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What Is Brewing in Your Latté? An Economic Analysis of the Fair Trade Coffee Movement

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How can developing countries build strong governments and dynamic economies to improve the lives of their people? As a Foreign Language and International Economics major, I became intrigued by this question throughout my undergraduate studies. The focus of my research project, Fair Trade coffee, was especially interesting to me as a tool for economic development. Fair Trade represents a nongovernmental attempt to address the effects of a volatile coffee market on farmers in developing countries. Through my research, I gained a lot of experience doing statistical analysis and came up with a few surprising results. I look forward to pursuing my interests further in graduate study, followed by a career in academic research.

What Is Brewing in Your Latté? – An Economic Analysis of the Fair Trade Coffee Movement

Introduction
In late December of 2003, Ethiopian coffee farmer Hayder Hassan found himself in a grim situation:

“Three years ago you could get twice as much for a kilo of coffee as you do today...We have no factories or any other means to live here. We dream of a better price for coffee, but only the government or God can assist us.” (Oxfam America)

Beginning in the late nineties, coffee prices on the world market began to plummet to record lows. In 2002, the International Coffee Organization (ICO) published a report stating that world market prices were at a 100-year low in real terms and called the situation a “global coffee crisis.” The ICO attributed the crisis to vast overproduction fueled by the rapid rise of coffee production in Vietnam and Indonesia.

Coffee is one of the world’s most valuable traded commodities, providing the livelihood for an estimated 125 million people worldwide (Osorio, 2). In other words, a version of Mr. Hassan’s story could be repeated 125 million times over. Moreover, coffee accounts for a very large share of total exports in some of the world’s poorest countries. In Burundi, Rwanda, Uganda, and Mr. Hassan’s Ethiopia, coffee accounts for at least one fifth of total exports (International Trade Center). All four African nations have a calculated per capita Gross National Income (GNI) of $300 or less (World Development Indicators 2006). Clearly, “a ‘coffee crisis’ is therefore a crisis of development” (Ronchi, 2).

The coffee market is currently in the process of recovering from the crisis. Prices have begun to climb over the past few years. However, the effects of the coffee crisis are still being felt around the world. As Mr. Hassan dreamed of a better price for his coffee, governments and aid organizations around the world proposed various programs to alleviate poverty caused by the crisis. One such
program began to gain popularity as the crisis continued, though it had existed in some form for several decades. As coffee farmers saw coffee prices reach record lows, the demand for certain types of coffee bearing the label “Fairtrade Certified” began to take off. Each bag of such coffee, though typically more expensive than most, carried the prospect of poverty alleviation in countries hit by the coffee crisis.

The theory behind the Fair Trade movement is that certain market failures, such as lack of market power and asymmetry of information, decrease the return to farmers and increase their vulnerability to volatility in the market (Ronchi, 1). Logistically, the program involves the cooperation of four parties: the producers, the fair trade organization, the distributors, and consumers. Producers promise to uphold certain environmental and labor standards set by the Fair Trade organization in exchange for the right to call their product “fair trade certified.”

The fair trade organization sets a minimum price (above that of the market) at which distributors may purchase the fair trade products. Distributors buy these certified products at the above-market fair trade price in exchange for the right to sell the products as fair trade certified. Consumers can then purchase these fair trade labeled products, (typically more expensive than non-certified products), with the knowledge that producers were paid above market price and were required to uphold certain environmental and labor standards.

In 1997, most of the major fair trade organizations centralized the inspection, certification, and price determination process by creating the independent Fairtrade Labeling Organization International (FLO). Only coffee bearing the “Fairtrade Certified” label has been independently certified by FLO. (The term Fair Trade refers to the movement as a whole. “Fairtrade” is a registered trademark of Fairtrade Labeling Organization International, which certifies the vast majority of Fair Trade coffee.) Since the centralization of the labeling and certification process, the demand for Fairtrade coffee has risen dramatically. Since its introduction to North America in 1998, the market has grown an average of 65% per year in the US alone (Ronchi, 3). According to the International Trade forum, sales are also very strong in Europe, growing at an average rate of 20% per year since 2000.

