

The Effect of Textile Firms on Crime Rates

Samantha Dabney

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Abstract:

This paper looks at how the availability of low-skilled labor affects the crime rates in Turkey. Specifically, the textile industry in Turkey because evidence shows it has been experiencing growth since the 1995 Agreement on Textile and Clothing. Textile firms are measured by the intensity in the area by looking at three different ways: labor, wages, and investment. Crime is separated into six different types of crime and the 81 different provinces in Turkey was divided into 26 different zones. The paper provides an insight into how the textile industry might help developing countries provide a better life for individuals. The paper finds an increase in labor, wages, or investment leads to an increase in crime committed. It seems the textile industry does not affect either migration, GDP per capita, or the average wage, that there is another variable that was not accounted for in this paper.

Developed countries, like the United State, view low-skilled labor as undesirable. However, in developing countries these low-skilled jobs can be viewed as more desirable since the alternative is limited. This paper asks the question do low-skilled labor opportunities affect crime rates in Turkey. Specifically, the Turkish textile industry because that sector has experienced large growth rates since 1995. To approximate for the size of the local textile industries three related measurements were used: wages, labor, and investment. The number of textile firms was not used because it does not account for the intensity of which the textile industry is present in the area. Which the three measurements use do account for the size and intensity of the presence of the textile industry. Crime, the number of convicts received into prison, is also separated between six different types of crime to get an idea of what drives the overall effect. Crime is chosen because there are several factors that could cause crime to increase or decrease.

One way crime could decrease is as the textile industry provides jobs for low-skilled labor it provides a steady income. When the low-skilled labor has a steady income it allows them to provide for themselves or family. This could reduce crime because people don't feel the need to commit a crime since they have a steady income. Blau (1982) looked at if there was a linkage between crime and poverty in the United States in 1970. The authors find as income inequality increases, so does violent crime like murder, rape, robbery, and aggravated assault.

On the other hand, crime could also increase if the low-skilled labor opportunities in the area increase, this could provide an incentive for migrants to move to that area. If there are more migrants who move to that area then there are labor opportunities, people can become unemployed. This can lead to an increase in crime since unemployment in an area could increase and could cause those people to become desperate and commit crime because they now don't have a steady income for themselves or family. Harris and Todaro (1982) looked at how urban wages affect rural individuals. They find an increase in urban labor opportunities might increase urban unemployment as more rural individuals migrate to the urban areas.

Turkey provides a good case study because of a 1995 policy change that increased growth in the textile industry. The Agreement on Textile and Clothing (ATC) maintained the pattern of bilateral quotas imposed by successful developed-countries like the US, EU, and Canada. While also introducing a fixed timetable for the removal of the quotas. Overall the main

goal of the ATC was to provide “protection to import-competing producers of these products in the importing countries.” (Conway 2013) This created an unexpected niche in the market, which Turkey was a beneficiary of. The removal of the quotas allowed Turkish textile firms to be competitive with low-cost producers like East and South Asia. Table 1 in the appendix is from the World Bank and shows the percent value added from the textile industry from the World Bank in 1995 is 16.7 percent. This number grew to 18.7 percent in 2006, showing that there was an increase in the textile industry in Turkey.

The results suggest that an increase in the intensity of the textile industry in an area increases crime. While crimes like theft, bribery, and firearms and knives are never significant, crimes such as assault, sex crimes, and total are significant. Underlying channels are a concern when it comes to the output, however, checking migration, GDP per Capita, and average overall and textile wages show that there is no underlying channel. The underlying channel that is affecting crime rate does not appear to be accounted for in the regression that is run.

The contribution of this paper is that there has been little to no literature on how the availability of textile firms in an area affects crime. This paper is also important to developing countries because if the textile industry could provide a steady income for low-skilled and low-income labor, which can help them provide for their families and also help economic growth in a zone. Table 2 in the appendix is from the World Bank and compares the Turkish textile industry percent value added to the United States, Bangladesh, and Indonesia. Bangladesh and Indonesia were picked because they are known to have a large textile industry. From 1995 to 2006 Turkey is the only country that increased in the percent value added in the textile industry. In 2006 Turkey was the second highest in the percent value added, only behind Bangladesh who has 19.8 percent. However, Bangladesh has had a significant decrease with their percent value added being 44.5 percent in 1995.

Literature Review

The majority of literature regarding inequality and crime in an area find a linkage between poverty and wages and crime. While they all look at crime and poverty, they each take a different approach. Bellair (2003) looks at how the conditions of labor markets affect violent adolescent delinquency. By using a “design-based” survey analysis the authors find there is a direct effect of the condition of the labor market and violent delinquency. The authors

specifically finds the low-wage service sector has a strong effect on adolescent delinquency. Bourguignon (2000) looks the increase in crime and violence and high inequality and low growth in developing countries, specifically in the Latin Americas. The author finds an increase in poverty or income inequality can increase crime rates. Kelly (2008) also looks at the relationship between inequality and crime but focuses more on the different incentives, pressures, and deterrents people face. The author uses a log-linear model and finds property crime is unaffected by inequality but influenced by poverty and police activity.

