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Double Squeeze on Educational Development: Land Inequality and Ethnic Conflict in Southeastern Turkey

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Abstract

This paper examines two structural factors that have restricted educational development in Southeastern Turkey: land inequality and ethnic fractionalization/conflict. Until recently a semi-feudal structure persisted in the region with politically and economically powerful tribal leaders and large landowners called *ağa*s. At the same time, the region has been the site of an ethnic conflict, which has been ongoing as an armed insurgency for over 30 years between Kurdish insurgents and the Turkish State. Using a province-level data set, we test the impact of land inequality, conflict and ethnicity on education investment and school enrollment for the period 1970-2012. We find that higher land inequality reduces the school enrollment rates due to budget constraints imposed on poorer households. However, the economic and political power of *ağa*s in the region does not block education investments. Moreover, we find that although the armed conflict in the region did not directly hinder education investments, it did reduce school enrollment rates at middle and high school levels, while increasing enrollment at the primary school level. Finally, we find that provinces with higher percentages of Kurdish population received less education investment even after controlling for conflict and land inequality. These results suggest that high land inequality and the Turkish State's neglect of Kurdish areas were the important factors behind Southeastern Turkey's educational underdevelopment, while the conflict had mixed effects on the education in the region.

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1. Introduction

Southeastern Turkey has historically been the most underdeveloped region in Turkey. Different studies on province level socioeconomic development (e.g. State Planning Organization (DPT), 1996; 2002; Albayrak, 2005; Ministry of Development, 2011) consistently reflect that the provinces in Southeastern Turkey dominate the lowest ranks in socioeconomic development.[1] In this study, we will focus on Southeastern Turkey's backwardness in education, since it's often considered as an important determinant of long-term growth (Barro, 2001; 2013) and economic development (e.g. Sokoloff and Engerman, 2000; Galor, et al. 2009). Moreover, following the capabilities approach (Dreze and Sen, 2002), that conceives "beings" and "to be" as important dimensions of social welfare, we believe availability of widespread education facilities is a crucial tool that provides the freedom of being educated. Lower access to education creates inequalities of opportunities that can be transferred to the following generations in the developing countries (De Barros, et. al., 2009) including Turkey (Ferreira, et al., 2011).

The historical evidence starting from 1970 shows that the school enrollment rate in Southeastern provinces has been significantly lower than the provinces in the rest of Turkey (Figure 1).[2] Southeastern Turkey also receives significantly less public socioeconomic investment (Figure 2), despite the contrary state discourse (Yeğen, 2007; Yayman, 2011) that underlines the need for allocating greater public investment in the region[3]. In this paper, we explain the underdevelopment and lack of public investments in Southeastern Turkey by two main factors: a) Land inequality b) Ethnic fractionalization and conflict.

Southeastern Turkey historically had a more inegalitarian structure compared to the rest of Turkey (Figure 3). This is the outcome of specific historical reasons that led to a semi-feudal structure in the region. The semi-feudal structure that emerged during the late Ottoman era (Özok-Gündoğan, 2014; van Bruinessen, 1992; Beşikci, 1970; Chaliand, 1993) managed to survive until very recently (Aydın, 1986). Galor and Zeira (1993) and Galor and Tsiddon (1996) claim that the land inequality reduces incentives for and creates constraints on the

[1] In our study, we consider the Southeastern provinces to be those that are listed as TRB and TRC according to the classification of Turkish Statistical Institute (Turkstat). These provinces are Gaziantep, Adıyaman, Kilis, Şanlıurfa, Diyarbakır, Mardin, Batman, Şırnak, Siirt, Malatya, Elazığ, Bingöl, Tunceli, Van, Muş, Bitlis and Hakkari. The socioeconomic indices mentioned in the text (DPT, 1996; Dincer, et al., 2003; Albayrak, 2005; Ministry of Development, 2013) consider demographic, labor market, education, industrial, health, financial, infrastructure and wealth indicators. In the Ministry of Development's (2011) report, 11 of the 15 provinces that are classified as least developed are the Southeastern provinces. Similarly, DPT (2003) classifies 16 provinces in the least developed category and 10 of these provinces are in Southeastern Turkey. Moreover, 8 of the 10 least developed provinces in Turkey are in Southeastern Turkey, according to the classification of DPT (1996). Lastly, Albayrak (2005) shows that 9 of the 10 least developed provinces in 1995-2002 and 8 of the 10 least developed provinces in 1990-1994 were in Southeastern Turkey.

[2] This is also consistent with the Population Census data that shows that the least educated provinces are also in Southeastern Turkey (Turkstat, 1963, 1977, 1984a, 1993).

[3] Mutlu (1996) shows that the region receives disproportionately greater public spending vis-à-vis tax revenue. Nevertheless, following the capabilities approach (Dreze and Sen, 2002), we believe that access to education regardless of the level of income is an important aspect of social welfare. Therefore, we believe the public spending- tax revenue gap should not be the chief determinant of the location of social spending or social investment.

education of poor children. Moreover, a wide range of literature indicates that in cases of high land inequality, the politically powerful wealthy landlords are likely to block socioeconomic public spending that would increase their tax burden without significantly contributing to their revenues (e.g. Galor et. al., 2009, Banerjee and Iyer, 2005, Wegenast, 2010).

Southeastern Turkey also historically has a Kurdish majority (Figure 4). The modern Republic of Turkey was constructed through the rejection of the Kurdish identity and language (Kirişçi and Winrow, 1997; Ergil, 2000) and it tried to assimilate all Muslim minorities under the umbrella of a Turkish identity (Yeğen, 2007). This policy created an environment for ethnic insurgencies (Kirişçi and Winrow, 1997). Moreover, Kurdish political movements have often claimed explicit discrimination against Southeastern Turkey. Ethnic discrimination might be an impediment to economic development, since ethnic conflict arises when economic and social deprivations coincide with political ones (Stewart, 2005). At the same time, ethnic tension may reduce returns to education when the language of instruction is not the ethnic minority's mother tongue as in the case of Southeastern Turkey (Coşkun, et al., 2011).

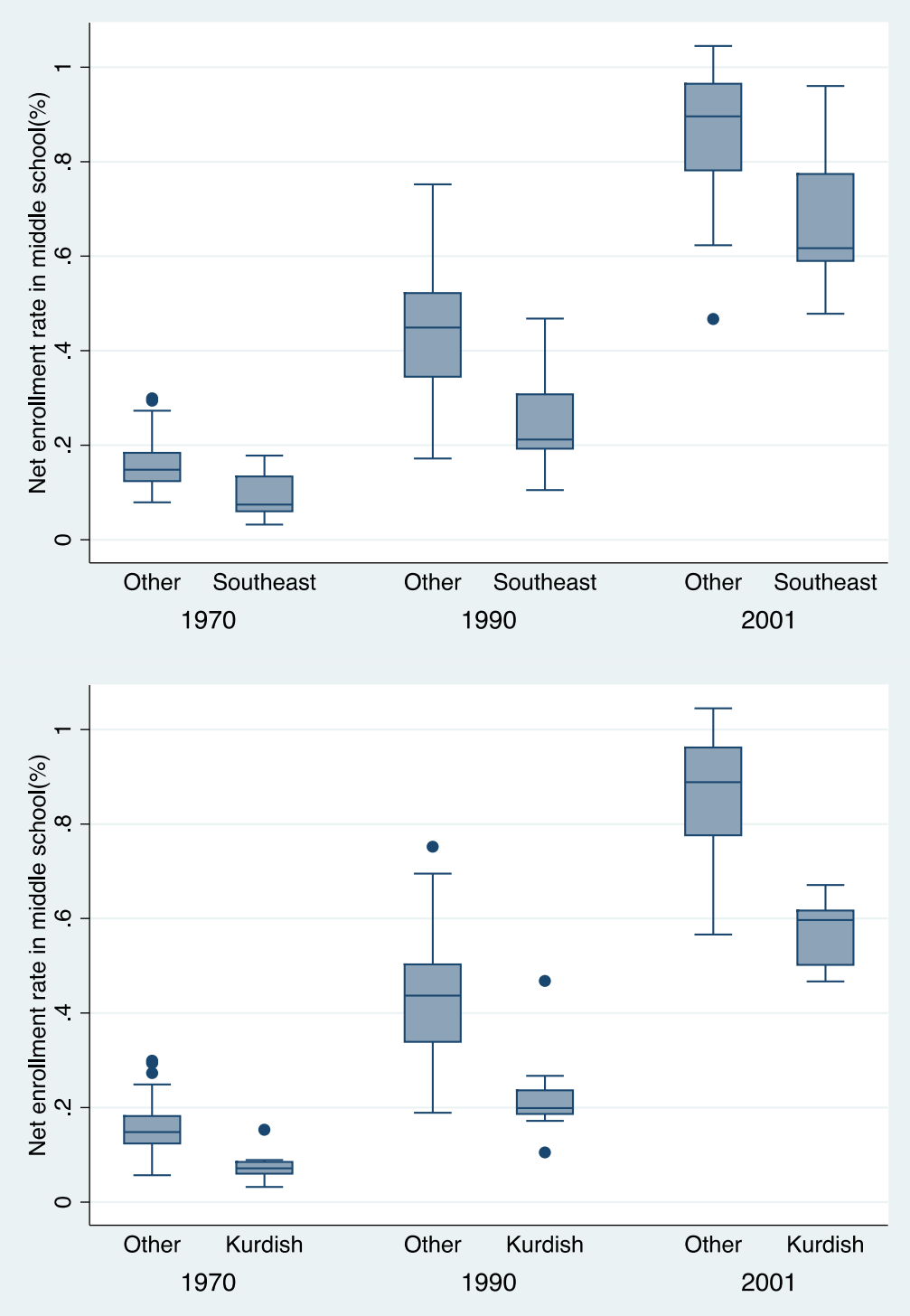
Another outcome of ethnic fractionalization is the armed conflict that is mainly ongoing in Southeastern Turkey. Since 1984, the region has been experiencing a civil war[4] between the Turkish State and a Kurdish guerilla organization- the Kurdistan Workers Party (PKK) with intermittent ceasefires. Ethnic conflict influences socioeconomic development in a region. It can discourage school attendance, especially of girls, by making the environment outside households dangerous (Shemyakina, 2011). Furthermore, insurgents targeted schools and teachers as places and agents of central government. In the early 1990s, the PKK killed 136 primary and high school teachers in Eastern and Southeastern Turkey (Kıbrıs, 2015).