This dramatic growth illustrates an increasing concern among consumers in developed countries for the well-being of coffee producers such as Mr. Hassan in Ethiopia. These consumers purchase fair trade coffee with the intention of helping such farmers cope with the hardships of the coffee crisis. This paper aims to discover if these good intentions are translated into sustainable relief for Mr. Hassan and the rest of the world’s coffee growers.

Because Fairtrade pays producers above the market price, some might argue that such a policy distorts the market for coffee and decreases average coffee prices in a given country. Basic supply and demand theory predicts a positive relationship between price and supply. High prices increase supply by attracting new farmers to the coffee market and encouraging existing farmers to increase their yield. The above-market Fairtrade price then provides an incentive to farmers to grow more coffee. This response not only perpetuates their dependence on coffee, but results in the overproduction of coffee, causing market prices to fall. Because the vast majority of producers do not sell to the Fair Trade market, these non-Fair Trade producers would have to suffer this decrease in price. Moreover, for those who do sell to the Fair Trade market, Fairtrade sales represent only a fraction of their yield (Ronchi, 4). Their participation in the Fairtrade market may increase the price at which they sell one fraction of their coffee, but decrease the price at which they sell the remaining fraction.

However, it is also possible for Fair Trade to have a positive impact on market price. Fair Trade encourages quality improvement among its producers. Investment in higher quality could improve profit margins, as consumers in developed countries are clearly willing to pay top dollar for a “premium” cup of coffee. Non-Fair Trade producers may be encouraged to take advantage of this premium market by their distributors. These producers could make improvements in quality without having to incur the costs of adopting Fair Trade labor and environmental standards. Fair Trade could encourage quality improvements among non-Fair Trade growers in a given country, resulting in higher market prices for coffee.

This paper will examine the following question: How does Fair Trade presence in a given country affect market prices paid to non-Fair Trade growers?

To test for the relationship between price and Fairtrade, I gathered average prices paid to growers in coffee exporting countries over the period of 1990-2006. I controlled for supply shocks (droughts), demand shocks (GDP of principal export market), and sticky price response (lagged price). I also included a time trend variable to control for overall market fluctuations.

Regression results suggest a negative relationship between equilibrium price and Fair Trade presence in a given country. Price regression analysis predicts market prices in countries with Fair Trade presence to be an average of 9.50% — 17.04% lower than in countries without Fair Trade. I also ran an export regression with the same market shock variables. Export regressions predict a positive Fair Trade effect on exports, which corresponds with the theory that Fair Trade encourages overproduction.
Background Information:
The Coffee Market and Fair Trade

1. Coffee and Coffee Exporting Countries
As many as 70 countries are exporters of coffee. Most of these nations are located in Latin America and Africa, though several Asian nations also have considerable presence in the world coffee market. These countries produce and export the two main varieties of coffee: Arabica and Robusta. Arabicas, mostly grown in Latin America, typically fetch higher prices on international markets than their Robusta counterparts (Food and Agriculture Organization of the United Nations). Arabicas are considered to have a more subtle taste than Robustas. Robustas, as the name implies, have a much more robust flavor, which some consider to be "an inferior tasting beverage with a higher caffeine content" (Coffee Research Institute). Africa and Asia produced the majority of Robustas.

The world’s coffee exporters are some of the poorest nations in the world, intensifying the considerable humanitarian implications of a coffee crisis. Over half of these countries had a 2006 per capita GNI of less than $3,595, falling into the Low Income and Lower Middle Income groups as defined by the World Bank. Only 6 coffee-exporting countries, of them Latin American, made it into the Upper Middle Income category ($3,596-$11,115 per capita GNI). No major exporter of coffee is in the highest income range of greater than $11,115 per capita. The closest country is Mexico with a per capita GNI of $7,870, still well below the lower bound for high income.

Even more telling are the figures for coffee as a percentage of total exports. Of the four countries for which coffee accounts for more than 15% of total exports, all four fall into very bottom of the Low Income category for 2006, with per capita GNI of $300 or less (International Trade Center). Burundi, in which coffee accounts for over half of total exports, is ranked at the very bottom of the World Bank GNI rankings, with a per capita GNI of $100. These developing nations are, therefore, extremely vulnerable to price volatility in the world coffee market. (See Figure 1)

Fair Trade is an attempt to address such price volatility. However, the regression results suggest that in exchange for lower vulnerability for Fair Trade growers, the program may, in fact, be causing increased vulnerability for non-Fair Trade growers by lowering the equilibrium price market price.

