A cross-country empirical assessment of Fairtrade: Determinants and growth effects*

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Abstract

This paper presents the first cross-country empirical evidence on the determinants of participation in Fairtrade networks and the impact of the production 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, estimation results indicate a significantly positive effect on the growth rate of per capita value added in agriculture in middle-income countries. In line with the development agenda laid down by the World Bank (2008), terming the inclusion of smallholders in new markets as a central tool for poverty reduction, the empirical analysis suggests that Fairtrade International indeed achieves some of its intended goals.

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 certified products seems to be one possibility to support marginalized producers in the global South.[1] The Fairtrade model offers farmers and agricultural workers a guaranteed minimum price, a price premium, stable market links, and assistance in finance and development, while consumers are able to satisfy their demand for socially and ecologically responsible consumption (Raynolds, 2000; Becchetti and Rosati, 2005). As a system of industry self-governance that aims at tackling issues of social, economic and environmental development and justice, Fairtrade is designed to govern the whole value chain of production, exchange and organization (Blowfield and Dolan, 2010*b*).

Since the early 2000s, Fairtrade has become increasingly popular among consumers as a form of socially regulated trade (Raynolds, 2012). Sales increased over the period 2003 to 2010 from 830 million to 4.9 billion Euro, corresponding to an annual growth rate of 25 percent. The four largest products by value, coffee, bananas, cocoa and flowers, generated more than 80 percent of Fairtrade sales. 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), while 60 percent of smallholders and workers are employed in African producer organizations. The price premium paid to producer cooperatives amounted to 51.5 million Euro (54 Euro on average per member) and was spent, e.g. on business development, production and quality improvements, cash payments to members, educational and environmental programs (Fairtrade International, 2011*b*).

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, e.g., enhancing access to financial services and reducing risk exposure, advancing producer organizations' performance, and providing environmental services.

Positive welfare effects of Fairtrade certification have been emphasized in Fairtrade reports (Krier, 2008; Smith, 2009; Boonman et al., 2011; Fairtrade International, 2011*b*) and many case studies. Weber (2011) shows that participation in (organic) Fairtrade coffee cooperatives increases net household income of Mexican smallholders by up to five percent, Bacon (2005) and Arnould et al. (2009) find for Nicaragua, Guatemala and Peru reduced exposure to low coffee prices, a significant increase in income, and lower dropout rates from school. Fairtrade cooperatives also serve as institutional surrogate providing smallholders with conditions for the development of contractual arrangements necessary to export and hedge against price volatility (Berndt, 2007; Valkila, 2009).

However, the question whether Fairtrade indeed supports marginalized producers is a disputed topic. Blowfield and Dolan (2010*a*) do not find benefits at the producer level for

[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. However, Fairtrade products are also sold in some producer countries such as South Africa (Fairtrade International, 2011*a*).

a sample of Kenyan tea producers, Ballet and Carimentrand (2010) report an increase in inequality among Bolivian quinoa producers, de Janvry et al. (2014) even reckon a negative net effective Fairtrade premium for Guatemalan coffee growers in the period 2005-2009. Moreover, the Fairtrade system is criticized for the inefficiency of the transfer (de Janvry et al., 2014; Yanchus and de Vanssay, 2003), market distortions from the price floor (Mann, 2008; Sidwell, 2008), and for reinforcing existing power relations (Blowfield and Dolan, 2010*a*).

The impact of participating in Fairtrade has not yet been tested in a cross-country setting, but largely in descriptive studies or interviews. While these studies provide important insights into the micro-level effects of Fairtrade certification, their results can not be generalized due to omitted country and time specific factors. The main contribution of this paper is thus to complement the existing literature with an econometric analysis that i) sheds light on the determinants of participation in Fairtrade on a country-level, and ii) allows to analyze the impact of Fairtrade certification on growth in the agricultural sector.

We collect data on the number of Fairtrade certified producer organizations per country over the period 2006 to 2010 and analyze the determinants of participation in Fairtrade (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, using the number of producer organizations in the rural population in order to test for a possible causal effect of Fairtrade certification 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 summarizes existing research on the impact of Fairtrade certification on producers, 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 Fairtrade. Section 4 formalizes a growth model that accounts for Fairtrade certification, presents estimation results and provides robustness checks. The final section 5 summarizes the results and concludes.

2 Fairtrade, Agriculture and Development

2.1 A brief history of Fairtrade

In the 1960s, alternative trade organizations (ATOs) based on Christian faith and aid organizations started practicing and promoting Fair Trade (equal exchange) primarily in Europe.[2] Until the late 1980s, mainly handicrafts purchased directly from producers in developing countries were sold in World Shops (Tallontire, 2000; Low and Davenport, 2005).[3]

In 1988, the Dutch development agency Solidaridad introduced the first Fair Trade label "Max Havelaar" for coffee to gain access to mainstream distribution channels. This practice of solidarity exchange rapidly spread across Europe and North America, resulting in

[2] "Fairtrade" exclusively refers to the certification schemes of Fairtrade International (FLO), while "Fair Trade" refers to the movement as a whole (WFTO, Fairtrade International and FLO-Cert, 2011).

[3] 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 events.

the foundation of certification agencies in 19 countries (Low and Davenport, 2005; Steinrücken and Jaenichen, 2007). These country-initiatives established Fairtrade International (Fairtrade Labelling Organizations International e.V. (FLO)) in 1997 in Bonn, Germany, to manage standards, coordinate national activities, and to develop common standards. The Fairtrade certification mark was launched in 2002 in order to improve the visibility of the label on supermarket shelves, facilitate cross border trade and simplify export procedures for both producers and exporters. In 2004 Fairtrade International splits into two independent organizations, Fairtrade International, setting standards and providing producer support, and the FLO-Cert, an independent auditing, inspection, and certification body.[4,5] Overall, Fairtrade has grown from a response to declining coffee prices to a certification system covering a wide range of (largely) agricultural products, ensuring social and ecological standards of production.[6]

2.2 Fairtrade 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). To reach the vision of just and sustainable development via trade, Fairtrade International defines five core principles: market access for marginalized producers, sustainable and equitable trading relationships, capacity building and empowerment, consumer awareness raising and advocacy, and the perception of Fairtrade as a "social contract". In addition, the standards set by the International Labour Organization (ILO) must be met (WFTO and FLO, 2009).

Producers, eligible for Fairtrade certification, must be organized democratically in small producer organizations, contract production schemes or hired labor organizations (e.g. for flowers or bananas, which are usually grown on large farms and require permanent harvesting). The size of the Fairtrade 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 Fairtrade-labor is employed (Fairtrade International, 2011*b*).