In this paper, we aim to contribute the economic development literature in several aspects. First of all, although the socioeconomic effects of the agrarian structure (Beşikci, 1970) and insurgency (e.g. Berker, 2012; Kıbrıs, 2015; Kayaoğlu, 2016) in Southeastern Turkey are widely discussed, this is the first study that empirically tests which of the two distinctive characteristics of Southeastern Turkey played a greater role behind the long-term socioeconomic backwardness of the region. This also is the first study that checks the impact of wealth inequality on education in Turkey. Second, we examine the impact of horizontal inequalities and possible ethnic discriminations along with the insurgency caused by the ethnic diversification. For this purpose, our empirical analysis includes data from 1970 and 1980- years before the insurgency between PKK and the Turkish State started. This approach gives us a wider perspective that evaluates the Turkish State's policies in the region, rather than exhibiting the insurgency as the only factor behind the underdevelopment of the region.

In our empirical analysis, we first test the factors affecting net enrollment at provincial level, which is the most basic educational performance outcome. We show that land inequality significantly reduces school enrollment, which partially explains the school

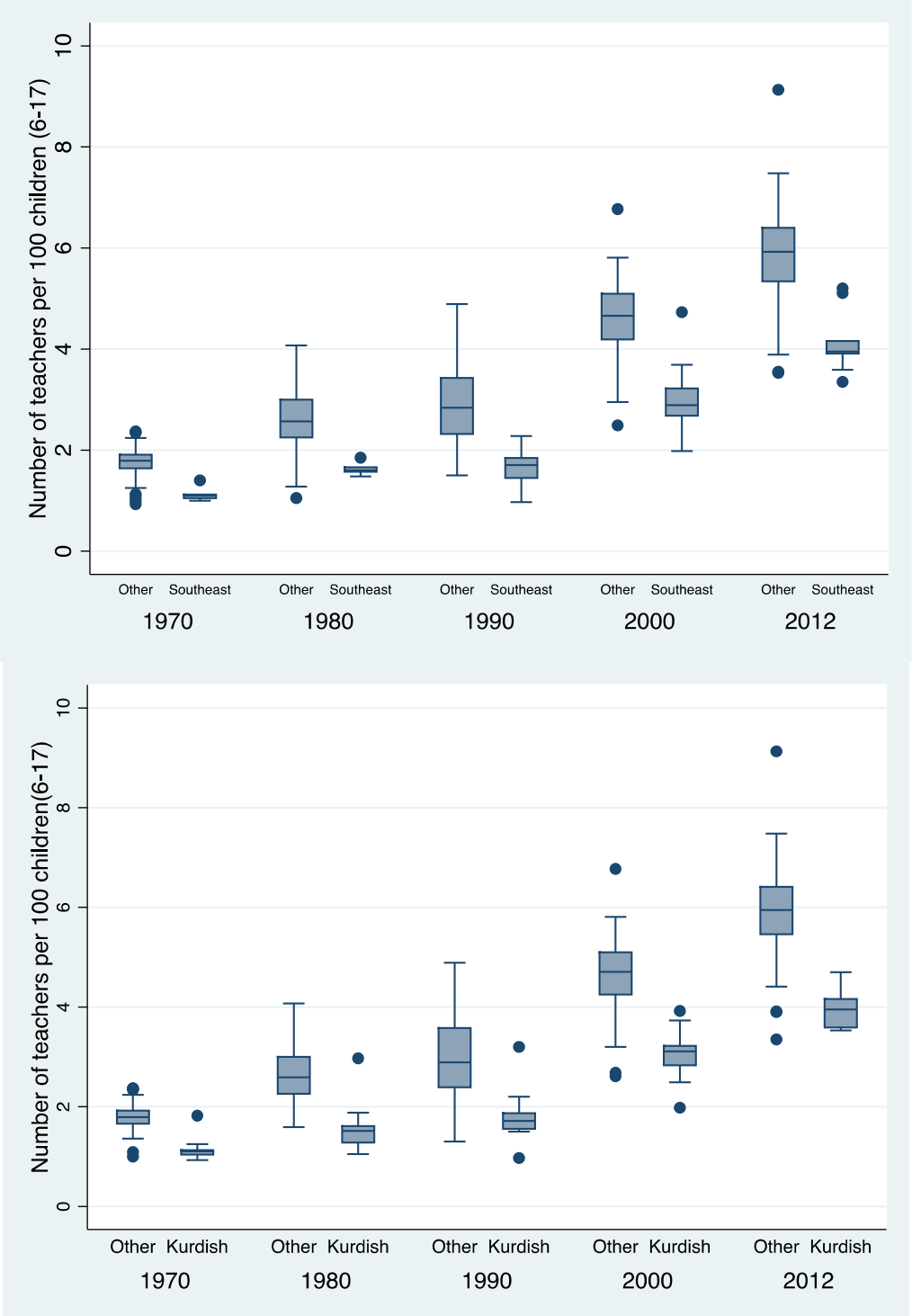
[4] Naming of the conflict between PKK and Turkish army is also a matter of political discussion. The Turkish State discourse names the conflict in the region as a series of terrorist attacks. We follow the definition of Uppsala Conflict Data Program (UCDP), which considers conflicts with over 1000 killings to be civil war.

Figure 1: Middle school enrollment rates (%) in provinces in Southeastern Turkey, in provinces with Kurdish population over 50% and their difference with the other provinces (1970, 1990, 2001)



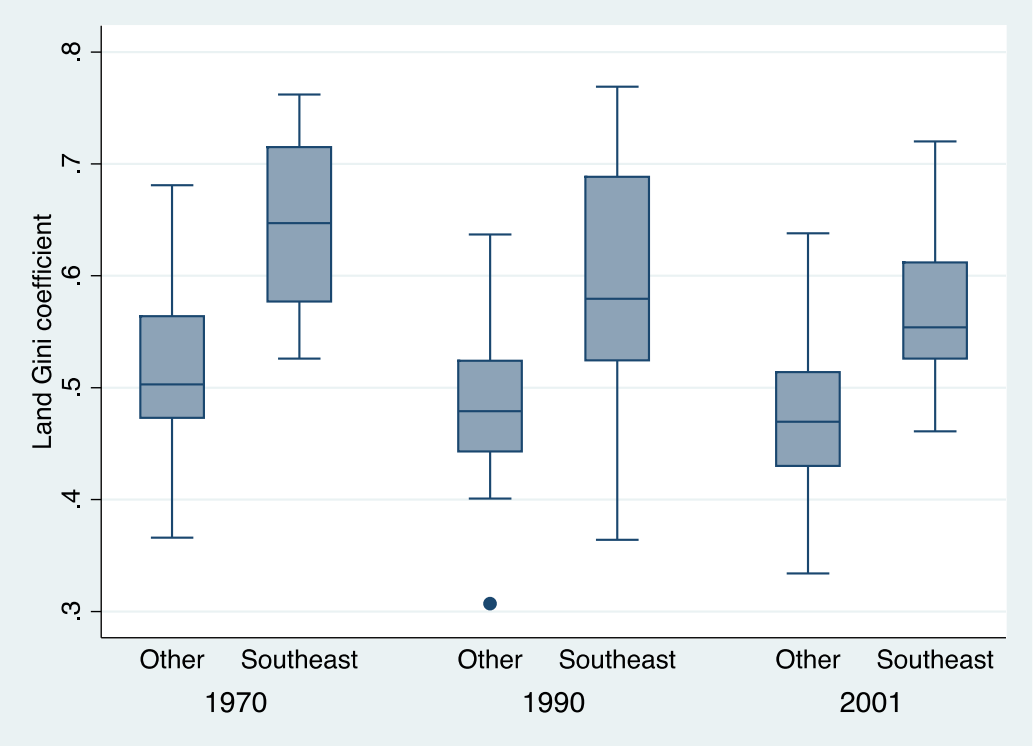
Notes: A one-tailed z-test (at 1%) shows that middle school net enrollment rates are significantly smaller both for Kurdish and Southeastern provinces. Provinces that are located in Southeastern Turkey are those that are classified as TRB and TRC according to the NUTS classification of Turkstat. The provinces with Kurdish population over 50% are Batman, Bingöl, Bitlis, Diyarbakır, Hakkari, Muş, Siirt, Şırnak, Tunceli and Van.

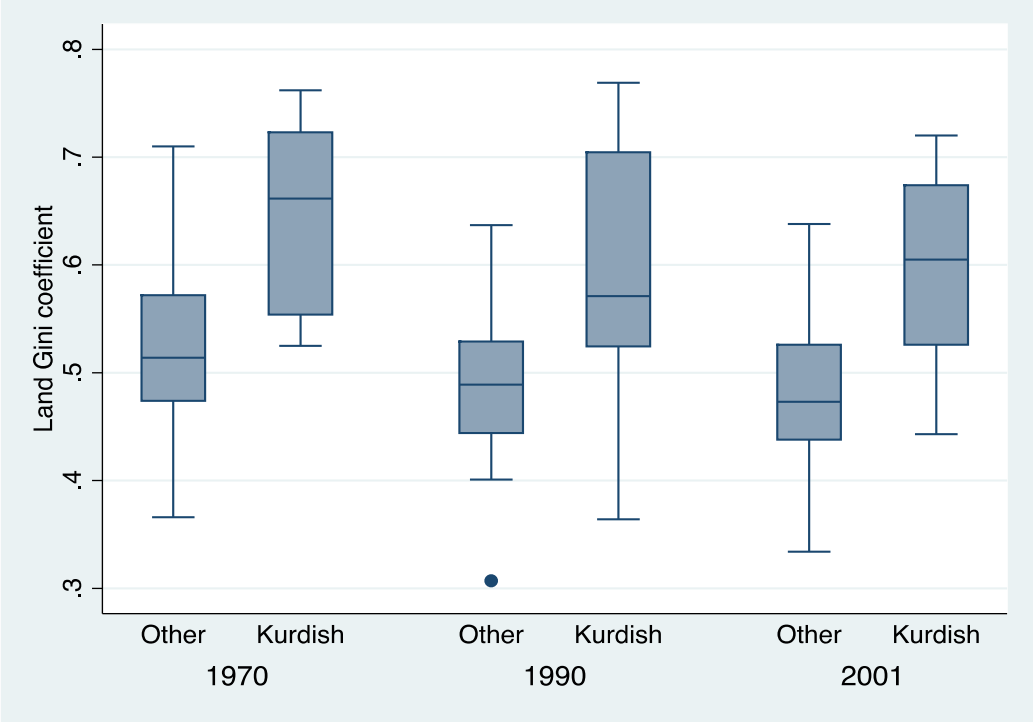
Figure 2: Number of teachers per 100 children (6-17) in provinces with Kurdish population over 50% and their difference with the other provinces (1970, 1980, 1990, 2001, and 2012)



Notes: A one-tailed z-test (at 0.01%) shows that the number of teachers per 100 children are significantly greater both for Kurdish and Southeastern provinces. Provinces that are located in Southeastern Turkey are those that are classified as TRB and TRC according to the NUTS classification of Turkstat. The provinces with Kurdish population over 50% are Batman, Bingöl, Bitlis, Diyarbakır, Hakkari, Muş, Siirt, Şırnak, Tunceli and Van.