2. Prices, Production, and the Coffee Crisis
The coffee market is currently in the process of recovering from a decade-long crisis that caused extreme hardship for millions of farmers worldwide. In 1997, coffee exports were valued at an estimated $12 billion, second only to oil in terms of overall market value for commodities (International Trade Center). By 2001, export values plunged to a mere $4.9 billion, less than half the pre-crisis value (International Trade Center).

The recent coffee crisis was a classic case of over-production in which rapid expansion in supply outpaced demand. Figure 2 and Figure 3 illustrate the particular overproduction crisis of the coffee market. Before 1989, the world market was rigidly regulated through a system of quotas that had existed in some form since 1963 (ICO). The beginning of the 1990s represent a period of market adjustment when overall production and exports fell to a decade low of around 87 million bags by the beginning of 1995.

After declining a bit in the beginning of the decade, prices began a period of rapid growth. Such high prices and the collapse of the quota system lured new producers into the market, both in countries with historically high market shares of coffee production and in countries relatively new to the coffee market. Specifically, production in Brazil, the world’s top producer, and Vietnam increased dramatically in the mid to late 1990s. Vietnam’s market expanded so fast that by 1999 it had eclipsed Colombia as the world’s second largest producer of coffee (Food and Agriculture Organization of the United Nations).

In response, prices plunged to record lows. The very prices that had lured a multitude of thousands of producers to the market began to fall rapidly. The market had overcorrected as too many producers entered the market, causing an overproduction crisis. Averages of prices paid to coffee growers reveal an equally dramatic decrease nearly simultaneous to the large increase in coffee production and exports. Farmers in some of the world’s poorest nations faced increasingly greater hardships as the crisis wore on.
3. The Characteristics and Distribution of Fair Trade in the Coffee Market

The Fair Trade movement’s rise to prominence was simultaneous to the dramatic collapse of world coffee prices. The movement first took off in Europe in the late 1990s and was introduced to US markets beginning in 1998. In 2003, Fairtrade coffee represented as much as 2.5-3% of the coffee market in Great Britain, Switzerland, and the Netherlands. Fairtrade’s share in the US coffee market was about 1% for the same year. However, as the world’s largest importer of coffee with an industry valued at $22 billion, 1% is nonetheless a considerable amount (Transfair USA 2007). Fair Trade’s market share continues to expand; the latest figures estimate a 3.31% market share in the US for 2006 (Transfair USA 2007).

Fair Trade guarantees farmers a certain minimum price for coffee. For Arabica coffee, the minimum price is $1.21 per pound. Beyond the minimum price, Fairtrade requires an additional $0.10 per pound Fairtrade premium to be allocated for use by the coffee cooperative for various development projects. When the price of Arabica coffee on the New York Board of Trade (NYBT) exceeds $1.21, the Fairtrade price is then equal to the NYBT price plus an additional $0.10 (FLO 2007).

Fairtrade is heavily concentrated in Arabica-exporting countries. Of 33 Arabica-exporting countries, 25 have at least one Fair Trade cooperative. Of those 25, 22 have had Fair Trade cooperatives operating within their borders since 1999. Of 23 Robusta-exporting countries, only ten have Fair Trade presence. Eight out of those ten also export Arabica.

Arabica production is concentrated in Latin American, a region that has a long tradition of coffee cultivation. It is home to both the largest number of Fairtrade cooperatives (199 in 2006) and the largest number of countries that export Fairtrade coffee. Mexico has the greatest number of cooperatives selling Fairtrade coffee, 41 total in 2006. Fairtrade cooperatives exist in 14 Latin American countries, six of which are home to at least 15 Fairtrade cooperatives (Transfair USA 2007).

African countries were home to 32 Fairtrade cooperatives in 2006. Nearly all of these countries are in the World Bank’s Low Income category in terms of 2006 GNI per capita. Moreover, coffee accounts for a large fraction of total exports for these African nations.

Asian countries have the smallest number of Fairtrade cooperatives. Indonesia and India have very few cooperatives as compared to Latin American countries such as Guatemala with similar production figures. Vietnam, the world’s second largest exporter of coffee, has no Fairtrade presence at all.