Fairtrade International (2007*a*) guarantees certified producer organizations a floor price (Fairtrade minimum price) plus a price premium per unit sold to a Fairtrade customer (Fairtrade premium). If the market price exceeds the Fairtrade minimum price, the market price

[4] Source: `http://www.fairtrade.org.uk/what_is_fairtrade/history.aspx`, retrieved June 24, 2014

[5] For a comprehensive review of the history of Fair Trade/Fairtrade, see Tallontire (2000); Fridell (2004) and Low and Davenport (2005).

[6] 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 (Fairtrade International, 2011*b*), and since 2011 also gold and silver (Fairtrade International, 2012).

plus the price premium applies. Up to 60 percent of the purchase price should be pre-financed to the producer organizations, serving as pre-export lines of credit.[7]

Fairtrade 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 Fairtrade 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 cooperative can obtain Fairtrade certification only if she obtained a letter of intent from a wholesaler or retailer to purchase her product at the Fairtrade price (Booth and Whetstone, 2007).[8] Nevertheless, in periods where the Fairtrade floor price is binding, excess certification is observed such that on average, only 20 percent of a cooperative's produce is sold to Fairtrade customers, the rest goes to conventional markets (Bacon, 2005; de Janvry et al., 2014).

2.3 Impact Evaluation

Coffee was the first commodity traded under the Fairtrade label and shows the highest market share relative to conventional production (Raynolds, 2009). It is one of the few internationally traded commodities that is produced mainly by smallholders (Utting-Chamorro, 2005). Consequently, the majority of research focusses on coffee growers in Latin and Middle America.[9]

Weber (2011) estimates the causal effect of organic Fairtrade certification on household income for a sample of 845 Mexican coffee farmers for the season 2004-2005. A two-step model that accounts for potential self-selection into cooperatives by controlling for certification fixed costs shows that the net organic Fairtrade price premium increases household income by five percent on average. Using the same dataset, Barham et al. (2011) confirm that the factor returns are higher for organic Fairtrade coffee farmers than for conventional growers. As income differences are driven by yields rather than prices, Fairtrade cooperatives emerge to apply better technology and management. However, both studies suggest that price premia have only limited potential to substantially increase coffee growers' household income.

Arnould et al. (2009), analyzing 1,269 Fairtrade and comparable non-Fairtrade coffee growers in 2004-2005 in Nicaragua, Guatemala and Peru, report a significant increase in income, lower dropout rates from school, and a higher probability of receiving treatment in the case of illness for the Fairtrade households. Moreover, certified farmers produce a significantly larger quantity of output per hectare.Similarly, for a sample of 177 coffee smallholders in northern Nicaragua, Bacon et al. (2008) find that in households selling to Fairtrade markets school attendance rates and female farm work days increase; more water purification systems,

[7] For details concerning price setting and the certification requirements, please see FLO-Cert (2013).

[8] The Fairtrade price is the sum of the Fairtrade minimum price and the Fairtrade premium (WFTO, Fairtrade International and FLO-Cert, 2011).

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

and soil and water conservation 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) were reported.

Using propensity score matching to account for potential self-selection, Ruben et al. (2009) compare Fairtrade and conventional coffee and banana producers in Costa Rica and Peru (700 producers in 13 cooperatives over 2006-2007). While direct income effects are negligible, significant indirect benefits exist, such as higher credit use and asset value, and the organizational strength through cooperative membership. Positive spatial externalities cause convergence of local farm gate prices for certified and conventional produce, and also of employment conditions for hired labor. Finally, the community benefits from Fairtrade premium payments, e.g. by using the premium as a collateral for community loans, a local counterpart for complementary public or NGO funding. Such multiplier effects can help to reduce potential inequality between certified and non-certified farmers.

The Fairtrade system is criticized for the inefficiency of the transfer (de Janvry et al., 2014; Yanchus and de Vanssay, 2003), market distortions from the price floor (Mann, 2008), an increase in inequality (Ballet and Carimentrand, 2010; Barrett et al., 2012), and for reinforcing existing power relations (Blowfield and Dolan, 2010*a*).

In a model with free entry, de Janvry et al. (2014) show that the rents from Fairtrade certification dissipate in equilibrium. The average net effective Fairtrade premium for Guatemalan coffee growers over the period 1997-2009 is estimated to US $0.24/lb and was even negative (US $-0.13/lb) in 2005-2009 when the floor price did not bind.[10] The ratio of Fairtrade to conventional sales is inversely related to the expected nominal premium due to increasing supply ("excess certification"), such that the welfare benefits remain stable over time. The current Fairtrade market thus fails to deliver real benefits as the system fixes prices but leaves quantity and quality as free parameters. As a result, the transfer in the form of a price floor and a price premium is inefficient relative to a direct transfer of funds for both, the donor and the recipient (Yanchus and de Vanssay, 2003; de Janvry et al., 2014).

Asking for an above-market price without delivering extra physical product quality can cause oversupply and a welfare loss. The price floor enables producers to stay in the market even if marginal costs exceed marginal revenue at world market prices (Mann, 2008) and reduces the incentives for diversification (Sidwell, 2008) and quality improvements, also through the monopsonic position of Fairtrade (Ruben et al., 2009). However, as income opportunities outside the agricultural sector dominate (Weber, 2011; Barham et al., 2011) and given the entry barriers in form of certification costs (Mutersbaugh, 2005), it seems implausible that Fairtrade certification indeed biases the market.

The evaluation of the Fairtrade concept against perfect market theory in general appears inappropriate, and should instead focus on the real alternatives open to producers. This also applies to the question of diversification: Successful diversification depends on physical, social and human capital, and the ability to manage risk and uncertainty - capabilities that

[10] The net effective Fairtrade premium is the difference between the Fairtrade price (plus the price premium), the quality adjusted conventional market price and the per unit-certification costs.

particularly lack the poorest (Smith, 2009).

In a specific factors model where land is specific to agricultural production, an increase in the return to certified factors lowers the return to non-certified factors, as all producers compete for limited resources (Yanchus and de Vanssay, 2003). This replicates or even increases regional inequality among participating and non-participating smallholders (Barrett et al., 2012), and can even increase income inequality among certified smallholders, as the largest and most productive growers sell the highest quantities to Fairtrade buyers (Ballet and Carimentrand, 2010). Even if the social projects are inclusive, Fairtrade privileges landowners, men and entrepreneurs, while its very construction excludes the very poor and landless, thereby reinforcing existing hierarchies (Blowfield and Dolan, 2010*a*).

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; Christiaensen et al., 2011).