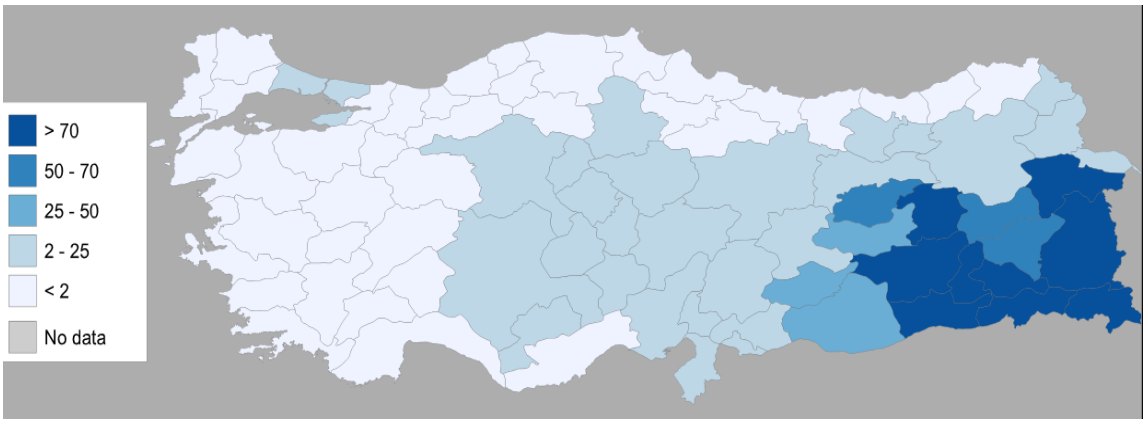
Figure 3: The average land inequality of provinces in Southeastern Turkey, provinces with Kurdish population over 50% and their difference with the other provinces (1970, 1991, and 2001)





Notes: A one-tailed z-test (at 0.01%) shows that the average land Gini coefficients are significantly greater both for Kurdish and Southeastern provinces. Provinces that are located in Southeastern Turkey are those that are classified as TRB and TRC according to the NUTS classification of Turkstat. The provinces with Kurdish population over 50% are Batman, Bingöl, Bitlis, Diyarbakır, Hakkari, Muş, Siirt, Şırnak, Tunceli and Van.

Figure 4: Percentage of Kurdish population according to the 1965 Census



Note: Source Mutlu (1996). Between 1989 and 1999, 14 new provinces were created. We assign the Kurdish population shares of mother provinces to the newly created provinces.

enrollment gap between Southeastern Turkey and the rest of the country. Moreover, we find a negative relationship between the share of Kurdish speakers in a province and primary school enrollment and the impact is larger for girls. Last, we find a significant positive effect of conflict intensity on primary school enrollment and a significant negative effect of conflict intensity on girls' middle and boys' high school enrollments.

We test the supply of educational investment at province-level with teacher-to-student and teacher-to-school age children ratios. We did not find a significant relationship between school investment and land inequality. Although, the large landlords in Southeastern Turkey are also politically influential (Abadan-Unat, 1966; Tezcür, 2015), Turkey is not a federal state and it has a highly centralized educational planning and financing, which could reduce *ağa*s' influence. Our empirical estimations for Turkey support the claims of ethnic discrimination against Kurds. For 1980-2012, we find that a higher share of Kurdish speakers in a province is associated with fewer teachers per 100 students at every level (primary, middle and high school). These findings are significant even after controlling for the impact of death tolls in Southeastern Turkey. Finally, we did not find a direct significant negative effect of conflict intensity on teacher-to-student ratios. We indeed show a significant positive impact of the conflict on the teacher-to-school age children ratio at the primary school level, which is consistent with the Turkish discourse aiming to solve the Kurdish conflict through "integrating Kurds" by teaching Turkish (Yeğen, 2007; Yayman, 2011). The conflict might have increased primary school education investments in the region along with the security investments, which would also affect primary school enrollment (Berker, 2012). Moreover, the conflict might have pushed those in smaller rural settlements to larger villages that are more likely to have a primary school.

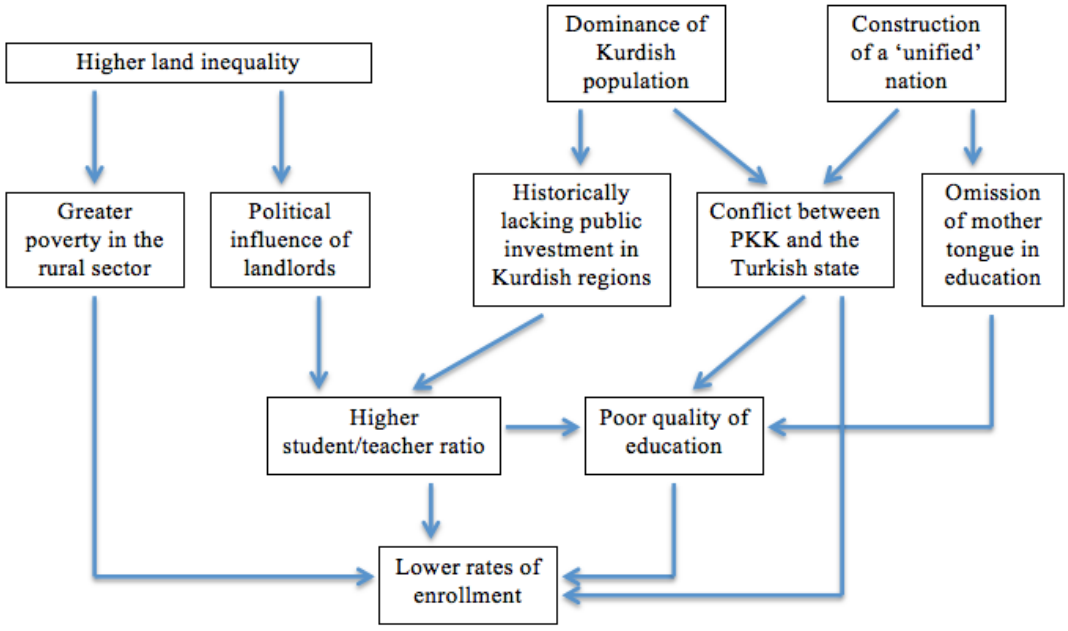
The rest of the paper is organized as follows: The next section reviews the literature on land inequality both in Turkey relative to other countries, and the effects of ethnic discrimination and armed conflict on education. Section 3 lays out the methodology, data and

the empirical findings. Section 4 discusses the economic significance of our findings and Section 5 concludes the paper.

2. The Double Squeeze in Southeastern Turkey

This section will discuss the possible channels that led to lower educational development in Southeastern Turkey. We first compare the agrarian structure in Southeastern Turkey with the rest of Turkey and discuss the possible effects of high land inequality on education. Next, we examine the Turkish State's economic policies in Southeastern Turkey, its approach towards recognition of Kurdish identity and the ethnic insurgency in the region. We discuss the effects of insurgency and lack of education in Kurdish mother tongue on educational development in Southeastern Turkey. The possible channels that led to educational underdevelopment are summarized in Figure 5.

Figure 5: The possible mechanisms that lead to the backwardness in education in Southeastern Turkey



2.1 Land Inequality

According to Keyder (1983, 1987), Turkish agriculture is historically characterized by the predominance of an independent, small-scale peasantry. Landless peasants do not represent an important category in rural Turkish society[5]. However, the rural inequality in Southeastern Turkey has significantly been larger than the rest of the country as the agrarian structure in the

[5] The share of landless peasants in Turkey was 14% in 2002 (Ünal, 2012).

region is historically different. During the era of the Ottoman Empire, the Kurdish provinces were mostly exempt from central taxation and had an autonomous semi-feudal structure. The Ottoman Empire granted Kurdish local leaders political and economic control of the Kurdish provinces. In exchange, the local leaders accepted the sovereignty of the Ottoman Empire and provided military protection for the Iranian border for the Ottomans (Beşikci, 1970; Chaliand, 1993).[6]

Although the Turkish Republic eliminated the autonomous structure and tax exemption of the Kurdish provinces[7], the semi-feudal structure in Southeastern Anatolia has persisted. Parts of Southeastern Turkey have been host to tribal leaders and large landowners called *ağa*s (Aydın, 1986). *Ağa*s are not merely landowners, they also exercise authority over peasants beyond their economic power. Peasants served as corvée labor and were required to perform other duties assigned by the *ağa*.

Figure 3 exhibits the gaps between the average land inequality (measured by the Gini coefficient) in provinces grouped according to two types of classification. Figure 3 shows that average land inequalities of provinces in Southeastern Turkey are respectively 0.120-0.135 points larger the average land inequalities for the other provinces. Similarly, the average land inequality for provinces with over 50% Kurdish population is 0.114-0.121 points higher than the average land inequalities for the provinces dominated by the Turkish population.

Unlike many of the countries with a history of colonization (e.g. Engerman and Sokoloff, 2000), land inequality in Southeastern Turkey is not an outcome of racial/ethnic inequalities. Indeed, most of the large landlords in the region are Kurdish locals. The sympathizers of Kurdish movements often accuse these landlords of forming a "Kurdish comprador bourgeoise" (Öcalan, 1993; Beşikci, 1970) that cooperate with the Turkish State for maintaining their own economic power. For this reason, many early attacks by the PKK in the late 1970s mostly targeted the semi-feudal landlords in Southeastern Turkey (Tezcür, 2015). The conflict between some of the landlords and the PKK continued during the civil war (1984-2012) pitting the PKK against the Turkish State.