Variables and Data Sources

I pooled average price and quantity data from the International Coffee Organization historical statistics database for 33 Arabica-exporting countries from 1990-2006. Due to the heavy concentration of Fair Trade in Arabica-exporting countries, I chose to restrict my analysis to Arabica production only. Moreover, most Robusta-exporting countries that are home to Fair Trade cooperatives are also exporters of Arabica.

The two dependent variables are average price and average quantity. Average price is the average market price paid to growers in each country in a given year. Quantity is the amount exported by each country in a given year measured in standard 60 kg bags.

As previously noted, there are two main varieties of coffee: Arabica and Robusta. Most countries specialize in either one or the other. There are several countries that export a mix of both varieties (ICO). However, export data broken down by coffee variety were not available for periods prior to 2006. For these countries, I used ICO
export data from 2006 and 2007 to calculate the percentage exported of each variety. I then extrapolated these percentages to the preceding years to estimate quantities of each variety exported over the entire time period. Though Arabica and Robusta are priced differently, prices for both varieties tend to fluctuate together as a function of the coffee market as a whole. Relative prices tend to remain fairly similar. Consequently, there is little incentive to substitute one variety for the other when both varieties maintain the same price relative to each other. As a result, I concluded that export percentages should be relatively constant over time.

Table 1 and Table 2 present descriptive statistics for price and quantity. Clearly, there is considerable variation in both variables. The minimum price over the entire time period was a rock bottom 12.9 cents per bag in Madagascar at the height of the coffee crisis in 2001. The maximum price was $3.55, twenty-seven times that figure, paid to Jamaican growers in 2006. However, Jamaican coffee is highly specialized (Coffee Research Institute). Coffee prices in this Caribbean nation are typically two to three times the average price paid for coffee produced in other countries. A more accurate figure is the 1997 figure for Kenya, $1.85 per bag when coffee prices peaked just before the coffee crisis.

Exports exhibit an equally wide variation. Brazil is the dominant producer in the world, producing nearly twice as much as the second largest producer, Vietnam. The top 20 producers excluding Brazil exported an average of 3,012,312 bags per country in 1997 when prices reached their decade high. That figure barely budged when prices reached record lows in 2002, when producers exported an average of 2,969,595 bags. Clearly, supply response was quite delayed in the face of falling prices.

The independent variables include controls for supply shocks (droughts), demand shocks (the GDP of the principal export) and the variable of interest, Fair Trade.

I pooled drought data from the International Emergency Disasters Database. The severity of the drought is measured by the estimated number of people affected by drought annually in each country. Ideally, other sources of supply shock, such as changing prices of fertilizers and pesticides, would also be included. However, data was unavailable for these types of supply shocks.

To control for demand shocks, I collected GDP data (real US dollars (USD)) in the principal export market for each coffee exporting country from the Penn World Tables. I identified the principal export market based on geography. The United States imports the bulk of coffee produced in the Western Hemisphere. Therefore, I designated the United States as the principal export market for Latin American and Caribbean countries.

The exception is Cuba. Due to the American embargo, Cuba’s principal export market is not determined by geography. Asian countries export most of their coffee to Japan. African countries’ main export market is Europe, whose top three coffee importers are Germany, Italy, and France. I combined the real GDPs for these three countries as a measure of the principal export market for African nations.

Fair Trade data were gathered from Fairtrade Labeling Organizations International and Transfair USA. Unfortunately, specific yearly export data were not available for all countries with Fair Trade. Consequently, the Fair Trade variable is a dummy variable whose value is 1 if Fair Trade was present in a given country in a given year and 0 if Fair Trade was not present.

| Table 1 |
| Price ($0.10 USD) |
| Mean | 77.39 |
| Standard Error | 2.34 |
| Median | 64.23 |
| Standard Deviation | 49.70 |
| Range | 341.97 |
| Minimum | 12.92 |
| Maximum | 354.89 |
| Count | 453 |

| Table 2 |
| Exports (60kg bags) |
| Mean | 1,757,887 |
| Standard Error | 163,963.5 |
| Median | 522,490.5 |
| Standard Deviation | 3,883,547 |
| Range | 26,749,980 |
| Minimum | 3,014 |
| Maximum | 26,752,994 |
| Count | 561 |

Methodology
I first pooled average prices and quantities for coffee exporting countries over the period of 1990-2006. I chose to begin collecting data in 1990 because prior to the nineties, members of the ICO participated in a quota system that limited exports. Therefore, 1990 marks the first year in which market forces began to take control of the coffee industry.