The majority of the literature regarding the textile industry looks at trade effects and foreign direct investments. Conway (2013) looks at trade in textiles and apparel and the 1995 Agreement on Textile and Clothing (ATC) in Turkey. The authors choose Turkey because the data suggests the textile and apparel industries are one of the sources for the increase in economic growth. The 1995 ATC maintained the bilateral quotas patterns by importing countries on the developing country exporters who are the most successful and provided a fixed timetable to remove the quotas. The authors use a difference-in-difference regression and found firms goods that were included in the ATC grew faster in real sales revenue and employment. Hu Jefferson (2002) focuses on medium and large firms in China's electronic and textile industries and the effects FDI has on the firm size and productivity. The authors use a FDI-augmented production function and find in the short run, FDI tends to reduce productivity and market share, however, it seems to disappear in the long run. Ruan and Zhang (2014) also look at the textile industry in China, but they focus on the "flying geese", which was introduced by a Japanese economist in 1962 who described the process of late industrialized economics catching up to the rest of the world. The authors want to test this theory on China's textile and apparel industry since both Europe's and East Asia's industrialization started with the textile industry. They find there is evidence the textile and apparel industry in China has begun shifting from the eastern coastal regions to the western regions. The paper suggests there is a "flying geese" pattern started domestic industrial migration in middle of the 2000s.

Data and Estimation Strategy

The panel data for this paper comes from the Turkish Statistical Institute and looks at the year 2007 to 2017. Turkey has 81 different provinces, which are divided up into 26 different zones. Figure 1 in the appendix shows the 26 different zones that Turkey is broken up into, each

color represents a different zone. Istanbul is labeled for a point of reference. To estimate the following equation is used.

$$\log(\text{Crime})_{it} = \beta_0 + \beta_1 \log(\text{Textile})_{it} + \beta_2 X + \theta_t + \theta_i + \varepsilon_{it}$$

Where θ_t from the regression is the time fixed effect and θ_i is the region fixed effect. Crime is the six different crime types used: sex crime, assault, theft, bribery, firearms and knives, and total crime, and the measurements for the three different indicators for the textile wages: percent of wages in the textile industry, percent of investment in the textile industry, and the percent of labor in the textile industry. X include the control variables migration, illiteracy rate, tourism, population density, GDP per Capita, unemployment rate, and the gender ratio. Both crime and the textile indicators were logged, along with GDP per cap, population density, and tourism. ε_{it} is the random error term.

The independent variable is the textile industry, which is described as manufacturers of textile firms, wearing apparel firms, and leather and related firms. The total number of firms is not used because this paper wants to look at the intensity of the textile industry in each zone, the total number of firms in a zone doesn't account for the size of the firm. The textile industry is measured by three different indicators: relative wages, the share of workers employed, and relative investment flows. These indicators are more accurate than just looking at the number of firms in the area because it factors in the size and intensity of textile firms in an area. Table 3 in the appendix provides a description of each variable used in the paper.

Crime is the dependent variable and is defined as the number of convicts received into prison, instead of the number of crimes committed, and looks at six different types of crime: assault, theft, bribery, firearms and knives, sex crimes, and total crime. While omitted variable bias is a concern with the crime data, it is controlled by the time and zone fixed effect in the regression. Table 4 in the appendix provides the summary statistics for all variables, on average Turkey has 4,812 people per zone received into prison for all crimes in a given year. On average, each zone's labor force consists of almost five percent in the textile industry and each invests a little over five percent of total investment in the textile industry. The average percent of wages come from the textile industry is six and a half percent.

While the textile industry and crime is the main focus in the paper, there are several different controls are used. Definitions and summary statistics for all the control variables are

described in Table 3 and Table 4 in the appendix. From this, a regression is run to determine the effects that the textile industry has on crime rates in a zone.

Results and Underlying Channels:

Table 5 in the appendix provides the regression outputs, where the standard deviations are in parenthesis. From the outputs theft, bribery, or firearms and knives were never significant for any of the textile industries. Sex crime is significant for the percent of textile labor force and the percent of textile investment. A one percent increase in the percent of either the textile labor force or the textile investment results in a .058 and .251 percent increase in the number of sex crime in a zone. However, sex crime was not significant for the percent of textile wages. Assault was significant for all three of the textile indicators. A one percent increase in either the percent of textile labor, investment, or wages resulted in a .035, .061, and .145 percent increase in the number of assault crime in a zone. Overall, total crime was not significant for the percent of textile wages but was significant for the percent of textile labor force and highly significant for the percent of textile investment. A one percent increase in either the percent of textile labor or investment resulted in a .032 and .191 percent increase in the total number of overall crime in a zone. Total crime also appears to be driven by assault crimes. However, underlying channels could be affecting the outcome of the regressions.