The nature of land distribution distinguishes the Southeast from the rest of Turkey. An unequal distribution of land can possibly influence rural income inequality through two channels. In regions with inegalitarian agrarian structures, lower income families might wish to have their children educated; however, they may be unable to invest in education due to credit constraints (Galor and Zeira, 1993). When these families have access to credit markets, the marginal returns to education might be minimal for the lower levels of schooling. This reduces poor families' incentives for investing in education (Galor and Tsiddon, 1996). Economic growth reduces the credit constraints on schooling, in so far as the average income for low-income households also increases. Nevertheless, improvements in educational

[6] In the 19th century, the Ottoman State intervened in the internal affairs of Kurdish provinces, which led to the uprising of the Kurdish tribal leaders (Chaliand, 1993)

[7] The Turkish Republic's attempts to exert sovereignty over the Kurdish provinces led to several rebellions in the region including the Dersim Resistance in 1937/1938 (Mumcu, 1993).

outcomes are slower in unequal societies because the marginal returns realized by low-income households are expected to be lower.

The negative impact of land inequality on school enrollment and quality of education is also reflected in several empirical studies for different cases. For India, Banerjee and Iyer (2005) demonstrate that primary and secondary school completion increases in states where the share of land held by individual cultivators and collectives are higher. Similarly, Wegenast (2010) finds that higher land inequality reduces both the quality and enrollment in secondary school education in Brazil. In a cross-country study, Kourtellos, et al., (2013) show that higher land inequality leads to delays in the extension of primary schooling. Baten and Juif (2014) demonstrate that land inequality also damages the quality of education.

Land inequality's impact on school enrollment in Turkey has not been examined empirically. Nevertheless, using Demographic and Health Surveys dataset, Kırdar (2009), Smits and Gündüz-Hoşgör (2006) and Ferreira and Gignoux (2010) show that the level of wealth is significantly effective on enrollment of both girls and boys in Turkey. Moreover, Göksel (2008) shows that higher household expenditures increase the children's probability of enrollment and had a negative effect on the incidence of child labor. These results suggest that land inequality might be an impediment to the opportunities of education in Turkey.

To alleviate poor educational attainment, the state typically pursues remedies through public investment. Nevertheless, public investments in education might also depend on distribution of power among peasants, landlords and urban capitalists. Bowles (1978) identified this relationship and argued that large landlords perceive little benefit in improving educational outcomes. The expansion of educational outcomes would provide peasants with greater opportunities to exit the traditional rural sector, which is undesirable for the large landlords because it limits the availability of inexpensive labor force in the rural sector. In societies with an unequal distribution of land, a greater proportion of educational expenditures is financed through taxes levied on large landlords. This encourages large landlords to block the expansion of public education (Galor et. al., 2009)[8].

The influence of large landlords on public investment is demonstrated in several case studies. Sokoloff and Engerman (2000) compare US versus Latin America. Engerman and Sokoloff (2005) compare Northern versus Southern states of the US. Wegenast (2010) and Frankema (2009) discuss Brazil and Latin America, respectively. They all conclude that the countries/states with high land inequality were lagged in terms of educational investments and reforms due to the negative influence of landowning elite.

The wealthy landlords have an institutional influence in Southeastern Turkey (Beşikci, 1970), too. Many of these landlords have served as deputies in the Turkish parliament (McDowall, 2003; Özer, 2000; Ateş Durç, 2009). Turkish political parties attempt to earn the support of *ağa*s in elections because they can deliver the votes of individuals living in their

[8] Large landlords could begin to accept the state's investments in education as the urban sector grows and urban capitalists finance a greater share of public education expenditures. However, in societies with inegalitarian land distributions, the expansion of the education frontier can lag (Galor, Moav and Vollrath, 2009; Bowles, 1978).

villages[9]. *Ağa*s generally support the party that offers them the most substantial favors and services (Leder, 1979); they often disregard ideological differences between parties when making their political decisions. As expected, *ağa*s demand infrastructure investments such as roads, dams, irrigation channels or subsidized credits from politicians. They exploit their political connections as a means of increasing their profits (Beşikci, 1970); public education and healthcare investments are not included in the *ağa*s' political agendas. Thus, in provinces with unequal land distribution, large landlords are able to influence public expenditures in their favor, at the expense of a large part of the population.

Landlords' political influence declined in recent years as the urban population share increased all over Turkey (Özer, 2000) and rising Kurdish nationalism undermined local elites' electoral influence (Tezcür, 2015). Moreover, the political mechanism that Engerman and Sokoloff (2005) and Wegenast (2010) outline might be weaker in Turkey. Unlike the US, Brazil and many of the other Latin American countries[10] Turkey does not have a federal state structure. The educational reforms in Turkey are implemented uniformly in all provinces. The educational budgets in each province are determined centrally by the Ministry of National Education.

In previous studies, Wegenast (2009) for Brazil, Banerjee and Iyer (2005) for India, Ramcharan (2010) and Galor et. al. (2009) for the U.S. empirically find that inegalitarian agrarian structures are impediments on public educational investments. Nevertheless, an empirical study on land inequality's impact on educational investments in Turkey was not conducted until this study.

2.2 Kurdish population and the conflict

2.2.1 A brief overview

A large part of Southeastern and Eastern Turkey have been dominated by the Kurds- an ethnic group that is mainly spread through Iraq, Syria, Iran and Turkey. According to the survey by Konda conducted in 2013, the Kurdish population constitutes 17.7% of the population in Turkey. Detailed information on how the Kurdish population is spread across Turkey is not available in Konda's report. After 1965, Turkstat also stopped including questions regarding ethnic identity and mother tongue in the population censuses.

[9]The political influence of *ağa*s is noted in several studies. According to Abadan-Unat (1966), the local notables including *ağa*s dominated voting behavior in the elections of 1965. McDowall (2003) also notes that one landlord instructed 500 of his villagers to vote for the Motherland Party (ANAP) during the 1983 elections in Hakkari. He claims that the influence through his villagers improved the votes of ANAP in Hakkari by 9%. Moreover, for elections between 1983 and 2011, Tezcür (2015) shows that the volatility of votes in Kurdish dominated provinces like Van, Ağrı, Hakkari, Bitlis is significantly higher than the rest of Turkey. Tezcür explains this volatility as evidence of *ağa*s, tribal and religious leaders shifting political support from the center-right to the left-wing Kurdish parties. This also supports the claims regarding the significant influence of *ağa*s, on elections.

[10] Mexico, Brazil, Venezuela, Canada and the US are among the countries with federal governments.

Using the population census of 1935 and 1965, Mutlu (1996) predicts that 64.2% of Southeastern and 38.8% of Eastern Turkey is Kurdish[11], and the Kurds constituted 10.0% of the total population in 1965. Using the internal migration statistics, Mutlu (1996) estimates that the share of the Kurdish population in Turkey has increased to 12.6% in 1990[12]. Similarly, Kıbrıs (2015) combines Mutlu's data for 1965, and the 2000 census results which provide information on birth places of residents of counties and predicts that the share of the Kurdish population in 2000 as 15%.[13] Figure 4 shows that, in 1965 the Kurdish population is the majority in the Southeastern provinces. But we also observe that the share of Kurdish population significantly increased in some of the large Western provinces like İstanbul, İzmir, İçel and Adana.

When the Turkish Republic was established in 1923; one of the primary goals of the new Republic was to build a nation state under the Turkish identity (Somer, 2004). The construction of the nation state moved along with a denial of Kurdish identity (Kirişçi and Winrow, 1997; Ergil, 2000) and the state's aim of making Kurds 'Turkish' (Yeğen, 2007). One of the measures taken for this was to recognize Turkish as the only official language. The Kemalist government who established the new Turkish State made education centralized, compulsory and free, but in Turkish for all children (Smits and Gündüz-Hoşgör, 2006).

The construction of a unified Turkish State was resisted by Kurds, as it significantly reduced the autonomy of Kurdish notables (Ergil, 2000)[14]. Between 1924 and 1938, 16 Kurdish rebellions broke out against the government (Kirişçi and Winrow, 1997). All of the rebellions were harshly suppressed by the Turkish State. From 1940 to 1960s, the Kurdish movements were weak. The Turkish State was relatively successful in keeping the Kurdish movements under control. Starting from the late 1960s, some of the leftist groups started to bring up the Kurdish question again. The 1970s were the period of leftist activism in Turkey. The left-wing Kurdish and Turkish intellectuals and youth united for a short period of time. A part of the Kurdish activists supported Turkish socialist organizations (Ergil, 2000; Ersan, 2013)[15].

The 1980 coup in Turkey changed the Kurdish setting for two reasons. First, the coup crushed the majority of the leftist movements in Turkey, thus creating space for Kurdish

[11] Mutlu (1996) claims that in some of the provinces there is an unusual fluctuation in the share of the Kurdish population. According to Mutlu, this fluctuation is an outcome of data discrepancies. Hence, Mutlu adjusts the share of Kurdish population in 1965 using the values from the population census in 1935.

[12] The increase in the share of the Kurdish population is consistent with the survey conducted by Konda (2013).

[13] Kıbrıs's (2015) estimates are also consistent with KONDA's 2006 survey which find the share of Kurdish population in Turkey to be 15.6%

[14] According to Yeğen (1999) and Ergil (2000), the abolition of the Ottoman Caliphate in 1924 was also a factor behind Kurdish rebellions, as the Ottoman Caliphate had an influence in unifying the Turks and Kurds under the same religious identity.

[15] The most notable example of this is Kurdish groups' support for TSİP (Turkish Socialist Labor Party) in the 1979 elections. In these elections, TSİP got 1.3% of the total votes and half of this was from Kurdish provinces-Siirt and Mardin (Ersan, 2013).

separatist movements. Second, the military regime entirely banned the use of the Kurdish language and forbade families from giving Kurdish names to their children[16].

In this new political environment, the guerilla organization PKK (Kurdistan Workers' Party) started an armed conflict in 1984. Between 1992 and 1999, the civil war led to the killings of over 1000 people every year (The Grand National Assembly of Turkey, 2013) with a peak of over 5000 causalities in 1994. The killings included not only Turkish soldiers and PKK guerillas, but also civilians including state officers such as teachers (Kirişçi and Winrow, 1997; Özdağ, 2009). In the early 1990s, PKK guerillas killed 136 teachers and burned 238 schools in Eastern and Southeastern Turkey (Kıbrıs, 2015).