I ran two different types of regressions to evaluate the effect of Fair Trade on market prices paid to growers in a given country. The first type of regression is an
Ordinary Least Squares (OLS) regression:

\[ P = B_0 + B_1 P_{c-1} + B_2 D_t + B_3 FT_t + B_4 GDPEX_t + B_5 TRD_t + B_6 TRD^2_t + \epsilon_t \]

Price \((P)\) is the dependent variable. Clearly, many things could affect the market price for coffee in a given country other than Fair Trade: weather, prices of inputs (fertilizer/pesticides), and demand for coffee. I wished to isolate the effect of Fair Trade on market prices, holding all of these other factors constant. The OLS regression does just that. The drought and export market variables serve as “control” variables, allowing me to analyze the effect of Fair Trade by itself.

The variables on the right side of the equation are the independent variables discussed in the previous section \((D = \text{drought}, \ FT = \text{Fair Trade}, \ GDPEX = \text{GDP of main export market})\). The coefficients represent the effect of a 1 unit change in the independent variable on the dependent variable \((price)\). If \(B_2 = .005\), then a $1 increase in the GDP in the main export market results in a $.005 increase in the average price paid to growers. However, as evident from Table 1, there is huge variation across countries in prices paid to growers. A $.005 increase in price in high-end Jamaican coffee is quite different from a $.005 increase elsewhere. Consequently, I chose to evaluate percentage changes in price rather than absolute changes. \(P\) is, therefore, the log of the average price paid to coffee growers for a given country in a given year. The \(B\)’s then are the percentage changes in price resulting from a 1 unit change in each corresponding independent variable.

There are several other independent variables included in the regression, to further control for factors influencing price other than Fair Trade. \(P_{c-1}\) is the lagged price, or the price paid to growers in the previous year. Average prices in commodities markets tend to be fairly sticky due to market shocks. For example, a drought causes lower yields, driving up market prices. If a drought causes prices to be higher than average in one period, we might expect the effects of the drought to continue to affect prices during the next period. Even if the drought itself has ended, coffee tree stocks might be depleted and seed quality may have gone down. The effects of the drought are, therefore, endured well after the first good rain. Including the lagged price implicitly controls for the longer term effects of such market shocks.

The last two independent variables (\(TRD\) and \(TRD^2\)) are trend variables. I included these variables to control for overall market trends caused by factors that may not be included in the regression. It is also likely that instead of following a straight line, these market trends may follow a more curved pattern over time. The squared term allows me to analyze the possibility of such a curved, parabolic pattern.

OLS allows for the inclusion of “control” variables such as drought, last year’s price, and market trends. These factors vary both across countries and over time. However, there are many factors that vary across countries and do not change over time (or changes are insignificant given the length of the time period). These “fixed effect” factors could include any number of things: geography, form of government, or even the cultural importance of coffee.

Any of these “fixed effects” could cause average prices to be lower in some countries than in others. In these countries, farmers have more to gain by applying for Fair Trade certification and taking advantage of the guaranteed minimum price. Therefore, countries with lower than average prices resulting from such a “fixed effect” are more likely to have Fair Trade. In such a case, this “fixed effect” is interacting with the Fair Trade variable and distorting the estimated coefficients in the OLS regression.

For example, in a given country, coffee may be quite culturally important. It has been grown by generations of farmers passing down cultivation techniques over many years. When faced with falling prices, these farmers may be less likely to diversify away from coffee to a more profitable crop. This cultural inertia further aggravates falling prices, causing average prices to be lower than in a country in which coffee has no particular cultural importance. Lower average prices encourage farmers to apply for Fair Trade and receive the minimum price. This “cultural fixed effect” is then correlated with Fair Trade, but is not controlled for in the OLS regression. Resulting estimated Fair Trade coefficients are therefore inflated.