To account for the possibility of underlying conditions several regressions using control variables. The control variables that were chosen were migration, GDP per cap, and both the average textile wage and average total wage. The regressions that were run are as followed, θ_t is the time fixed effect, θ_i is the zone fixed effect, and ε_{it} is the random error.

$$Controls_{it} = \beta_0 + \beta_1 \log(Textile)_{it} + \beta_2 X + \theta_t + \theta_i + \varepsilon_{it}$$

Where controls are the percent of migration, log of GDP per Capita, and the log of both the overall average wage and the average textile wage. Textile is the three different measurements for the textile industry: wages, labor, and investment, however for the two average wages regression the percent of textile wages measurement was not used due to correlation. X are the control variables which are the same for the original regression. However migration was taken out for the migration regression, GDP per Capita was taken out for the GDP per Capita regression and both the average wages regressions.

These regressions are run to check to make sure that there are no underlying channels that could be affecting the output of the original regression. Migration was considered since an increase in migration could cause an increase in crime if there isn't enough work for all the migrants, as talked about before. GDP per cap and average textile and total wages were selected because a decrease in overall wealth in an area would cause an increase in crime. Table 6 in the appendix provides the results from the regressions. If an underlying channel was present for migration, it would be expected that there was a positive relationship between the textile industry and migrations. However, there are no significant results coming from the regressions. An underlying channel being present for GDP per cap, the average total wage, and the average textile wage if the regression shows a negative relationship between the textile industry and GDP per cap or average wages. However, GDP per cap is never significant, while average total wages are significant for the percent of the textile labor force, and the average textile wage is highly significant for the percent of textile investment. Though both of the relationships are positive, only strengthening that there is no underlying channel between the textile industry and the average total wage and average textile wage. These findings show that textile firms do not have any effect on these variables, suggesting that there is another channel at work that is not accounted for.

Conclusion:

Since 1995 the Turkish textile industry has seen a large amount of growth. This paper looked at if this growth in the textile industry had any effect on the crime rates. It found a percent increase in labor, wages, and investment in the textile industry leads to a percent increase in a zone the total number of crime. This paper was one of the first to try to connect crime rates and low-skilled labor. Future research into the linkage between crime rates and low-skilled labor could be checking to see if the results found in Turkey hold the same in other countries. Specifically, countries that are more known for the textile industry, such as Malaysia and Indonesia. Looking into the underlying channels through crime rates are affected is another interest that could be explored, along with looking at other low-skilled labor industries such as the service industry.

Appendix:

Table 1: Textile Industry in Turkey

Turkish Textile Industry		
	1995	2006
Percent Value Added	16.7	18.7

Table 2: Turkey vs Other Countries Textile Industry

Textile Industry % Value Added		
	1995	2006
Turkey	16.7	18.7
US	4.5	2.2
Indonesia	18.8	13.1
Bangladesh	44.5	19.8