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 one effective strategy to connect smallholders to economic growth and to reduce poverty. Accordingly, 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). Producer organizations can help to correct market imperfections such as high transaction costs or missing credit markets, to reach quality standards, to pool labor and financial resources in order to access new domestic or international markets, and to increase bargaining power and exercise voice in policy making (Bacon et al., 2008; Byerlee et al., 2009; Barrett et al., 2012). International organizations can back a successful development of producer organizations.

In this context, Fairtrade International can be regarded as such an intermediary connecting local producers to high-value (export) markets in exchange for a certification fee. The gains from certification largely arise from cooperative membership via the resolution of market failures, economies of scale and reduced risk exposure rather than from the certification standards or the floor price. Financial benefits appear important in the short run, while in the long-run capacity building contributes most to sustainable development (Raynolds et al.,

2004). These economic, social and ecological aspects of Fairtrade certification promote local and regional rural development, and are expected to reduce poverty.

Whether Fairtrade value chain governance indeed supports marginalized producers remains an empirical question. Even tough Fairtrade sales have been growing rapidly over the last years, the market share relative to conventional production remains marginal. Fairtrade cooperative membership is restricted to smallholders, and employment possibilities of unskilled labor are limited to harvest hands, with wages set by national minimum requirements.[11] Although the existing case studies provide interesting insights into the design of Fairtrade cooperatives and impact of participation, they cannot be generalized as potential benefits vary across countries, regions, products and time. Our paper aims to overcome these issues by using panel data that allows to account for country-, time- and regional-specific heterogeneity. Before investigating the effect of Fairtrade certification on growth in the agricultural sector, we first need to identify the determinants of the extensive and intensive margin of Fairtrade certification across countries.

3 Determinants of Participation in Fairtrade

3.1 Empirical Model

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

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 Fairtrade

[11] Research on Fairtrade plantations (hired labor organizations (HLO)) is sparse. HLOs do not face a floor price (that would befit to the owner of the plantation), but the workers receive social premia. For flower plantations in Ecuador, Raynolds (2012) finds that occupational health and safety standards are substantially more strict than the domestic laws, the same holds for environmental protection and pesticide usage. The greatest impact for the workers lies in the improvement of the social conditions and the empowerment through collective organization. For the standards for hired labor organizations, see `http://www.fairtrade.net/hired-labour-standards.html` (retrieved June 30, 2014.)

[12] According to the World Bank, Fairtrade International (2011*a*) 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, the geographical scope of Fairtrade also comprises high-income countries such as Saudi Arabia but excludes some upper middle-income countries. For consistency, we stick in our analysis to the geographical scope defined by Fairtrade International (2011*a*).

certification. 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 (56 percent) 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, while the other has a non-zero probability of positive counts (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

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

The ZINB model resembles a Heckman (1979) selection model, 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 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 rather than potential outcomes (Madden, 2008).

The Heckman (1979) model requires exogenous exclusion restrictions for the selection process to avoid collinearity of the regressors and the inverse Mills ratio. 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 Fairtrade International annual 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). Fairtrade International does not report production or employment figures of FTPOs per country, compelling us to use this very general measure. The FTPO variable summarizes small producer organizations and hired labor organizations as the available data does not allow to distinguish between both organizational types on a country-level.

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 participation in Fairtrade. 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 the 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 (Bresciani and Valdés, 2007). We include both measures to control for a country's agricultural diversity or specialization patterns, e.g. the dualistic agricultural sector in Brazil with capital and labor intensive agricultural subsectors (Lindsey, 2004; Poulton et al., 2010).

[13] Fairtrade International (2007*b*,*a*, 2011*b*).

Initial GDP (in 2006) and initial GDP squared, the growth rate of GDP per capita, and official development assistance (ODA) in GDP describe the level of economic development. Trade openness (imports plus exports in GDP) indicates a country's integration into global markets, and also implicitly controls for the export of products from the list of Fairtrade certified products. Similarly, a set of regional dummies captures whether a country can produce Fairtrade key commodities as they are usually grown in a narrow geographical area.[14] Year dummies catch effects such as changes in demand or prices that affect all countries equally and whether the floor price was binding.

Resource rents in GDP are expected to lower the extensive and intensive margin of participation in Fairtrade due to employment opportunities related to this (rural) non-farm sector. 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 particularly relevant for establishing and maintaining business relations. Finally, given the faith based origins of the early Fairtrade movement and anecdotal evidence that Christian organizations promote the idea of Fairtrade, assist in the certification process and help to establish contact to Northern customers, we assume that predominantly Christian 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 (see Table A1). The sample consists of 309 observations (52 percent) with a zero and 277 with a positive count and covers 61 out of 63 countries with Fairtrade certified producers. The broad country coverage should allow us to draw a valid picture of the determinants of the extensive and intensive margins of Fairtrade 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 average marginal effects on the log count of FTPOs, and average marginal effects on the probability of belonging to the always zero group for the latter. Columns (1) and (2) report the results for the full sample, Columns (3) and (4) exclude the years 2008 and 2009 to judge the impact of imputing the missing FTPO data.

For the probit estimation in Column (2), initial GDP per capita exhibits an U-shaped impact on the probability of belonging to the always zero group suggesting that producers in lower middle-income countries have the highest probability to get certified. Country size (population) decreases the probability of zero FTPOs, while the labor intensity of the agricultural sector (arable land in total land area and rural population density), resource rents and official development assistance increase the probability to observe zero FTPOs. As expected, the probability of belonging to the always zero group significantly decreases with the rule of

[14] For this reason, geographical measures such as share of area in the tropics, absolute latitude, coastal population density etc. all turn out insignificant.

law when a country is predominantly Christian. The sample excluding the years 2008 and 2009 (Column (4)) confirms this pattern, suggesting that data imputation does not bias the results for the extensive margin.