A fixed effects regression solves this particular problem. The basic fixed effects regression model is shown below. This type of regression looks similar to OLS, but keeps track of each specific country over time. In doing so, the regression isolates the effects of factors that change over time and controls for those that do not. As a result, any fixed effect that is causing lower than average prices will no longer distort the estimated coefficient for Fair Trade.

\[ P = B_0 + B_1 P_{c-1} + B_2 D_t + B_3 FT_t + B_4 GDPEX_t + B_5 TRD_t + B_6 TRD^2_t + \epsilon_t \]

I also ran several more regressions in which I restricted the data to specific time sub-periods. Such restrictions also allowed for a more precise fit of the time trend variable. The first restricted regression includes only data from 1997-2006. During this time, prices followed a fairly parabolic path. During 2000-2004, the trend appeared to be even smoother. However, such an approach involved a tradeoff between the fit of the time trend and the number of observations. Each additional restriction decreased the sample size, perhaps causing accuracy to diminish somewhat.
Results

1. Price
The price regressions reveal several key relationships between average price and Fair Trade presence in a given country. Most strikingly, there appears to be a negative correlation between price and Fair Trade presence. Though restricting the time period does cause the estimated coefficients to decrease in significance, the coefficients are consistently negative in all regressions. Additionally, it appears that prices changes, rather than structural differences, are the major force behind Fair Trade presence in a given country. The estimated coefficients for Fair Trade are quite similar between OLS and fixed effects for all time periods, with the exception of the period from 2000-2004.

Restriction of the time period as well as the inclusion of a time trend reveals that the simultaneity of a negative price trend and the rise of Fair Trade had some impact on the estimated percentage decrease in price. The second regression predicts a 17.04% lower average price in countries with Fair Trade presence as opposed to those without. The magnitude of the estimated percentage in price difference is cut in half when the time period is restricted to 1997-2006. Such a restriction allows for the isolation of the crisis of the mid 1990s followed by the current partial recovery. This pattern of price change is clearly illustrated by the positive coefficient on the squared time trend variable.

In addition, possible fixed effects such as form of government and cultural importance of coffee do not appear to be very strong. In the first three regressions, the estimated coefficients from OLS are fairly comparable to those predicted by the fixed effects regression. However, the fourth regression reveals an entirely different result.

I chose the time period from 2000-2004 as an additional attempt to smooth the effects of the coffee crisis on the estimated coefficient for Fair Trade.

First of all, the estimated percentage decrease in price resulting from Fair Trade jumps to 35.33%, nearly twice that of the second regression (1990-2006). This time subset represents a phase in which world coffee prices hit their decade low. It is not surprising that a regression that isolates the bottoming out of the market would show such a strong negative correlation between Fair Trade and average price.

Secondly, the fixed effects regression estimates a price decrease of nearly three times the decrease that is estimated by the corresponding OLS regression. For this particular time period, it appears that possible fixed effects are having quite a large impact on Fair Trade. Moreover, the fraction of variance due to fixed effects in this regression is quite high (.869) as compared to the first three regressions.

However, it is important to consider the fact that less dramatic price fluctuations may cause the OLS estimates to be less precise. Additionally, accuracy may be diminished due to a smaller number of observations.

The remainder of the independent variables appear to have fairly predictable effects on price, indicating a good overall fit of the regression. The lagged price is consistently positively correlated with the price at a very high degree of statistical significance. This result is quite logical. Market prices are typically correlated over time. If a negative shock causes prices to be lower than average in one period, we might expect the effects of the shock to continue to negatively affect prices during the next period. Similarly, the effects of a positive shock in the previous period may continue into the current period.

The estimated coefficients for the GDP of the main export market are all positive, though not statistically significant in all regressions. This result is also expected. Growth in the main export market of a given country will likely increase the demand for the export. Increased demand shifts the demand curve to the right and increases price.

