order to see whether the impact of FT differs across products.

Given the important role of agriculture in reducing poverty, FT certification seems to be able to support poverty reduction via increasing growth in the agricultural sector, but in its present construction it misses to reach the truly poor. The positive link between income and the number of producer organizations suggests that the certification fee limits FT certification of smallholders in lower middle- and low-income countries. This is a consequence from the very conception of FT certification where smallholders face a costly certification process in order to participate.

An important policy conclusion is to remove the entry barriers for poor smallholders in order to fulfil the Fairtrade mission of delivering sustainable livelihoods and development opportunities to the poorest countries in the world, in particular since those are the ones who lack income opportunities outside the agricultural sector.

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A Appendix

A.1 Data and Sources

Table A1: *Geographical Scope of FT producer certification*

Country	ZINB		Growth	Country	ZINB		Growth	Country	ZINB		Growth
Africa: 253 producer organizations											
Algeria	+	(0)	+	Gabon	+	(0)	+	Niger	+	(0)	
Angola		(0)		Gambia	+	(0)	+	Nigeria		(0)	
Benin	+	(2)		Ghana	+	(14)		Rwanda	+	(8)	
Botswana	+	(0)	+	Guinea		(0)		St. Helena		(0)	
Burkina Faso		(11)		Guinea-Bissau		(0)		Sao Tome & Principe		(1)	
Burundi	+	(0)	+	Kenya	+	(54)	+	Senegal	+	(12)	+
Cameroon	+	(3)	+	Lesotho	+	(0)	+	Seychelles		(0)	
Cape Verde	+	(0)	+	Liberia	+	(0)	+	Sierra Leone	+	(1)	
Chad		(0)		Libyan Arab. Jam.		(0)		Somalia		(0)	
Central African Rep.	+	(0)		Madagascar	+	(8)	+	South Africa	+	(45)	+
Comoros	+	(2)	+	Malawi	+	(8)	+	Sudan	+	(0)	+
Congo	+	(0)		Mali	+	(7)	+	Swaziland	+	(1)	+
Congo, Dem. Rep.	+	(1)	+	Mauritania	+	(0)	+	Tanzania	+	(17)	+
Cote d'Ivoire	+	(14)	+	Mauritius	+	(5)	+	Togo	+	(2)	+
Egypt	+	(6)	+	Mayotte		(0)		Tunisia	+	(4)	+
Equatorial Guinea	+	(0)	+	Morocco	+	(2)	+	Uganda	+	(8)	+
Eritrea	+	(0)	+	Mozambique	+	(2)	+	Zambia	+	(1)	+
Ethiopia	+	(6)	+	Namibia	+	(0)	+	Zimbabwe	+	(8)	+
Americas: 509 producer organizations											
Anguilla		(0)		Dominican Republic	+	(31)	+	Panama	+	(2)	+
Antigua & Barbuda	+	(0)	+	Ecuador	+	(24)	+	Paraguay	+	(9)	+
Argentina	+	(19)	+	El Salvador	+	(5)	+	Peru	+	(82)	+
Barbados		(0)		Grenada	+	(0)	+	St. Kitts & Nevis		(0)	
Belize	+	(2)	+	Guatemala	+	(22)	+	St. Lucia	+	(1)	+
Bolivia	+	(29)	+	Guyana	+	(0)	+	St. Vincent & the Grenadines		(1)	
Brazil	+	(35)	+	Haiti	+	(7)		Suriname	+	(0)	+
Chile	+	(23)	+	Honduras	+	(23)	+	Trinidad & Tobago	+	(0)	+
Colombia	+	(77)	+	Jamaica	+	(0)	+	Turks & Caicos Islands		(0)	
Costa Rica	+	(13)	+	Mexico	+	(47)	+	Uruguay	+	(1)	+
Cuba	+	(27)	+	Montserrat		(0)		Venezuela	+	(0)	+
Dominica		(0)		Nicaragua	+	(29)	+				
Asia: 142 producer organizations											
Afghanistan		(0)		Korea (North)		(0)		Philippines	+	(2)	+
Armenia	+	(0)	+	Kazakhstan	+	(0)	+	Saudi Arabia	+	(0)	+
Azerbaijan	+	(0)	+	Kyrgyzstan	+	(1)	+	Sri Lanka	+	(15)	+
Bangladesh	+	(0)	+	Laos	+	(2)	+	Syrian Arab Republic	+	(0)	
Bhutan	+	(0)	+	Lebanon	+	(0)	+	Tajikistan		(0)	
Cambodia	+	(0)	+	Malaysia	+	(0)	+	Thailand	+	(7)	+
China	+	(7)	+	Maldives	+	(0)	+	Timor-Leste		(0)	
Georgia		(0)		Mongolia		(0)		Turkmenistan		(0)	
India	+	(61)	+	Myanmar		(0)		Uzbekistan	+	(0)	+
Indonesia	+	(14)	+	Nepal	+	(0)	+	Viet Nam	+	(7)	+
Iran	+	(0)	+	Occ. Palestinian Terr.		(0)		Yemen	+	(0)	+
Iraq		(0)		Oman		(0)					
Jordan	+	(0)	+	Pakistan	+	(8)	+				
Oceania: 5 producer organization											
Cook Islands		(0)		Niue		(0)		Tonga	+	(0)	+
Fiji	+	(1)	+	Palau		(0)		Tokelau		(0)	
Kiribati	+	(0)	+	Papua New Guinea	+	(4)	+	Tuvalu		(0)	
Marshall Islands		(0)		Samoa	+	(0)		Vanuatu	+	(0)	+
Micronesia		(0)		Solomon Islands		(0)		Wallis & Futuna Islands		(0)	
Nauru		0)		Tokelau		(0)					

A "+" indicates whether the particular country is included in the analysis, the number in parenthesis the number of Fair Trade certified producer organizations in 2010.