As a response to the rising insurgency, between 1987-2002, the Turkish State created an Emergency Governorship (OHAL) region that covered 13 provinces and was governed by a "supergovernor" who had the power to implement drastic measures in coordination with the Ministry of the Interior (Aydın and Emrence, 2015)[17]. The OHAL supergovernor ruled all OHAL officers, supervised the security forces and could relocate the citizens in the OHAL region. Starting from 1985, the Turkish State also armed and paid Kurdish villagers, named "village guards", to combat the PKK guerrillas in the OHAL region (Marcus, 2007). This extended the insurgency into the civilian population as the village guards and their families were also targeted by PKK attacks.

A number of researchers allege that locals aligned to the Turkish State visited violence on civilians in the OHAL region (Marcus, 2007; Akın and Danışman, 2011, Dorman and Toper, 2003; TİHV, 2003). According to Turkey Human Rights Report (TİHV, 2003), from 1990 to 2002, 993 people in the OHAL region were subject to extrajudicial killings such as the shooting for disobeying police orders, irregular shootings by security forces, killings during police investigations in houses and workplaces and arrests by the police. In the same period, 1650 people in the OHAL region were subject to "mystery killings" which are also often associated with state violence.

The insurgency also damaged the socioeconomic infrastructure. In Turkey, all public recruitment and appointments are centralized. Most of the teachers and health staff working in the region are not from the region. However, the overall insecure environment and the PKK's attacks on civil servants created further disincentives for staying in the region (Kıbrıs, 2015; Kıbrıs and Metternich, 2016). Many young teachers and health employees appointed to conflict regions, either quit their jobs or tried to minimize the period they spent in the Southeastern region by any means (sick leave, etc.).

In addition, the Turkish State emptied a significant part of the insurgency region

[16] The ban on the speaking of Kurdish continued until 1991. However, Kurds had to wait until the late 2000s for the removal of ban on Kurdish print media, restrictions on the use of Kurdish names and private Kurdish education. The Kurdish language is still not taught in primary and secondary level public schools and TV broadcasts in the Kurdish language is only conducted by Turkish public channel- TRT.

[17] The Emergency Governorship (OHAL) region first covered 8 provinces including- Bingöl, Diyarbakır, Elazığ, Hakkari, Mardin, Siirt, Tunceli and Van in 1987. Later Adıyaman, Bitlis and Muş were also included in the OHAL region as "neighboring provinces". In 1990, the newly created provinces of Şırnak and Batman also became a part of the OHAL region. In 2002, OHAL ended following the declining magnitude of the insurgency.

through waves of forced migration. A report by a Turkish major political party, the CHP (1999) notes that 450,000 civilians in the region were subject to forced migration. As a result of the forced migration policy, 820 villages and 2,345 hamlets were vacated. The migrants mainly either moved to local city centers like Diyarbakır and Van or to cities in the west like Mersin, Adana and Antalya. The insurgency continued until the peace negotiations that started between the PKK and the Turkish State in 2012. With the unilateral ceasefire, the conflict's intensity was significantly reduced for three years. The peace negotiations between the Turkish State and the PKK collapsed in July 2015 and the insurgency in the region restarted.

2.2.2 Lack of public investment in the Kurdish region and the Kurdish nationalist movement's discourse on the political economy of the region

A wide range of literature notes that ethnic fractionalization might lead to a bias in public goods in favor of groups that control the government (e.g. Easterly and Levine, 1997; Easterly, 2001; Alesina, et. al, 2003; Alesina and Le Ferrara, 2005; Stewart, 2005). For Turkey, possible public investment bias against Kurds is also a popular political claim; however, quantitative academic evidence on this is very limited. In addition, Kurdish nationalist movements do not present a consistent critique of the economic policies in Southeastern Turkey. For example, Kışanak, a leading member of HDP- the main Kurdish party, and the previous mayor of Diyarbakır, the largest city in Southeastern Turkey, claims *"the greatest discrimination in this [Kurdish] land is economic discrimination"* (Hürriyet, 4th February 2014). She also notes that the lack of socioeconomic development in the Kurdish region is an outcome of the discriminatory state policies.[18]

On the other hand, PKK's leader Abdullah Öcalan (1993) and İsmail Beşikci (1970, 1990), an intellectual with great influence on the Kurdish nationalist movements, strongly criticized the nature of public investments. From a neo-Marxian perspective, Öcalan (1993) and Beşikci (1970, 1990) argue that Southeastern Turkey is an internal colony and public expenditures in this region target surplus extraction from the periphery to the center[19]. Their critique also encompasses socioeconomic spending, including education. Öcalan (1993) perceives education as a tool of *"educational and cultural colonization"*. Similarly, Beşikci (1970) describes the boarding school investments of the Turkish State as an assimilation policy, since the law for boarding schools explicitly stated *"spreading the Turkish language and culture"* as one of the aims of such schools.

[18] In a separate speech, Kışanak (GNAT, 2012) indicates that the economic backwardness in cities with a dominant Kurdish population continued during the Justice and Development Party era, due to Justice and Development Party governments "unfair public expenditure methods".

[19] According to Öcalan, the Turkish capitalist class extracts the surplus in the Kurdish region with the support of the Turkish State. A part of the surplus in the region is extracted through: a) State owned enterprises in the region b) Public investments in transportation that would provide larger markets and cheap labor for the Turkish capitalist class c) Turkish capitalist classes economic activities in the region that are conducted with the intermediary role of the Kurdish comprador class and the feudal landlords.

The reports of the Turkish State and parliamentary political parties reflect the state discourse on Southeastern Turkey's development. Although a number of earlier official reports (e.g. Hamdi Bey Report in 1926, Fevzi Çakmak Report in 1931) suggest solving the Kurdish issue solely through security policies, the reports of the early Turkish State mainly underline that economic development of the region would bring political stability to Southeastern Turkey (Yayman, 2011). Moreover, Yeğen (2013) notes that after the 1960s the Turkish State perceived the Kurdish question mainly as a regional underdevelopment problem. The reports of parliamentary parties on the region constantly underlined that economic development and public investment was crucial for integration of Southeastern Turkey to the rest of Turkey. On the other hand, educational differences are constantly underlined in the reports after 1980, including the Ministry of Education's 2015 Annual Report that emphasizes the aim of reducing "regional gaps" in education seven times (MoE, 2016). This reflects that the Turkish State was never able to raise the level of education in Southeastern Turkey to desired levels.

Consistent with the state discourse, the Turkish State throughout its history implemented policies to reduce inter-regional gaps within Turkey. Beşikci (1970) notes that in the 1960s new boarding schools in Turkey were mostly constructed in Southeastern Turkey and explains this by the state's aim of assimilating the Kurdish population. Public boarding school investments continued in the region. Starting from the late 1980s, the Turkish State implemented "education by carrying" policy widely in Southeastern Turkey (Keyder and Üstündağ, 2008). With this policy, primary and middle school students, living in smaller villages lacking school facilities were carried to schools in larger towns.

The lion's share of Conditional Cash Payments (62.9% in 2009) was given out in Southeastern and Eastern Turkey (Esenyel, 2009) as these are the regions where poverty is very widespread. Conditional Cash Payment includes educational subsidies especially for girls that are enrolled in primary and middle school. Nevertheless, Keyder and Üstündağ (2008) note that the amount of Conditional Cash Payments that each family receives is very limited compared to the minimum wage in Turkey.

In his quantitative work, Mutlu (2001) presents a larger picture of public expenditures in Southeastern Turkey, and he refutes Kurdish nationalist movements' claims of underinvestment and colonization. He shows that Kurdish majority provinces receive more public expenditure and investment compared to their tax contribution to the central budget. Nevertheless, Mutlu's estimates are based on monetary input only and do not reflect the citizens' real benefits from these investments. Indeed, the outcome-based statistics on socioeconomic investments is rather consistent with Kışanak's (Hürriyet, 4th February 2014) claim. Figure 2 shows persistent regional inequalities in education between 1970 and 2012. The provinces with a Kurdish majority significantly had lower teacher per child ratios. The Turkish State's plan and discourse of solving the Kurdish issue through economic development has not been realized. Attempts to reduce the regional socioeconomic gaps were insufficient and the state either discriminated against Southeastern Turkey or at best did not put sufficient emphasis on the development of the region.

The rise of the Kurdish parties (DEHAP, DTP, BDP, and HDP) in the 2000s and their influence through electoral competition also did not largely affect the underdevelopment of Southeastern Turkey. For the 2004-2012 period, Luca (2016) finds no evidence of Kurdish parties' vote share on level of fixed capital investment and Luca and Rodriquez-Pose (2015) estimate that Kurdish party vote share only mildly increases per capita government public fixed capital spending[20].

2.2.3 Omission of education in mother tongue/first language

Kurdish was prohibited and actively prosecuted for most of the 20th Century in Turkey (Hassanpour et al., 1996). The situation was especially dire throughout the Republican period (1923 and onwards), but Kurdish language instruction experienced occasional flourishing. Turkey only very recently allowed Kurdish language teaching in private language courses and as a language elective in schools but still does not implement any Kurdish language instruction in compulsory education (MoE, 2012)[21].

Several studies focus on the impact of instruction in a second language on educational attainment and long-run earnings. Benson (2005) reports that learning to read is most efficient when the mother tongue is used. Mother tongue usage increases creativity and self-esteem of students. Bilingual instruction provides a more interactive and participatory learning environment. Thomas and Collier (2002) compare eight different education methods for language-minority students in the U.S. and found that English-only instruction is the least effective method for long-term academic achievement.[22]

Shifting to education in mother tongue impact proficiency in previous instruction language differently depending on the case. Angrist and Lavy (1997) report that switching the instruction language in middle and high school education from French to Arabic reduced the long-term earnings of younger men in Morocco. This is due to widespread use of French in business and public service and the recent graduates' French writing skills deteriorated after the switch. In contrast to Angrist and Lavy, Angrist et al. (2008) for Puerto Rico show that the natives' English proficiency was not negatively affected, when Puerto Rico switched the language of instruction in middle school from English to Spanish.

The existing evidence of the experience of Turkey supports the view that practical difficulties are faced by language minorities, when they are forced to study in the majority language. Coşkun et al., (2011) and Çağlayan (2014) note that there was insufficient

[20] Luca and Rodriguez-Pose (2015) exclude mining and energy investments in their public fixed capital spending estimates.

[21] These very recent reforms are not covered by the period examined in the empirical section of paper.