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<tr>
<td></td>
<td>OLS</td>
<td>FE</td>
<td>OLS</td>
<td>FE</td>
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<tr>
<td>lagged log price</td>
<td>.7797 (.0367)**</td>
<td>.6290 (.0438)**</td>
<td>.7387 (.0452)**</td>
<td>.4393 (.0590)**</td>
</tr>
<tr>
<td>drought (per 100,000,000 affected)</td>
<td>-.1030 (.0374)**</td>
<td>-.1180 (.0380)**</td>
<td>-.1070 (.0409)**</td>
<td>-.0948 (.0369)**</td>
</tr>
<tr>
<td>fair trade</td>
<td>-.1653 (.0414)**</td>
<td>-.2008 (.0580)**</td>
<td>-.1895 (.0486)**</td>
<td>-.1704 (.0562)**</td>
</tr>
<tr>
<td>GDP main export mkt ($100,000,000 USD)</td>
<td>.00012 (.00008)</td>
<td>-.00089 (.00053)</td>
<td>.00013 (.00008)</td>
<td>-.00100 (.00038)</td>
</tr>
<tr>
<td>time trend</td>
<td>.0643 (.0250)**</td>
<td>.1076 (.0237)**</td>
<td>-.9848 (1.054)**</td>
<td>-.9742 (.1003)**</td>
</tr>
<tr>
<td>(time trend)$^2$</td>
<td>-.0038 (.0015)**</td>
<td>-.0080 (.0015)**</td>
<td>-.0420 (.0044)**</td>
<td>-.0390 (.0042)**</td>
</tr>
</tbody>
</table>

Each pair of columns represents a different regression. *Indicates statistical significance at the 1% level. ** Indicates statistical significance at the 5% level.
The surprising result is the negative coefficient for drought. One expects a drought to cause the yield to go down for an agricultural commodity, shifting the supply curve to the left and increasing the equilibrium price. This unexpected result brought into question the regression as a whole. As a result, I ran all of the regressions without the drought variable. However, the coefficients and standard errors on the other independent variables were practically identical. The coefficient is consistently positive (and statistically significant in the first and second regressions) and appears to have no adverse effects on the other variables. Therefore, I kept the drought variable in the regressions.

One theory for the cause of this counterintuitive regression coefficient stems from the idea of product quality. Perhaps many of the droughts were not severe enough to cause the crop to fail, but instead caused the quality of the crop to decrease substantially. When it came time for harvest, distributors were unwilling to pay a high price for an inferior product.

2. Exports

As noted in the data section, the overall change for exports between 1990 and 2006 was a slow but sustained positive trend. It seems that, faced with falling prices, producers had difficulty responding to market signals. The export regressions in general do not fit the data as well as the price regressions. Many of the estimates vary significantly across regressions in magnitude, statistical significance, as well as sign. However, there is a clear positive coefficient on Fair Trade in almost all of the regressions, which corresponds to the negative Fair Trade coefficient in the price regressions.

This result is consistent with the idea that Fair Trade provides a disincentive for coffee farmers to respond to market fluctuations. Instead of substituting production by diversifying their crop, a guaranteed high price encourages producers to keep producing at present levels.

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<tr>
<td></td>
<td>OLS</td>
<td>FE</td>
<td>OLS</td>
<td>FE</td>
</tr>
<tr>
<td>lagged log price</td>
<td>.8588 (0.0321)**</td>
<td>.2052 (0.0459)**</td>
<td>.8588 (0.0321)**</td>
<td>.1814 (0.0422)**</td>
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<tr>
<td>drought (per 100,000,000 affected)</td>
<td>-.1300 (0.0477)**</td>
<td>.0958 (0.0369)**</td>
<td>.1300 (0.0477)**</td>
<td>.1620 (0.0537)**</td>
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<td>fair trade</td>
<td>.1834 (0.0670)**</td>
<td>.1834 (0.0670)**</td>
<td>.2113 (0.0648)**</td>
<td>.0363 (0.0570)**</td>
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<tr>
<td>GDP main export mkt ($100,000,000 USD)</td>
<td>.00012 (0.00008)</td>
<td>-0.00114 (0.00030)</td>
<td>.00035 (0.00016)</td>
<td>.00036 (0.00045)</td>
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<td>time trend</td>
<td>-.0786 (0.0062)</td>
<td>-.0047 (0.0249)</td>
<td>-.0272 (0.1243)</td>
<td>-.1150 (0.1118)</td>
</tr>
<tr>
<td>(time trend)$^2$</td>
<td>.0029 (0.0033)</td>
<td>.0022 (0.5754)</td>
<td>-.0013 (0.0054)</td>
<td>-.0013 (0.0047)</td>
</tr>
</tbody>
</table>

Each pair of columns represents a different regression. *Indicates statistical significance at the 1% level. **Indicates statistical significance at the 5% level.