Table A2: *Summary statistics: ZINB model*

Variable	Mean	Std. Dev.	Min	Max
FTPO	3.576	6.411	0	35
GDP growth p.c.	0.031	0.05	-0.204	0.249
log(Rur. pop. den.)	5.812	1.142	2.27	9.326
log(ODA/GDP)	-3.059	1.117	-5.383	0.362
log(Trade/GDP)	-0.24	0.45	-1.334	0.985
log(Resource rents/GDP)	-2.682	1.341	-4.605	0.73
log(Arable land/total land area)	-2.624	1.295	-7.748	-0.498
log(Population)	15.606	1.947	11.124	21.014
log(GDP p.c. 2006)	7.041	1.193	4.551	9.483
Catholic	0.266	0.442	0	1
Rule of Law	-0.51	0.674	-1.942	1.294
Spanish Colony	0.14	0.348	0	1
Ethnic fractionalization	0.49	0.258	0	0.930
No. of coups	2.719	4.883	0	20
Political freedom	2.027	0.762	1	3
Obs.		556		

Table A3: *Summary statistics: Growth regression*

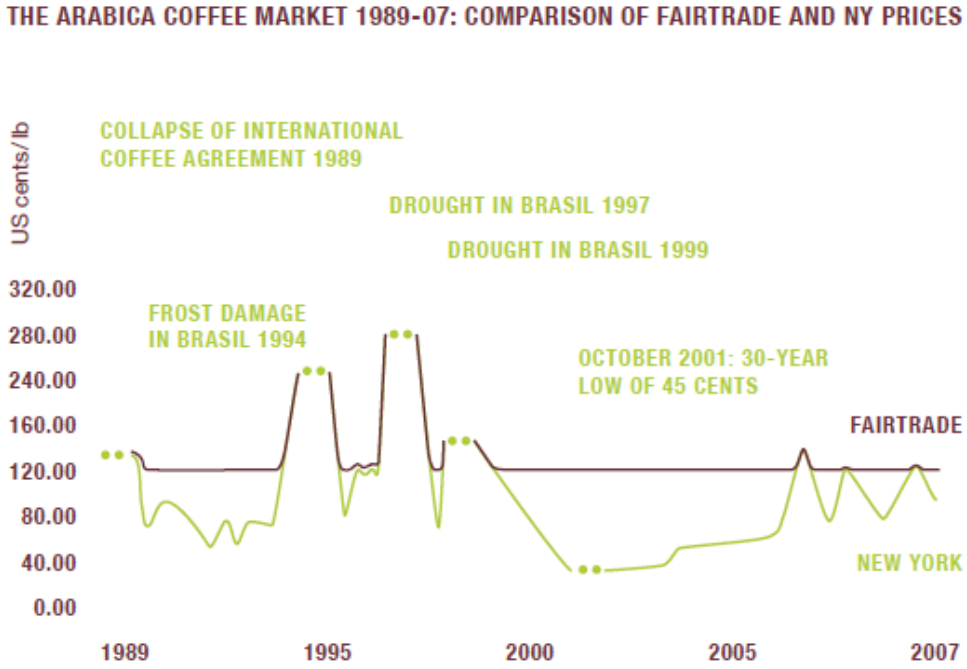
Variable	Mean	Std. Dev.	Min	Max
Agri. GDP growth p.c.	0.006	0.096	-0.601	0.369
log((FTPO+1)/rur.pop)	-13.957	1.862	-18.659	-9.753
log(Rur. pop. den.)	5.841	1.145	2.27	8.486
ODA/GDP	0.068	0.138	-0.005	1.437
Trade/GDP	0.914	0.418	0.263	2.678
Resource rents/GDP	0.114	0.16	0	0.879
Arable land/total land area	0.123	0.116	0.003	0.602
log(Population)	15.606	2.019	11.124	21.014
log(Agri. GDP p.c. 2006)	5.038	0.652	3.425	6.387
Catholic	0.297	0.458	0	1
Rule of Law	-0.464	0.65	-1.835	1.294
Spanish Colony	0.16	0.367	0	1
Ethnic fractionalization	0.461	0.248	0	0.930
No. of coups	2.031	4.258	0	18
Political freedom	1.966	0.749	1	3
Obs.		357		

Table A4: *Data Sources*

Source	Variable
FLO reports 2006, 2007, and 2010	FTPO (Fair Trade Producer Organization): Number of Fair Trade certified producers. The number of producers for 2008 and 2009 was calculated based on the country-specific growth rate.
World Bank World Development Indicators 2012	Agricultural area (share of total land area)
	Growth rate of agricultural GDP per capita in constant 2000 USD
	Growth rate of GDP per capita in constant 2000 USD
	GDP per capita in constant 2000 USD
	Net official development assistance (ODA) received in constant 2010 USD as a share of GDP in 2010 current USD.
	Population
	Rule of Law
	Share of rural population of total population (in %); rural areas are defined by national statistical offices.
	Total natural resource rent as a share of GDP.
Penn World Tables 2012	Openness to trade at 2005 constant prices
Powell and Clayton (2011)	(Cumulative) number of coups d'etat and revolutions
Norris (2009)	Predominant catholic nation dummy, CIA factbook (updated and extended)
	Regional dummies (Middle-East and North Africa, Sub-Saharan Africa, South Asia, East Asia, South East Asia, Pacific, Latin America)
	Colonial roots
	Landlocked dummy
Freedom House	Political freedom: Composite measure of the political rights index and the civil liberties index: 1 . . . free, 2 . . . partly free, 3 . . . unfree

A.2 Fair trade prices

Figure A1: *Fair Trade Price for Coffee*



Source: FLO (2007b)