[22] Angrist et al. (2008) claim that most of the observational studies on the effects of lack of instruction in first language on subsequent academic achievement suffers from selection bias. In other words, better educated and more motivated minority parents search for and enroll their children in schools with bilingual programs and hence their children's subsequent better performance should not be compared to children of less educationally conscious minority parents who enroll their children to neighborhood school irrespective of availability of bilingual programs.

communication between Turkish teachers and Kurdish students who could not speak Turkish and therefore the real learning of many Kurdish students does not start until they learn Turkish in school. Moreover, based on her interviews, Çağlayan also claims that the language barrier in schools damage Kurdish children's self-esteem and engagement in school. These claims are consistent with the empirical findings of Kırdar (2009), who shows that Kurdish mothers' lack of Turkish proficiency reduces school enrollment.

According to Derince (2012), the language barriers are larger for girls. Due to unequal gender relations, girls are less exposed to the life outside household, which reduces their opportunities to learn Turkish. Indeed, Smits and Gündüz-Hoşgör (2003)'s data reflects that i 23.3% of Kurdish women aged 15-49 could not speak Turkish, whereas only 1.8% of Kurdish men aged 15-49 could not speak Turkish in 1998. Moreover, Kırdar (2009) shows a significant gap between the enrollment rates of Kurdish and Turkish girls even after controlling for many socio-economic variables; however, a similar significant gap does not exist between Kurdish and Turkish boys.

2.2.4 The impact of insurgency on socioeconomic development

The conflict affects the socioeconomic development in the region through several channels. However, the nature of a conflict's impact differs from country to country, and it is hard to find stylized facts relating to civil conflict. Collier et al. (2003) point out that economic growth is likely to decline during armed conflict (or even outright recession), which would later also indirectly affect productive public spending. The negative impact on growth might also be permanent as conflict may result in deterioration of political institutions such as spread of corruption. The conflict also increases military spending, which might crowd out education and healthcare spending.

Conflict might also discourage school enrollment by reducing returns on education. Poirier (2012) for a sample of Sub-Saharan African countries, Verwimp and Van Bavel (2013) for Burundi and Chamarbagwala and Moran (2011) for Guatemala show the civil conflicts reduced school enrollment rates for girls and boys. Leon (2012) for Peru and Rodriguez and Sanchez (2012) for Colombia show that the insurgencies decreased the years of schooling for all children. Moreover, Rodriguez and Sanchez (2012) find that the number of violent attacks in a region exacerbates school dropouts and encourages child labor.

Conflict's impact might also differ with respect to gender. For Iraq, Diwakar (2015) shows impact of conflict is worse for boys, because the potential returns for boys' education is greater due to patriarchal norms. On the other hand, Shemyakina (2011) finds that the conflict has a worse impact on girls in Tajikistan. She speculates that due to deteriorating security conditions in the conflict zone parents are concerned that their daughters might be harassed by soldiers or militants on their way to school. Unlike the studies listed above, Valente (2013) for Nepal finds that conflict increases the enrollment of girls, because Maoist

rebels expounded the female empowerment.[23] Finally, Justino et al. (2013) report that the recovery of school enrollment for boys was slower than for girls, probably since boys had to work to help household economic survival.

For Turkey, Berker (2012) investigates the effect of armed conflict on access to school. Using a dummy variable for provinces under OHAL, Berker (2012) finds children exposed to conflict are more likely to graduate from primary school and less likely to graduate from middle and high schools. He speculates that the unexpected positive effect on primary school completion may be due to the fact that many peasants in the smallest hamlets without schools are forced to move to larger settlements with schools. Moreover, Kayaoğlu (2016) implements difference-in-differences methodology, uses provinces under OHAL as her treatment group and demonstrates that conflict reduced the teacher/student ratio.

Kıbrıs (2015) investigates the impact of armed conflict in the region on the quality of high school education using university entrance exam scores. After controlling for Kurdish speakers' share and the intensity of conflict (measured as security force casualties) in each county she finds strong effect of armed conflict on university exam scores of high school graduates. She speculates that low exam scores are due to very high teacher turnover and absenteeism of teachers compounded by the conflict. She argues that the central government cannot attract and keep skilled and experienced teachers due to the conflict. Kıbrıs and Metternich (2016) investigate the impact of conflict on "white collar flight" in a separate study. They find that the conflict leads to medical personnel fleeing from the conflict zone and the Turkish State's attempts to reduce the "white collar flight", by mandatory service in the conflict region and bonuses for working in there, were not sufficient.

3. Empirical Analysis

We implement a province-level empirical analysis to analyze the main factors that lead to the schooling and public investment gaps between Southeastern and other provinces in Turkey. In our analysis, we aim to test the impact of land distribution, ethnicity and conflict on school enrollment ratios, per student and per capita education staff in each province.

3.1 Data and Variable Selection

One of the main contributions of this analysis is to put together the most comprehensive data set at province level to account for long-standing ethnic and socioeconomic differences (including ethnicity, and land distribution inequality) for the period between 1970 and 2012. Inclusion of data from 1970 and 1980 is helpful for controlling for the share of the Kurdish population's impact before the PKK insurgency. We measure the levels of educational attainment with primary, middle and high school net enrollment ratios for boys and girls.

[23] At the same time, Valente (2014) shows that abductions by Maoists reduce school attendance. It seems that parents are concerned that their children may join Maoists after intense indoctrination.

Province-level data for land Gini coefficient is only available for years 1970, 1991 and 2000. Similarly, for the post-1960 period, the province-level share of Kurdish population ratio data is only available for years 1965, 1990 and 2000. In order to create share of Kurdish speakers for 1970, we linearly interpolate Mutlu's (1996) estimates for 1965 and 1990. Due to data limitations, the regression analysis for school enrollment is restricted to three years (1970, 1990, and 2000). There were 67 provinces in 1970, 73 in 1990 and 81 in 2000. Hence, we have 221 observations in the pooled data set.

We measure the regional gaps in public investment on education by number of teachers per 100 students and number of teachers per school age population for primary, middle and high school levels. The paper focuses on public education investments, and the institutional variables might evolve over the longer run; therefore, we controlled for the education investment variables with one period lags of our control variables. Since we have Gini coefficient and Kurdish population ratio data only for 1970, 1990, and 2000, we investigate the education investment variables for 1980, 2000 and 2012.[24] There were 67 provinces in 1980, 81 in 2000 and 81 in 2012, hence we have 229 observations in the pooled data set.

Teacher-to-student and teacher-to-school age population ratios, for 2000 and 2012 and net school enrollment rates for 2000 are from Turkstat (2014b). We construct data for net school enrollment rates in 1970 and 1990 and teacher-student, teacher-population in 1980 by obtaining the student and teacher numbers from the Ministry of Education (MoE) Statistical Yearbooks (Turkstat, 1976a, 1976b, 1994a) and number of school age children from Population Censuses (Turkstat, 1977, 1993). The net enrollment rates are missing for 1980, since MoE Statistical Yearbooks do not have age or year of birth data for 1980[25].

We control the land distribution with the land Gini coefficient using data from general agricultural censuses constructed for FAO's World Census of Agriculture programs. For 1970, we obtained this data from Çınar and Silier [Köymen] (1979). For 1990, we used Turkstat's (1994b) 1991 General Agricultural Census book constructed for the 1990 World Census of Agriculture and for 2000 we used Turkstat's (2014a) 2001 General Agricultural Census constructed for the 2000 World Census of Agriculture.

We control the share of Kurdish population with the share of population whose first language is Kurdish. We used data on share of Kurdish (Kurmanci and Zaza dialects) speakers from Mutlu (1996) and Kıbrıs (2015). In order to create share of Kurdish speakers for 1970, we linearly interpolate Mutlu's 1965 and 1990 estimates.

[24] The primary and middle schools in Turkey were combined between 1997 and 2011. For this period, Turkstat (2016) reports both types of schools together as primary schools. Using Ministry of Education (MoE) Statistical Yearbooks, we construct primary and middle school data by taking the first five grades as primary and grades between 6 and 8 as middle school. In 2012, the primary and middle schools in Turkey were separated again and accordingly Turkstat provides separate data for these types of schools starting from 2012. As number of teachers and students data are provided separately by Turkstat for 2012, we preferred to use our public investment data from 2012 rather than 2010.

[25] See Appendix A for more detailed explanation of construction of net school enrollment rate.

We measure the intensity of conflict by the number of civilian and Turkish soldier deaths per 100,000 in each province within the past 10 years. We combine casualty data from three different sources: Özdağ (2009) provides casualties data for civilians, but only for incidents with 3 or more civilian casualties. Using Directorate General of Press and Information (2015)'s "Today's Date" archive, we combined Özdağ (2009)'s data with keyword search on newspaper articles. Summaries of news on Today's Date provide us information for incidents with 1 or 2 civilian casualties and military causalities. Finally, we complete the missing province information in Today's Date archive by cross-checking the incidences with the Global Terrorism Database (2015). Our combined data allows us to construct time and place varying series. The correlation coefficient between our data and Kıbrıs (2015) is very high (r=0.94).

We control for province level GDP capita, level of urbanization, population density and population growth for 5-14 year old children in our estimations[26]. We obtained the level of urbanization data from respective population censuses (Turkstat; 1977, 1984a, 1993, 2014b). In order to construct GDP per capita figures, we also combine different studies. Turkstat (2014b) provided GDP per capita data at province level for the period 1987-2001, which provides us data for 1990 and 2000. Moreover, Özötün (1988) reports province level GDP per capita for 1975 and 1980. Using Özötün's (1988) data for 1975, we deflated 1975 province level GDP per capita to 1970 based on annual growth rates in GDP per capita for Turkey between 1970 and 1975.

Population density and population growth in 5-14 year old children comes from population censuses (Turkstat; 1963, 1977, 1982, 1984a, 1993, 2014b). Last, we control for the existence of strong levels of patriarchy with the missing girls dummy that we formed. UN (2015) data suggest that average boys-to-girls birth ratio is 1.06 around the world. If the ratio of 0-4 year old boys-to-girls are two standard deviations larger than mean (1.082) we assigned 1 to the missing girls dummy variable and 0 if the ratio is less than 1.082.[27]

Table 1 shows that overall teacher-student ratios have increased between 1970 and 2012 except for high school. During the study period, high school gradually became a level attained by the majority of school-age children rather than only the elite. Enrollment rates have significantly increased at all levels and both for boys and girls over the period and the gender difference has mostly disappeared by 2012.