Side by side comparisons of OLS and fixed effects regressions provide little explanation for the relative importance of fixed effects in determining the export volume of a given country. In the first and third regressions, the estimated coefficient for Fair Trade decreases. In the second and fourth regressions, the difference is just the opposite.

For reasons of symmetry and comparison, I ran the same series of regressions for both price and exports. However, because producers did not respond to the coffee crisis by drastically reducing output, trends in average export volumes did not mirror those of average price. Consequently, there is less need to restrict the time period in an attempt to smooth volatility in the dependent variable.

The fourth regression predicts some surprising effects, most notably a 51% decrease in exports due to Fair Trade. This value is not only the opposite sign but also more than twice the magnitude of all other estimates. However, the overall R$^2$ value reveals that the fourth regression explains only 19.11% of the variation in exports. The other three regressions produced R$^2$ values ranging from .4230 to .9449. Additionally, as noted with the corresponding price regression for this time period, the dependent variable did not vary substantially during this time period. Consequently, the signs and especially the magnitudes of the estimated coefficients in the fourth regression should be interpreted with caution.

Conclusions

There appears to be some evidence of market distortion in coffee exporting countries with Fair Trade presence. Price regressions predicted Fair Trade to have a negative impact on average price paid to growers. Export regressions, though weaker overall, predicted Fair Trade to have a positive impact on total exports. Together, these results are symptomatic of a market distortion that encourages overproduction.
However, the magnitudes of the estimated coefficients for Fair Trade appear unrealistically large (9.5% — 35.3% lower prices on average in countries with Fair Trade). It seems that if Fair Trade were causing such huge price decreases, there would be more opposition among non-Fair Trade growers or the governments of such countries. Part of the explanation may be the direction of causation: a negative shock causes prices to fall and farmers to apply for Fair Trade certification. The negative shock encourages the entrance of Fair Trade via falling prices. Nevertheless, one would hope that the data set used in this paper (33 countries over 17 years) would be large enough to eliminate such effects.

Another explanation is the limitation of the Fair Trade to a qualitative variable due to data constraints. Consequently, there was no measure of the amount of Fair Trade presence in each country. In 2006, Mexico had 41 Fair Trade cooperatives, while Cameroon had only two. These two countries were weighted equally in the regression, perhaps causing the estimated coefficients to be inflated. Some of this discrepancy is due to the large difference in export volume. However, there may be other relevant effects to identify. If data could be found on the number of cooperatives and the total volume of Fair Trade exports in each year, one could include some measure of the magnitude of Fair Trade in each country (controlling for the size of the coffee industry). Such a modification of the Fair Trade variable would likely lead to a more accurate estimation of the degree of influence on equilibrium price and quantity.

By no means does this paper provide a definitive conclusion as to the overall value and effectiveness of Fair Trade as a development tool. It merely suggests that when designing and implementing a program such as Fair Trade, it is important to take a more comprehensive approach to evaluating overall success. It is not enough to simply consider those who participate and benefit directly from Fair Trade.

Furthermore, the regressions in this paper are straightforward equilibrium price and quantity regressions. Additional considerations, such as social benefits and effects on areas outside the coffee market, are not included in this analysis. More research is needed to fully measure the overall economic and welfare implications of Fair Trade. Some inclusion of social welfare is clearly necessary. Furthermore, there are other aspects of this recent economic phenomenon yet to be explored. If Fair Trade producers are paid above market price, why haven’t more producers chosen to participate? What is preventing the mass conversion of traditional production to Fair Trade production? It would be interesting to do country-specific analyses as well as overall market analyses to better address these issues.

Clearly, there is a need to address the plight of farmers who depend on coffee for the livelihood of their families. The daily hardships endured by Mr. Hassan in Ethiopia represent an opportunity for development projects to alleviate his suffering along with that of coffee farmers around the world. Fair Trade’s goal is a noble one: directly helping farmers who are vulnerable to the volatile coffee market. This paper reveals that the key to lasting poverty alleviation for coffee farmers is more complex than it appears. However, by no means is it beyond human capability. It is likewise significant that so many consumers in developed countries are willing to purchase coffee with the intention of helping a farmer halfway around the world. This raised awareness is an encouraging first step.

Works Cited/Data Sources
Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006.