Table 1: *ZINB: Determinants of extensive and intensive margin of Fairtrade certification*

	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(GDP p.c. 2006)	6.1040***	-0.4602**	6.3973***	-0.4282**	4.9437***	-0.4823***	4.7666***	-0.4935***
	(1.1635)	(0.1991)	(1.1542)	(0.1974)	(1.0602)	(0.1747)	(1.0422)	(0.1782)
log(GDP p.c. 2006)^2	-0.3925***	0.0554***	-0.4166***	0.0538***	-0.3194***	0.0564***	-0.3122***	0.0578***
	(0.0777)	(0.0167)	(0.0777)	(0.0148)	(0.0689)	(0.0138)	(0.0685)	(0.0131)
GDP growth p.c.$_{t-1}$	0.4529	0.0491	2.4146	-0.2850	0.0564	0.0609	1.0431	-0.2659
	(1.5605)	(0.2176)	(2.0162)	(0.5038)	(1.4798)	(0.2144)	(2.4231)	(0.4724)
log(ODA/GDP)$_{t-1}$	0.3221*	0.0843**	0.2955*	0.0898*	0.3611**	0.0833**	0.2767*	0.0840*
	(0.1894)	(0.0404)	(0.1790)	(0.0497)	(0.1672)	(0.0389)	(0.1635)	(0.0437)
log(Trade/GDP)$_{t-1}$	0.1824	0.0422	0.2003	0.0549	0.0382	0.0236	0.0839	0.0339
	(0.2885)	(0.0756)	(0.3025)	(0.0766)	(0.2399)	(0.0569)	(0.2619)	(0.0528)
log(Res. r./GDP)$_{t-1}$	0.1857	0.2612***	0.1367	0.2543***	0.3240***	0.2648***	0.3987***	0.2757***
	(0.1520)	(0.0536)	(0.1582)	(0.0401)	(0.1140)	(0.0487)	(0.1487)	(0.0410)
Rule of Law	0.0657	-0.2271***	0.0966	-0.2740***	0.2158	-0.2104***	0.2471	-0.2451***
	(0.2137)	(0.0738)	(0.2066)	(0.0878)	(0.2275)	(0.0528)	(0.2228)	(0.0618)
log(Pop.)	0.7962***	-0.1176***	0.8165***	-0.1159***	0.6635***	-0.1226***	0.5906***	-0.1319***
	(0.1337)	(0.0184)	(0.1479)	(0.0252)	(0.0946)	(0.0183)	(0.1207)	(0.0212)
log(Arable land)	0.2292*	0.0407*	0.2017	0.0390*	0.3139***	0.0417*	0.3663***	0.0442*
	(0.1336)	(0.0237)	(0.1320)	(0.0227)	(0.1101)	(0.0224)	(0.1248)	(0.0253)
log(rur. pop. den)$_{t-1}$	0.3283***	0.1040***	0.2896***	0.0952***	0.3122***	0.1026***	0.2992***	0.0949***
	(0.0978)	(0.0298)	(0.1015)	(0.0273)	(0.0836)	(0.0247)	(0.0857)	(0.0231)
Christian	-0.0483	-0.2306***	-0.0697	-0.2635***	-0.2580	-0.2386***	-0.2136	-0.2586***
	(0.3377)	(0.0432)	(0.3186)	(0.0533)	(0.2902)	(0.0415)	(0.2646)	(0.0418)
Overdispersion α	-1.1311***		-1.1226***		-1.5927***		-1.3070***	
	(0.2493)		(0.2347)		(0.3429)		(0.2644)	
Pseudo Log L.	-940.492		-566.416		-818.532		-504.250	
AIC	1972.984		1216.832		1729.065		1090.5	
N	586		351		566		339	
N zero	309		182		309		182	

Notes: The dep. variable for the probit model is 0/1, 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 clustered at the country level. Coefficients represent average marginal effects on the probability of a zero-count and the log FTPO count. *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.

In the outcome equation in Columns (1) and (3), initial GDP has a significant inverse U-shaped effect on the log FTPO count with the maximum lying in the group of lower middle-income countries, supporting the pattern observed for the extensive margin. Country size and labor intensity are significantly positive, such that the log count of FTPOs is higher when the agricultural sector is relatively labor intensive. High population density permits the cultivation of labor intensive crops (cocoa, coffee) (Weber, 2011), but is also associated with lower per-unit costs in infrastructure, service provision and trade, enhancing the intensification of (high-value) farming systems (Dorward et al., 2004).

In line with our expectations, the share of ODA in GDP significantly raises the log FTPO count. As argued by Bacon et al. (2008), Valkila (2009) or Arnould et al. (2009), NGOs play an important role in assisting smallholders in the certification process. The application for Fairtrade certification itself is rather complex and costly and often requires assistance, in particular for the poorest smallholders.[15]

[15]Of course, official development assistance is not equivalent to the assistance given by NGOs, but the lack of

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.

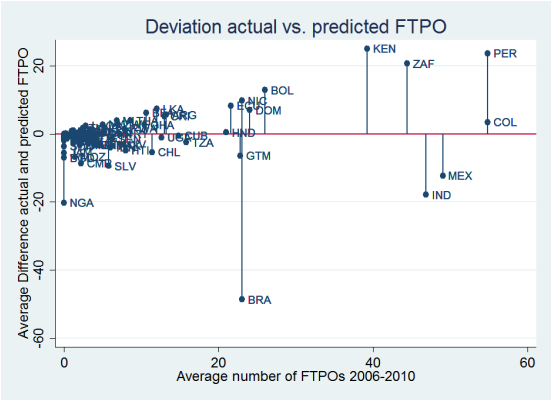
Table 2 compares the actual data, the predicted probability and the predicted FTPO count based on the estimation in Columns (1) and (2). The predicted probability of a zero FTPO count is 47 percent, slightly below to the actual probability of 51 percent, the average difference between the actual and the predicted count is smaller than one. 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 20 FTPOs.

In general, the specification predicts the count outcome well, but for some countries we observe large deviations of the predicted values, 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 deviation between the actual and the predicted FTPO count exceeding 20 as outliers and exclude them subsequently from our regressions (Brazil, Kenya, South Africa, Peru).

Table 2: *Summary ZINB*

	Mean	Std. Dev.	Min	Max
Probit Model		Full sample		
Actual Probability	0.513	0.408	0	1
Predicted Probability	0.472	0.499	0	1
Correlation		0.827		
Neg. Binomial Model		Full sample		
Actual Count	5.858	11.949	0	82
Predicted Count	6.251	12.645	0	87.27
Correlation		0.805		
Neg. Binomial Model		Positive counts		
Actual Count	12.393	14.878	1	82
Predicted Count	12.256	15.999	0.040	87.27
Correlation		0.7705		

Figure 1: *Actual vs. predicted FTPOs*



Columns (5) to (8) in Table 1 replicate the regressions for both samples excluding the countries identified as outliers in Figure 1. The results closely match those obtained for the full sample, apart for effect of resource rents on the count outcome that turned statistically significant at the one percent level in Columns (5) and (7). At the same time, the impact of initial GDP declined in magnitude, reflecting that excluded countries are characterized by a below-average level of income per capita and share of resources rents in GDP. According the the estimates,

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.

the largest number of FTPOs is reached in countries with initial per capita income of around US $2,300 (measured in constant US $2000). 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).

3.4 Robustness

Testing the impact of data imputation and removing potentially influential observations has shown that our specification fits the data very well. We thus choose the sample in Columns (6) and (7) in Table 1 to test the robustness of our 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 hypotheses. We first concentrate on the participation equation before we turn to the outcome equation.