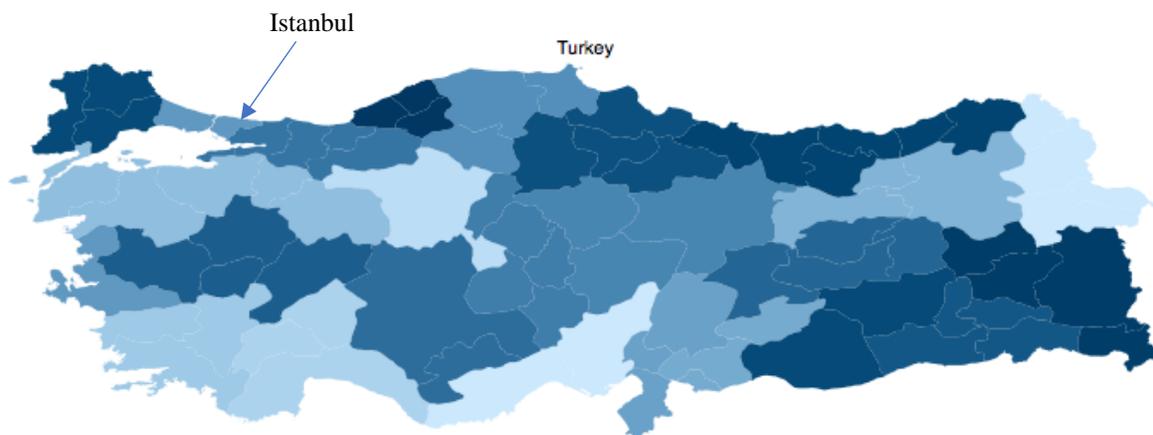
Figure 1: Map of Turkey in 26 Zones

Table 3: Variable Descriptions

Variable	Description
Textile Industry	Includes manufacturers of textile firms, wearing apparel firms, and leather and related firms
Crime	The number of convicts received into prison
Percent Textile Labor Force	The total number of people who work in a textile firm divided by the total labor force of a zone
Investment	The total number invested of a year in all tangible goods in a zone
Percent Textile Investment	The sum of total investment in the textile industry divided by the total investment overall in a zone
Wages	The total amount paid to workers within a year
Percent Textile Wages	The total textile wages divided by the total wages in a zone
Average Textile Wages	The total income in the textile industry divided by the total labor force in the textile industry in a zone
Average Total Wage	The total income of all firms divided by the total labor force in a zone.
Migration	The percent of people change from their usual residence address within the zone
Illiterate	The number of people who are illiterate in a zone divided by the total population in the zone
Tourism	The total number of nights both foreigners and Turkish citizens stay in a Tourism Operation Licensed Accommodation Facilities in a zone
Female	The total number of females in a zone divided by the total population in a zone
Population Density	Population of a zone per one square kilometer
GDP per Capita	The GDP divided by the mid-year population of a zone in current US dollar prices
Unemployment	A person who is not employed is actively seeking a job by utilizing at least one of the channel of help, and are available to start the job within two weeks. Those who are not included in the labor force are anyone under the age of 15, those who are either discourage or available to start work but not actively seeking, seasonal workers, housewives, in education or training, retired people, or disabled people.

Table 4: Summary Statistic

<i>Variable</i>	Observation	Mean	Standard Deviation	Min	Max
<i>Theft</i>	260	612.11	748.92	21.00	4,951.00
<i>Bribery</i>	186	4.68	6.27	1.00	50.00
<i>Firearms & Knives</i>	260	166.98	160.70	15.00	1,279.00
<i>Assault</i>	260	609.72	504.79	48.00	2,816.00
<i>Sex Crime</i>	260	103.62	114.18	2.00	727.00
<i>Total Crime</i>	260	4,811.58	4,024.82	527.00	27,378.00
<i>Percent of Employees</i>	182	4.98	2.72	1.36	14.69
<i>Percent Invested</i>	174	5.13	7.99	0.00	43.71
<i>Percent Wage</i>	176	6.5	6.98	0.0009	28.48
<i>Population</i>	286	2,910,733.00	2,416,221.00	732,790.00	15,000,000.00
<i>Population Density</i>	286	194.60	498.94	26.00	2,892.00
<i>Unemployment</i>	286	10.12	4.17	3.40	28.30
<i>Internal Migration</i>	260	(1.86)	8.82	(28.98)	15.99
<i>GDP per Cap</i>	208	9,011.30	3,671.11	3,415.00	20,726.00
<i>Tourism</i>	286	1,330,007.00	2,543,409.00	65,464.00	14,800,000.00
<i>Female Ratio</i>	286	49.75	0.60	47.75	50.79
<i>Illiterate Percentage</i>	260	4.98	2.73	1.36	14.69

Table 5: Regression Outputs

	Theft	Bribery	Firearms & Knives	Assault	Sex Crime	Total Crime
Labor	0.0189 (.0565)	-0.0103 (.3059)	-0.0173 (.0727)	0.0353** (.0545)	0.0582* (.1132)	0.0317** (.0461)
Wages	-0.0183 (.0274)	0.1012 (.2241)	-0.0164 (.0367)	0.0609** (.0276)	-0.0233 (.0563)	0.0086 (.0234)
Investment	0.0228 (.0172)	0.0064 (.1208)	-0.0102 (.0224)	0.1453** (.0167)	0.2510** (.0349)	0.1912*** (.0148)

Fixed Effects: Yes
 Controls: Yes
 Standard Deviation
 in parentheses
 * 10% significance
 ** 5% significance
 *** 1% significance

Table 6: Underlying Channels

	Migration	GDP per Cap	Average Textile Wages	Average Total Wages
Labor	-.8927 (1.8731)	.0005 (.0127)	.1877 (.1351)	.0784** (.0305)
Wages	-1.1884 (.9232)	-.0051 (.0063)		
Investment	-.2091 (.5449)	.0036 (.0038)	.1728*** (.0304)	-.0111 (.0084)

Fixed Effects: Yes
 Controls: Yes
 Standard Deviation in parentheses
 * 10% significance
 ** 5% significance
 *** 1% significance

Reference:

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