[26] Initially we also controlled for average years of schooling for 11 years and older populations in each province. Average years of schooling variable is highly correlated with GDP per capita and urbanization variables. Inclusion of this variable reduces the coefficient size for GDP per capita and urbanization variables without affecting the coefficient estimates for conflict intensity, land inequality and Kurdish share. Eventually we decided to omit this variable from regression analysis due to multicollinearity problems. Regression estimates including average years of schooling are available from authors upon request.

[27] Unfortunately, the 0-4 years old sex ratio for 1970 is not credible, there are more girls than boys in most provinces. This anomaly is only limited to 0-4 years olds in 1970 and moreover, when we compare the number of 0-4 years old boys and girls in 1970 to 10-14 years old boys and girls to 1980, we discover that the number of girls have only changed by 30 thousand whereas number of boys in the same cohort have increased by almost two hundred thousand in 1980. As a result, we use 1975 0-4 years old boys-to-girls ratio as a proxy for 1970.

Table 1: Summary Statistics for All Variables in the Study

Year	1970		1980		1990		2000		2012	
	Mean	**St. dev.**	**Mean**	**St. dev.**	**Mean**	**St. dev.**	**Mean**	**St. dev.**	**Mean**	**St. dev.**
Teacher per 100 students, all levels	2.89	(0.27)	4.30	(0.83)	4.15	(1.06)	4.49	(0.92)	5.66	(1.07)
Teacher per 100 students, primary	2.76	(0.29)	4.14	(0.82)	3.83	(1.08)	4.07	(0.77)	5.67	(1.07)
Teacher per 100 students, middle	3.72	(0.87)	3.37	(1.12)	4.11	(1.07)	4.07	(0.77)	5.74	(1.25)
Teacher per 100 students, high	5.41	(1.41)	8.52	(3.21)	6.15	(1.41)	6.29	(1.44)	5.58	(1.18)
Teacher per 100 children, all levels	1.70	(0.35)	2.52	(0.67)	2.80	(0.85)	4.42	(0.90)	5.66	(1.07)
Teacher per 100 children, primary	2.76	(0.65)	4.03	(1.12)	3.69	(1.09)	3.69	(0.69)	6.40	(1.10)
Teacher per 100 children, middle	0.90	(0.29)	1.05	(0.55)	1.83	(0.79)	3.61	(1.19)	5.99	(1.20)
Teacher per 100 children, high	0.44	(0.23)	1.21	(0.53)	2.21	(0.84)	3.34	(1.30)	5.40	(1.56)
Nurse per 10000 residents	7.28	(2.82)	10.97	(3.63)	16.25	(5.85)	25.41	(8.01)	45.14	(11.10)
Girls' net enrollment, primary	0.66	(0.22)			0.83	(0.13)	0.88	(0.12)	0.98	(0.02)
Girls' net enrollment, middle	0.08	(0.05)			0.29	(0.15)	0.77	(0.18)	0.93	(0.04)
Girls' net enrollment, high	0.02	(0.02)			0.19	(0.10)	0.32	(0.14)	0.73	(0.13)
Boys' net enrollment, primary	0.86	(0.13)			0.89	(0.08)	0.92	(0.12)	0.98	(0.01)
Boys' net enrollment, middle	0.20	(0.07)			0.51	(0.14)	0.87	(0.13)	0.93	(0.04)
Boys' net enrollment, high	0.07	(0.03)			0.33	(0.10)	0.43	(0.11)	0.70	(0.15)
Land Gini coefficient	0.54	(0.09)	0.52	(0.08)	0.51	(0.09)	0.49	(0.08)		
Kurdish speakers' share	0.16	(0.26)			0.17	(0.27)	0.16	(0.24)		
Tot. fatalities per 100000[a]	0	0	0	0	4.86	(18.97)	12.19	(33.45)	2.58	(10.05)
GDP per capita	593.47	(266.43)	762.30	(448.31)	1171.10	(628.41)	1416.16	(846.94)		
Urbanization rate	0.32	(0.12)	0.37	(0.12)	0.48	(0.13)	0.55	(0.12)	0.65	(0.14)
Population density	54.37	(60.12)	67.64	(93.82)	82.90	(139.00)	103.14	(209.31)	117.49	(290.31)
Boys-to-girls ratio (age 0-4)	1.05	(0.03)	1.05	(0.02)	1.05	(0.02)	1.06	(0.02)	1.05	(0.01)
School age pop. gr %[a]	2.52	(1.31)	1.29	(1.53)	1.18	(1.63)	-0.89	(1.82)	-1.79	(1.92)

a: Within the preceding decade.

Table 1 also shows that key variables of interest, share of Kurdish population and land Gini coefficient, do not vary over the years which make panel data fixed effect regressions unsuitable for this research. Total fatalities per 100,000 figures represent the preceding decade and show that 1991-2000 was the most intense period. The relative size of the mean and the standard deviation shows the extreme concentration of conflict casualties in certain provinces. Over the study period, GDP per capita, urbanization rate, and population density variables have all increased as expected in a developing country. Again as expected from a developing country, growth rate of school age children has declined over the study period. Finally, the boys-to-girls ratio (ages zero to four) variable does not show much variation over the years, however the standard deviation declines over the years indicating much less extreme observations above 1.082 by 2012.

3.2 Empirical Methodology

A number of studies use provincial level data to test the effectiveness of institutional structure in Turkey. These studies generally use panel data fixed effect methods to control for unobserved variation in order to focus on the effectiveness of specific policies (e.g. Luca and Rodrigues-Pose, 2015; Cesur et al., 2015; Cesur et al., 2016)[28]. All of these studies employ fixed effects panel data methods to control for unobserved heterogeneity at province level[29]. The province-level fixed-effects regressions would not be appropriate for long-standing regional differences in Turkey, because province level wealth inequality (proxied by land inequality) and ethnicity data do not exhibit significant variations over time. On the contrary, they are two important 'socio-political cleavages' that affect long-standing regional gaps in the institutional and socioeconomic structure (Güvenç and Kirmanoğlu, 2009). For this reason, we control yearly fixed effects and only broad regional fixed effects[30] instead of province level fixed effects for examining the factors that affect enrollment rates for boys and girls, teacher per student and teacher per school-age children ratios. We expect that broad regional fixed effects would not absorb all of cross-province variation but they will absorb large differences across regions.

First, we employ OLS with clustered standard errors at province level to estimate the net primary, middle and high school enrollment rates for boys and girls with the following equation:

[28] Luca and Rodrigues-Pose (2015) study allocation of public investment at province level; Cesur et al. (2015) study whether the Family Medicine Program reduced mortality rates; Cesur et al. (2016) studies the link between air pollution and infant mortality.

[29] Solon et al. (2015) point out that with province or state level data (for example different from micro data collected with stratified sampling) the purpose of weighting primarily is to reduce standard errors. Hence they recommend to present estimates from province level data with and without weights applied and if weighting do not reduce standard errors they suggest to use estimates without weights for discussion. We find that weighting provinces for population do not reduce standard errors so we present unweighted estimates in the paper due to space considerations. The weighted estimates are available from authors upon request.

[30] We divide Turkey into five broad regions: West (TR1, TR2, TR3, and TR4), South (TR6), Central (TR5 and TR7), North (TR8 and TR9), and East (TRA, TRB, TRC). As a robustness check, we recalculated OLS estimates without region dummies. Our coefficient estimates are very close to estimates including regional fixed effects (see Appendix D).

$$Enroll_{it} = \beta_0 + \beta_1 Gini_{it} + \beta_2 Kurd_{it} + \beta_3 Conf_{it} + \beta_k X_{itk} + \alpha_t + \gamma_j + e_{it} \quad (1)$$

where the effect of land distribution inequality ($Gini_{it}$), and the number of causalities per 100000 within the past 10-years ($Conf_{it}$) and the share of Kurdish population ($Kurd_{it}$) enrollment rate in each year (t) are controlled for each province (i). α_t and γ_j are respectively year and region variables. X_{itk} is a vector of other control variables that are expected to affect the enrollment rates in provinces.

Following Wegenast (2010), Kourtellos, et al. (2013), we expect the land Gini variable ($Gini_{it}$) to have a negative coefficient. More unequal land distribution would lead to higher poverty, which would make sending children to school harder for poorer families. Moreover, the impact of the share of Kurdish population on school enrollment might be negative due to possible impediments caused by the omission of education in the mother tongue in the Kurdish regions (Coşkun et al., 2011). On the other hand, Kurdish families might be eager to send their children to school so that they can learn the dominant language of the country. In other words, the relationship between mother tongue and enrollment is not as clear-cut as the relationship between instruction in mother tongue and learning outcomes. We mainly expect a negative coefficient for the conflict intensity variable, because families may be unwilling to send their children to school. However, as we noted earlier, there is no clear-cut stylized fact characterizing the relationship between conflict and school enrollment. The conflict in the region might also have increased enrollment especially in primary schools through pushing residents of the smallest rural settlements to larger villages.

We expect a negative coefficient for the boys-to-girls ratio dummy variable, since a skewed gender ratio for infants and toddlers may reflect skewed gender preferences of parents in favor of boys (Sen, 1990). We use the missing girls as a proxy for the existence of heavy patriarchal norms. These patriarchal norms may also affect schooling decisions to a smaller extent for boys.

We expect positive coefficients for urbanization and GDP per capita. Lower incomes reduce the capabilities of school enrollment and urbanization increases the returns on education. The population density would have an ambiguous sign. The return to education might be greater in more urban areas, which would make school enrollment more desirable. However, the crowding might also affect education quality negatively, which might lead to school dropouts. We also expect positive coefficients for year dummy variables; especially 2000 for middle school enrollment regressions since middle school enrollment became compulsory in 1997.

Next, we estimate the factors behind teachers-to-students and teachers-to-school age children ratios using OLS regressions with yearly and regional fixed effects. Number of teachers per 100 students ($Teach/Stu_{it}$) shows the number of teachers that the Turkish State appoints for the given public demand for education. We estimate this variable for primary, middle, high and all school levels with the following equation:

$$Teach/Stu_{it} = \beta_1 Gini_{i(t-1)} + \beta_2 Kurd_{i(t-1)} + \beta_3 Conf_{i(t-1)} + \beta_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{it} \quad (2)$$

We also test for the number of teachers per 100 school age children ($Teach/Child_{it}$) with a similar equation:

$$Teach/Child_{it} = \beta_1 Gini_{i(t-1)} + \beta_2 Kurd_{i(t-1)} + \beta_3 Conf_{i(t-1)} + \beta_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{it} \quad (3)$$

The number of teachers per 100 school age children also reflects the supply of education investments and it has weaknesses and strengths compared to the number of teachers per students. On the one hand, the teacher-to-student ratio reflects the number of teachers hired for the existing demand for public education. On the other hand, there are regions where the schools themselves do not exist or are too far for the poor students to attend. The non-availability of schools can be more accurately captured with the teacher-to-school age children ratio.