In Column (4) we test the hypothesis that Christian organizations promoted Fairtrade by asking whether the effect of being predominantly Christian persists in an ethnically (religiously) fragmented environment. We find that ethnic fractionalization significantly increases the probability of zero FTPOs, while the impact of being Christian neither quantitatively nor qualitatively affected. This supports the idea that the existing - and usually well established - Christian network structures in developing countries successfully promote the concept of Fairtrade and equal exchange.

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 (6) and (8) 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). The number of coups d'etat and revolutions is not statistically significant, but for political freedom the regressions show a significant reduction in the probability of a zero count when political freedom decreases. The coefficient estimates of resource rents (relative to Column (2)) - and also the rule of law - remain largely unchanged.

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.

Overall, following picture emerges: Fairtrade certification is more likely in large, resource poor, Christian countries with a relatively capital intensive agricultural sector, a strong rule of law and a low number of coups d'etat (political stability), as well as a ethnically rather homogenous - but not necessarily politically free - society. The coefficients of the quadratic initial income term, together with the positive effect of rural population density and the indicators of institutional quality, suggest that lower middle-income countries have the highest probability of non-zero FTPOs. This certainly reflects the fact that the high certification costs prevent market entrance of producers from the poorest countries in the sample

Given a positive probability of certification, the largest number of certified producers can

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
log(GDP p.c. 2006)	4.9437***	-0.4823***	4.4415***	-0.6878***	4.3103***	-0.5823***	4.9482***	-0.1255	4.3295***	-0.8115***
	(1.0602)	(0.1747)	(1.1034)	(0.1632)	(1.0633)	(0.1839)	(1.0865)	(0.2484)	(1.0705)	(0.1429)
log(GDP p.c. 2006)^2	-0.3194***	0.0564***	-0.2881***	0.0670***	-0.2820***	0.0625***	-0.3159***	0.0315*	-0.2843***	0.0769***
	(0.0689)	(0.0138)	(0.0751)	(0.0129)	(0.0697)	(0.0147)	(0.0688)	(0.0174)	(0.0736)	(0.0119)
GDP growth p.c.$_{t-1}$	0.0564	0.0609	-0.9105	-0.1859	-1.4405	-0.0092	-0.5751	0.1197	-1.4555	-0.3504***
	(1.4798)	(0.2144)	(1.4358)	(0.2258)	(1.5997)	(0.2630)	(1.5139)	(0.2311)	(1.3233)	(0.1322)
log(ODA/GDP)$_{t-1}$	0.3611**	0.0833**	0.3555**	0.0495*	0.2886*	0.0680	0.3886**	0.0877**	0.3266**	0.0283*
	(0.1672)	(0.0389)	(0.1670)	(0.0279)	(0.1747)	(0.0422)	(0.1674)	(0.0411)	(0.1623)	(0.0155)
log(Res. r./GDP)$_{t-1}$	0.3240***	0.2648***	0.3661**	0.1977***	0.4736***	0.2866***	0.3867***	0.2708***	0.3816**	0.2775***
	(0.1140)	(0.0487)	(0.1627)	(0.0260)	(0.1470)	(0.0739)	(0.1210)	(0.0395)	(0.1590)	(0.0392)
log(Trade/GDP)$_{t-1}$	0.0382	0.0236	-0.0016	-0.0803**	0.0556	0.0389	0.0012	0.0065	0.0219	-0.1844***
	(0.2399)	(0.0569)	(0.2425)	(0.0402)	(0.2588)	(0.0583)	(0.2319)	(0.0638)	(0.2492)	(0.0474)
Rule of Law	0.2158	-0.2104***	0.3039	-0.1819***	0.2567	-0.2100***	0.2798	-0.2287***	0.2802	-0.2826***
	(0.2275)	(0.0528)	(0.2479)	(0.0592)	(0.2598)	(0.0616)	(0.2613)	(0.0423)	(0.2720)	(0.0572)
log(Pop.)	0.6635***	-0.1226***	0.5460***	-0.1222***	0.5319***	-0.1293***	0.5772***	-0.1314***	0.5375***	-0.1689***
	(0.0946)	(0.0183)	(0.0924)	(0.0159)	(0.0995)	(0.0184)	(0.0910)	(0.0162)	(0.0915)	(0.0288)
log(Arable land)	0.3139***	0.0417*	0.2989***	0.0361*	0.3933***	0.0629	0.3106***	0.0363*	0.3228***	0.0494***
	(0.1101)	(0.0224)	(0.1129)	(0.0185)	(0.1395)	(0.0487)	(0.1202)	(0.0194)	(0.1099)	(0.0103)
log(rur. pop. den)$_{t-1}$	0.3122***	0.1026***	0.3090***	0.0962***	0.3467***	0.1099***	0.3149***	0.0953***	0.3174***	0.1357***
	(0.0836)	(0.0247)	(0.1049)	(0.0230)	(0.0910)	(0.0381)	(0.0896)	(0.0188)	(0.1098)	(0.0234)
Christian	-0.2580	-0.2386***	-0.1155	-0.2595***	-0.1349	-0.2561***	-0.2289	-0.1505*	-0.0700	-0.2177***
	(0.2902)	(0.0415)	(0.2665)	(0.0429)	(0.2940)	(0.0548)	(0.3066)	(0.0793)	(0.2709)	(0.0357)
Ethn. frac.			0.6021	0.3448***					0.5596	0.4670***
			(0.5138)	(0.0752)					(0.5283)	(0.0885)
No. of coups					-0.0122	-0.0058			-0.0113	-0.0070***
					(0.0207)	(0.0069)			(0.0193)	(0.0019)
Political Freedom							0.0245	-0.1263**	-0.0392	-0.1604***
							(0.1587)	(0.0637)	(0.1715)	(0.0343)
Overdispersion α	-1.5937***		-1.1607***		-1.3516***		-1.5573***		-1.1399***	
	(0.3430)		(0.3572)		(0.3067)		(0.3394)		(0.3465)	
Pseudo Log L.	-940.492		-834.806		-834.136		-821.080		-822.995	
AIC	1729.065		1715.611		1712.273		1688.161		1695.991	
N	566		566		566		566		566	
N zero	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.

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 Fairtrade intensity, while ethnic homogeneity, political stability, and institutional quality play a minor role. Here again, the relationship between initial income and the number of FTPOs points to the role of certification costs as entry barrier for some smallholders.

4 Growth Effects of Fair Trade

4.1 Empirical Model & Data

The literature review conveyed that the Fairtrade system is considered as a specific type of development assistance, based on a floor price, a price premium, and cooperative membership. To address the question whether the number of FTPOs has any significant impact on the growth rate of income in the agricultural sector and thereby on poverty, we 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). We specify a growth equation that tests the causal relationship between agricultural growth and the intensity of Fairtrade 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 Fairtrade 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.[16] 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 Fairtrade 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 Fairtrade intensity is a crude proxy of the size of the Fairtrade sector in terms of export share or employment, but it is the only data available on a country level. However, Henson et al. (2008) name the number of farmer groups supplying higher-value-crops as a widely mentioned indicator for measuring the success of integrating smallholders to higher-value supply chains. We thus are confident to provide at least an estimate of the sign and significance of $ftpo_{i,t}$ in a growth framework, and are aware that the magnitude of the coefficient has to be interpreted with particular care.

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

[16] Our sample includes also five cooperatives in Pakistan that produce sportsballs - removing them from our estimation does not change the results.

to address a possible correlation of country- and year-specific effects and the explanatory variables. Furthermore we use the Blundell and Bond (1998) system GMM estimator (BB), taking lagged levels and differences as instruments to account for endogeneity arising from serial correlation and unobservable heterogeneity. However, the system GMM estimator can be biased if the instruments 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 Christian 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) 101 of 143 eligible producer countries (see table A1 in the Appendix), where 49 countries (51 percent) have FTPOs. Brazil, Kenya, South Africa, and Peru 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 373 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 ten percent (five 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 a positive but insignificant impact of current and lagged aid on growth but a statistically significant non-linear effect for current and lagged aid. The application of an aid-growth framework on the impact of Fairtrade certification on (agricultural) growth thus turns out as a feasible approach.

As the size of the coefficients remains relatively stable across specifications (1) to (4), and using the Akaike Information Criterion as a model selection criterion, we choose the lagged quadratic specification (Column (4)) as our preferred model. The empirical evidence for increasing marginal returns to $ftpo$ is supported by Ruben et al. (2009), who report spatial externalities and multiplier effects if a certain degree of participation in Fairtrade is reached. It appears plausible that the impact of, e.g. investments in infrastructure and product quality, technical training, women's participation or educational programs arises with a time lag.

Column (5) shows the results of running OLS on the cross-section that closely resemble

those obtained for the random effects model. In Columns (6) and (7) 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 are similar to 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 apart from arable land area turn insignificant.

Table 4: *Growth regressions*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			RE		CS	FE	BB
log(agri. GDP p.c. 2006)	-0.0064	-0.0089	-0.0068	-0.0097	0.0002		-0.0106
	(0.0114)	(0.0113)	(0.0113)	(0.0112)	(0.0082)		(0.0110)
ODA $(GDP)_{t-1}$	0.0813***	0.0822***	0.0805***	0.0812***	0.0756***	-0.0337	0.0649**
	(0.0297)	(0.0301)	(0.0295)	(0.0299)	(0.0230)	(0.0585)	(0.0294)
Trade_{t-1}	0.0156	0.0185	0.0161	0.0195	0.0155*	0.0294	0.0201
	(0.0170)	(0.0170)	(0.0170)	(0.0170)	(0.0088)	(0.0765)	(0.0170)
$\text{Resource rents}_{t-1}$	0.0441	0.0446	0.0444	0.0454	0.0659*	0.1264	0.0511*
	(0.0346)	(0.0330)	(0.0342)	(0.0325)	(0.0389)	(0.0921)	(0.0298)
Rule of Law	0.0050	0.0035	0.0048	0.0029	-0.0023	-0.0310	0.0015
	(0.0094)	(0.0095)	(0.0094)	(0.0094)	(0.0080)	(0.0441)	(0.0090)
log(Pop.)	0.0102**	0.0113**	0.0113**	0.0126***	0.0114***	0.0720	0.0131***
	(0.0044)	(0.0045)	(0.0045)	(0.0047)	(0.0031)	(0.5373)	(0.0047)
Arab. land	0.0884*	0.0804*	0.0898*	0.0820*	0.0191	1.5250*	0.0879*
	(0.0491)	(0.0480)	(0.0494)	(0.0480)	(0.0303)	(0.8939)	(0.0460)
$\log(\text{Rur. pop. den.})_{t-1}$	0.0021	0.0004	0.0024	0.0006	-0.0019	0.0964	0.0010
	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0032)	(0.0902)	(0.0042)
Christian	-0.0210	-0.0196	-0.0222	-0.0206	-0.0193*		-0.0206
	(0.0156)	(0.0154)	(0.0157)	(0.0155)	(0.0101)		(0.0152)
$ftpo_{i,t}$	0.0102	0.0618**			0.0568**		
	(0.0064)	(0.0301)			(0.0273)		
$ftpo^2_{i,t}$		0.0018*			0.0016*		
		(0.0009)			(0.0009)		
$ftpo_{i,t-1}$			0.0118*	0.0694**		0.2954	0.0730**
			(0.0065)	(0.0297)		(0.2345)	(0.0301)
$ftpo^2_{i,t}$				0.0020**		0.0083	0.0020**
				(0.0009)		(0.0070)	(0.0009)
N	373	373	373	373	101	373	373
No. of Instruments							23
AIC	-675.194	-674.868	-675.801	-675.915	-379.809	-794.204	

Notes: The dep. variable is the growth rate of GDP per capita in the agricultural sector (expressed in logs). CS: Cross section; all explanatory variables enter contemporaneously; 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.

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 estimation is efficient. However, in panels with short T, the Hausman test typically 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 (7) 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.

For the regression in Column (7) we find that the quadratic $ftpo$ term is separately and jointly significantly different from zero at the five percent level. A one percent increase in the Fairtrade intensity $ftpo$ increases agricultural growth per capita by 0.0175 percentage points. Holding rural population constant, an increase in the number of FTPOs by one (equivalent to a 25 percent increase in the average number of FTPOs for this sample) implies an average increase in agricultural growth by 0.44 percentage points, raising average annual agricultural growth from 0.6 percent to 1.04 percent per year, corresponding to an implied elasticity of almost three.

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).[17] 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, Fairtrade 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 Column (7) from Table 4 (restricted to the sample when all explanatory variables are included) and then we gradually include the additional explanatory variables from the ZINB specification. Finally, Columns (6) to (8) show the estimation results for the subsamples of low-, lower middle- and upper middle-income countries.[18]

The estimation results throughout show a significantly positive impact of the lagged quadratic $ftpo$ term on agricultural growth. The parameter estimates are not sensitive to any

[17] 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.

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

of the additional variables, suggesting that our Fairtrade 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 effects for the quadratic *ftpo* term, turning significantly positive at the ten percent level for lower middle-income countries and at the one percent level for and upper middle-income countries (Columns (7) and (8)). While the magnitude of the impact for lower middle-income countries is similar to the full sample, it increases by more than 60 percent for upper middle-income countries. However, the Hansen J test for overidentifying restrictions casts doubt on the validity of the instruments for this subsample and thus on the confidence interval of the parameter estimates.

Table 5: *Growth Regressions: Robustness tests*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ftpo_{t-1}$	0.0859**	0.0850**	0.0880***	0.0811**	0.0822**	0.1808	0.0691*	0.1368***
	(0.0336)	(0.0335)	(0.0337)	(0.0332)	(0.0332)	(0.1411)	(0.0384)	(0.0498)
$ftpo^2_{t-1}$	0.0025**	0.0024**	0.0025**	0.0023**	0.0023**	0.0058	0.0021*	0.0037**
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0047)	(0.0013)	(0.0017)
log(agri. GDP p.c. 2006)	-0.0119	-0.0120	-0.0119	-0.0130	-0.0132	0.0215	0.0090	-0.0399**
	(0.0124)	(0.0125)	(0.0125)	(0.0127)	(0.0130)	(0.0372)	(0.0150)	(0.0174)
ODA $(GDP)_{t-1}$	0.0734**	0.0741***	0.0726**	0.0776***	0.0779***	0.0288	0.0763	-0.7069
	(0.0293)	(0.0286)	(0.0298)	(0.0299)	(0.0293)	(0.0558)	(0.1088)	(0.6795)
Trade_{t-1}	0.0179	0.0188	0.0183	0.0173	0.0189	0.0733*	0.0000	0.0027
	(0.0176)	(0.0174)	(0.0181)	(0.0176)	(0.0177)	(0.0397)	(0.0212)	(0.0278)
Resource rent_{t-1}	0.0567*	0.0573*	0.0581*	0.0579*	0.0608*	0.0517	0.0990**	0.0279
	(0.0308)	(0.0309)	(0.0326)	(0.0305)	(0.0322)	(0.0554)	(0.0388)	(0.0461)
Rule of Law	0.0037	0.0023	0.0022	0.0034	-0.0003	0.0758***	0.0024	-0.0212
	(0.0091)	(0.0098)	(0.0068)	(0.0091)	(0.0072)	(0.0153)	(0.0138)	(0.0132)
log(Pop.)	0.0128***	0.0128***	0.0129***	0.0132***	0.0135***	0.0061	0.0003	0.0084
	(0.0048)	(0.0047)	(0.0048)	(0.0049)	(0.0048)	(0.0145)	(0.0063)	(0.0085)
Arab. land	0.0887*	0.0953**	0.0879*	0.0784	0.0841*	0.0210	0.1354**	0.0024
	(0.0458)	(0.0446)	(0.0460)	(0.0496)	(0.0487)	(0.0615)	(0.0540)	(0.0697)
$\log(\text{rur. pop. den.})_{t-1}$	0.0009	0.0009	0.0009	0.0003	0.0002	-0.0152	0.0082	-0.0005
	(0.0043)	(0.0043)	(0.0043)	(0.0042)	(0.0042)	(0.0181)	(0.0101)	(0.0069)
Christian	-0.0259	-0.0260	-0.0260	-0.0275	-0.0280	-0.0005	-0.0023	-0.1146**
	(0.0176)	(0.0176)	(0.0173)	(0.0178)	(0.0175)	(0.0289)	(0.0148)	(0.0559)
No. of coups		-0.0006			-0.0007			
		(0.0008)			(0.0008)			
Political freedom			-0.0024		-0.0033			
			(0.0110)		(0.0109)			
Ethn. frac.				-0.0190	-0.0218			
				(0.0241)	(0.0241)			
N	357	357	357	357	357	77	138	142
p-value (Hansen)	0.630	0.659	0.624	0.710	0.750	0.341	0.735	1.000
p-value AR(2)	0.518	0.520	0.517	0.515	0.515	0.211	0.813	0.608
No. of instruments	23	24	24	24	26	19	23	23

Notes: The dep. 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. BB uses orthogonal deviations.

The estimation results suggest that the specialization in high value agricultural products (coffee, bananas or cocoa), in combination with a marketing strategy that connects consumers more closely to the producers can cause a significant increase in income. One possible explanation relates to Engel's law and the income elasticity of demand for agricultural products. As (Northern) consumers incomes rise, the proportion spent on food declines, but not necessarily the expenditures, as demand for high value agricultural products is relatively income elastic

(Byerlee et al., 2009). Demand for 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. If trading opportunities for high value food exist, its production can provide some producers and countries with important growth opportunities (Christiaensen et al., 2011; Witt, 2011). These so called 'policy and innovation rents' (Mutersbaugh, 2005) generated from the participation in Fairtrade are captured by producers with exceptional administrative capacity. With respect to the findings from the ZINB model, it should not come as a surprise to find most of them in the more developed countries in our sample.[19]

From the regressions we conclude that the positive growth effects in countries are likely to arise from cooperative membership, collective producer action, and the rewards to efficient administration and innovation, rather than from the Fairtrade minimum price and the price premium. As smallholders typically face high transaction costs and low bargaining power in factor and product markets and have limited access to public services, the formation of producer organizations allows to reduce transaction costs and to compete more successfully on domestic and international (input and output) markets.

The indirect impact of Fairtrade on poverty via its effect on agricultural growth is presumably limited, as it has been shown that agriculture is more effective in poverty reduction in low-income countries due to larger participation of poorer households in agriculture (Christiaensen et al., 2011). This implies that the Fairtrade concept has only a limited capacity to reach people at or below the 2$-a-day poverty line due to high fixed costs of participation.

Overall, the results of the empirical analysis need to be interpreted with care. Firstly, the measure of Fairtrade intensity serves only a rough proxy of actual export or employment figures in the small Fairtrade sector and 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 middle-income countries where the share of agriculture in GDP is relatively small compared to low-income countries.

Given these weaknesses we do not want to overemphasize the estimation results, but there is certainly empirical evidence that participation in Fairtrade networks has some positive on agricultural growth. As moreover (ethical) consumers experience utility from the consumption of Fairtrade certified products, and smallholders and hired labor seem to experience rewards from participation in Fairtrade cooperatives, the Fairtrade concept indeed constitutes an alternative way of outside assistance. What makes the benefits from the Fairtrade system special is that its market-based character rewards incentives, and is thus hopefully less prone to deleterious usage than other forms of foreign aid.

[19] Conditional on participation, 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.

5 Conclusions

The present paper provides a framework for a cross-country assessment of the determinants of the extensive and intensive margins of Fairtrade certification, and analyzes the impact of Fairtrade certification on growth in the agricultural sector and thus on poverty. We therefore collected data on the number of producer organizations which held Fairtrade certification for agricultural products from Fairtrade International in 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 Fairtrade certification from the number of producer organizations. The estimation results suggest that Fairtrade certification is more likely in large, resource poor, Christian countries. 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 and ethnic homogeneity. The coefficients of the quadratic initial income term, together with the positive impact of rural population density (capital intensity) and institutional quality, indicate that lower middle-income countries have the highest probability of non-zero FTPOs. Given a positive predicted probability of 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 raises the number of Fairtrade cooperatives and reflects a certain degree of cooperation across development institutions.

In order to obtain an estimate of the impact of Fairtrade certification on agricultural growth, we specify a growth regression that includes a country-specific measure of Fairtrade 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. In particular, the growth effects are significantly positive in middle-income countries, while there are only little discernible links between Fairtrade and agricultural growth in 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 least developed countries in the sample countries can not (yet) reap the benefits.

The estimation results show that the Fairtrade system is most present and effective in middle-income countries. The positive link between income and the number of producer organizations suggests that the certification fee limits the participation of smallholders in low-income countries, and also the growth effects turn out insignificant in these countries. Taking the role of agriculture in reducing poverty as given, Fairtrade certification appears to reduce poverty by raising the growth rate of the agricultural sector, but it is not able to reach producers from the poorest countries in the sample. This is a consequence from i) the very conception of Fairtrade certification, where the poorest smallholders struggle to complete the costly certification process, and ii) from the demand side that favors certain products and thus certain producers.

An important policy conclusion is that Fairtrade International needs to develop even more elaborate tools (some already exist) that facilitate entry of the poorest smallholders. This is a cornerstone in order to fulfil the 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. Governments are encouraged to establish sound property rights in order to generate an environment where both, producers and exporters, find stable conditions that permit this type of investment in business relationships.

Future research needs to analyze the impact of Fairtrade certification with respect to the different organizational forms, i.e. small producer organizations versus hired labor organizations. Intuition suggests that smallholder structures provide benefits in middle income countries, while hired labor organizations should perform better in low-income countries. Moreover, a disaggregation of the data by products is necessary. Product-level data would permit to analyze the effect when the price constraint is binding and thus to disentangle the monetary from the non-monetary benefits.

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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)	+	Nigeria	+	(0)	
Angola	+	(0)	+	Gambia	+	(0)	+	Rwanda	+	(8)	
Benin	+	(2)		Ghana	+	(14)		St. Helena		(0)	
Botswana	+	(0)	+	Guinea	+	(0)	+	Sao Tome & Principe		(1)	
Burkina Faso	+	(11)		Guinea-Bissau	+	(0)		Senegal	+	(12)	+
Burundi	+	(0)	+	Kenya	+	(54)	+	Seychelles	+	(0)	+
Cameroon	+	(3)	+	Lesotho	+	(0)	+	Sierra Leone	+	(1)	
Cape Verde	+	(0)	+	Liberia	+	(0)	+	Somalia		(0)	
Chad	+	(0)		Libyan Arab. Jam.	+	(0)		South Africa	+	(45)	+
Central African Rep.	+	(0)		Madagascar	+	(8)	+	Sudan	+	(0)	+
Comoros	+	(2)	+	Malawi	+	(8)	+	Swaziland	+	(1)	+
Congo	+	(0)		Mali	+	(7)	+	Tanzania	+	(17)	+
Congo, Dem. Rep .	+	(1)	+	Mauritania	+	(0)	+	Togo	+	(2)	+
Cote d'Ivoire	+	(14)	+	Mauritius	+	(5)	+	Tunisia	+	(4)	+
Djibouti	+	(0)		Mayotte		(0)		Uganda	+	(8)	+
Egypt	+	(6)	+	Morocco	+	(2)	+	Zambia	+	(1)	+
Equatorial Guinea	+	(0)	+	Mozambique	+	(2)	+	Zimbabwe	+	(8)	+
Eritrea	+	(0)	+	Namibia	+	(0)	+				
Ethiopia	+	(6)	+	Niger	+	(0)					
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)		Tuvalu		(0)	
Kiribati	+	(0)	+	Papua New Guinea	+	(4)	+	Vanuatu	+	(0)	+
Marshall Islands		(0)		Samoa	+	(0)	+	Wallis & Futuna Islands		(0)	
Micronesia		(0)		Solomon 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	4.64	9.795	0	77
log(GDP p.c. 2006)	7.047	1.192	4.551	9.483
GDP growth p.c.	0.031	0.05	-0.204	0.249
log(Trade/GDP)	-0.245	0.445	-1.334	0.985
log(Population)	15.666	1.993	11.124	21.014
log(Arable land/total land area)	-2.614	1.306	-7.748	-0.498
log(Rur. pop. den.)	5.827	1.124	2.27	9.326
log(ODA/GDP)	-3.082	1.12	-5.383	0.362
log(Resource rents/GDP)	-2.679	1.33	-4.605	0.73
Christian	0.5	0.5	0	1
Rule of Law	-0.507	0.67	-1.942	1.294
Ethnic fractionalization	0.49	0.256	0	0.930
No. of coups	2.671	4.853	0	20
Political freedom	2.019	0.761	1	3
Obs.		566		

Table A3: *Summary statistics: Growth regression*

Variable	Mean	Std. Dev.	Min	Max
Agri. GDP growth p.c.	0.006	0.095	-0.601	0.369
$ftpo$	-13.882	1.927	-18.659	-9.753
log(Rur. pop. den.)	5.883	1.12	2.27	8.486
ODA/GDP	0.066	0.135	-0.005	1.437
Trade/GDP	0.908	0.412	0.263	2.678
Resource rents/GDP	0.111	0.157	0	0.879
Christian	0.528	0.5	0	1
Rule of Law	-0.435	0.663	-1.835	1.294
No. of coups	1.944	4.186	0	18
Political freedom	1.938	0.751	1	3
Ethnic fractionalization	0.462	0.246	0	0.930
Arable land/total land area	0.127	0.122	0.003	0.602
log(Population)	15.584	2.151	10.829	21.014
log(Agri. GDP p.c. 2006)	5.043	0.643	3.425	6.387
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 Christian nation dummy, CIA factbook (updated and extended): 1 if either catholic, protestant or orthodox and 0 otherwise
	Ethnic fractionalization (0. . . homogeneous, 1. . . very heterogeneous)
	Regional dummies (Middle-East and North Africa, Sub-Saharan Africa, South Asia, East Asia, South East Asia, Pacific, Latin America)
	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