Unlike the studies on Brazil (Wegenast 2010), India (Banerjee and Iyer, 2005) or the US (Ramcharan, 2010; Galor, et al., 2010) we expect the land Gini coefficient to have a smaller impact on education investments. This is because unlike the above countries, Turkey does not have a federal state structure. Education investments in Turkey are centrally planned and are subject to the influence of the landlord class to a lower extent. We expect a negative effect of share of Kurdish population on teacher-to-student and teacher-to-school age children ratios, since less public investment and spending is noticeable in Kurdish majority provinces (Figure 2). Our expectations of the conflict intensity variable's impact are ambiguous and likely to differ at different levels of schooling. Teachers are likely to be unwilling to work in conflict zones (Kıbrıs, 2015), which would make the education investments in the region costly and less efficient. On the other hand, as discussed in section 2.2.2, the ethnic tensions created incentives for the Turkish State to teach Turkish, which would stimulate primary school investment.

We expect positive coefficients for urbanization, and GDP per capita, since education investments are more likely to be made in more developed urban regions where the returns to education are higher. The coefficient of population density can be positive, because densely populated provinces are generally more urbanized. However, it can also be negative if high population density is the result of rapid migration where public investment and government spending and investment may fall behind the population increase. We expect a negative coefficient for school age population growth since it can be very rapid vis-à-vis bureaucratic path dependency. Finally, we expect positive coefficients for year dummy variables for 1990 and 2012, since the state is expected to hire more teachers with economic development.

Finally, similar to the existing studies on land inequality (e.g. Ramcharan, 2010; Galor, et al., 2009; Easterly, 2007), we use measures of weather and geography as instruments for land concentration. Unfortunately, the commonly used instruments for weather and geography are likely to be correlated with our dependent variables especially in mountainous provinces and/or where winter is harsh. Therefore, we only present OLS results in the main text. IV-2SLS estimates for school enrollment, for the teacher-student ratios, and for teacher-to school age children are available in Appendix B. Although the magnitudes of the estimated coefficient are different, results are qualitatively mostly similar.

Table 2: Pooled OLS Estimates for Net Enrollment (1970, 1990, 2000)

	Girls' net enrollment			Boys' net enrollment		
	Primary	Middle	High	Primary	Middle	High
Gini coef. for land distr.	-0.311**	-0.270**	-0.115	-0.235**	-0.253**	-0.129**
	(0.135)	(0.122)	(0.075)	(0.096)	(0.100)	(0.063)
Log of Kurdish %	-0.094***	0.006	0.017*	-0.030**	-0.014	-0.008
	(0.015)	(0.011)	(0.010)	(0.014)	(0.010)	(0.008)
Log of total civilian and security fatalities	0.059***	-0.033*	-0.020*	0.063***	0.009	-0.022***
	(0.010)	(0.017)	(0.012)	(0.010)	(0.010)	(0.007)
Boys-to-girls ratio dummy	-0.009	-0.054**	-0.030**	0.005	-0.035**	-0.028**
	(0.031)	(0.022)	(0.014)	(0.025)	(0.013)	(0.012)
Urban	0.102	0.170**	0.182***	-0.109	0.140*	0.157**
	(0.071)	(0.085)	(0.056)	(0.069)	(0.083)	(0.063)
Log of gdp pc	0.105***	0.117***	0.100***	0.091***	0.121***	0.089***
	(0.025)	(0.023)	(0.017)	(0.022)	(0.019)	(0.017)
Log of pop. density	0.034**	-0.009	-0.021*	0.057***	0.004	-0.026**
	(0.014)	(0.016)	(0.012)	(0.013)	(0.014)	(0.011)
1990 dv	0.067***	0.113***	0.077***	-0.055**	0.193***	0.191***
	(0.024)	(0.023)	(0.018)	(0.023)	(0.020)	(0.015)
2000 dv	0.073**	0.581***	0.189***	-0.057*	0.521***	0.279***
	(0.031)	(0.034)	(0.024)	(0.029)	(0.028)	(0.020)
South	-0.004	0.000	-0.008	-0.007	-0.011	0.010
	(0.029)	(0.021)	(0.017)	(0.024)	(0.019)	(0.021)
Central	0.007	-0.012	-0.036*	0.003	0.009	0.012
	(0.023)	(0.024)	(0.021)	(0.023)	(0.023)	(0.019)
North	-0.097***	-0.019	-0.006	-0.055**	-0.008	0.041***
	(0.027)	(0.021)	(0.017)	(0.022)	(0.020)	(0.015)
East	0.032	-0.053*	-0.069**	0.016	0.014	0.026
	(0.033)	(0.031)	(0.027)	(0.033)	(0.029)	(0.029)
Constant	0.149	-0.484***	-0.510***	0.245*	-0.464***	-0.353***
	(0.165)	(0.138)	(0.102)	(0.137)	(0.120)	(0.106)
Number of Observations	221	221	221	221	221	221
R-squared	0.747	0.934	0.844	0.455	0.931	0.891

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

3.3 Empirical Results

In this section we present pooled OLS estimates for school enrollment, for teacher-to-student and teacher-to-school age children ratios[31].

3.3.1 School Enrollment

We present the OLS results for school enrollment in Table 2. As expected the effect of the land Gini coefficient is negative and significant except for girls' high school enrollment. The

[31] Alternative estimates of yearly fixed effects, panel fixed effects, panel random effects, instrumental variables and population weighted IV results for each regression are available from authors upon request. We only discuss full models in the main text because of space considerations (in total, we have 14 different dependent variables). In Supplementary Materials we present regression results where we add the explanatory variables to OLS regressions one by one for selected dependent variables. For the main variables of interest (land inequality, share of Kurdish speakers and conflict intensity), the results are not qualitatively different when we drop any of the other explanatory materials.

coefficient of land Gini for girls' high school enrollment is also negative and roughly the same size with boys' high school enrollment, but it has higher standard errors. The coefficient on the share of Kurdish speakers is generally close to zero except for primary school enrollment. The coefficient size is significantly larger for girls' primary school net enrollment, which is consistent with the previous studies based on micro data (Kırdar, 2009; Smits and Gündüz-Hoşgör, 2006). This outcome might be due to several reasons. Considering that the negative impact of speaking Kurdish is larger for girls, there might be an unfavorable attitude of Kurdish parents' toward their daughter's education due to historical and cultural factors (Kırdar, 2009). Moreover, Kurdish girls are less exposed to the world outside their households than Kurdish boys, which limits their proficiency in Turkish (Derince, 2012). Also Kurdish families might have extra incentives for insisting on their boys' education, since learning advanced level Turkish would relieve an important barrier to Kurdish men for working in nonagricultural jobs and any bureaucratic tasks. This might apply less for Kurdish women, since the labor participation rates for women have been very low in Turkey.

Signs of the conflict variable are significantly positive for primary school enrollment. These findings are unexpected but similar to Berker (2012). Rural settlements' migration from smaller rural hamlets to larger villages with primary schools might have led to this outcome. The conflict variable is significant and negative for boys' high school enrollment (at 5% level) and it's significantly negative for girls' middle and high school enrollment (at 10% level). Hence, rising insecurity in the region might also have discouraged families from sending their children to middle and high schools.[32]

According to most specifications, growth in GDP per capita and urbanization in provinces statistically significantly increase school enrollment as expected. 'Missing girls' (boys-to-girls ratio) dummies for patriarchal attitudes are mostly negative. The coefficients are significant at 5% for middle and high school levels and are larger for girls' enrollment at middle school. The school enrollment also increases with time, and the coefficient estimate for year 2000 dummy variable is significantly larger than the estimate for 1990 especially for middle school enrollment. This probably reflects the impact of the compulsory education law of 1997, which extended mandatory education from 5 to 8 years.

3.3.2 Teacher-to-Student and Teacher-to-Children Ratios

Table 3 and Table 4 respectively present the OLS results for number of teachers per 100 students and teachers per 100 school age children. Contrary to existing literature, the coefficient estimates for the land Gini variable are statistically insignificant and has mixed signs for teacher-to-student and teacher-to-school age children ratios. Unlike other countries (USA, India, and Brazil) studied in the literature, education spending is financed by central government in Turkey. Although landlords in Turkey have an influence on the central

[32] We alternatively estimated the effect of conflict by dropping the intensity of conflict variable and introducing Kurdish population share variables interacted with the year dummies (see Table C1). Similar to our findings in Table 2, the Kurdish population share increases primary school enrollment and decreases middle and high school enrollment decrease during conflict years.

government (e.g. Beşikci, 1970; McDowall, 2003; Özer, 2000; Ateş Durç, 2009), their capabilities to resist spending on schools are weaker compared to countries with federal state structures. Moreover, they have smaller incentives, since the education expenditures are financed from the central budget.

Table 3: Pooled OLS Estimates for Teacher-to-student Ratio (1980, 2000, 2012)

	Number of teachers per 100 student			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.385	0.327	0.870	2.669
	(0.493)	(0.524)	(0.747)	(1.773)
Log of Kurdish % t-1	-0.306***	-0.227**	-0.536***	-0.888***
	(0.100)	(0.108)	(0.136)	(0.236)
Log of security and civilian fatalities prev. 10 years	-0.080	-0.091*	0.034	0.103
	(0.065)	(0.050)	(0.095)	(0.155)
Urban t-1	0.214	-0.132	0.159	1.463
	(0.490)	(0.439)	(0.715)	(1.266)
Log of gdp pc t-1	0.557***	0.643***	0.184	0.375
	(0.119)	(0.121)	(0.139)	(0.315)
Log of pop. density t-1	-0.504***	-0.425***	-0.402***	-0.829***
	(0.106)	(0.101)	(0.147)	(0.221)
5-14 pop. gr. previous 10 years	-0.252***	-0.235***	-0.232***	-0.254***
	(0.024)	(0.030)	(0.031)	(0.074)
2000 dv	-0.433***	-0.694***	0.292*	-2.765***
	(0.135)	(0.136)	(0.153)	(0.505)
2012 dv	0.452***	0.626***	1.830***	-3.619***
	(0.168)	(0.176)	(0.219)	(0.572)
South	0.026	-0.003	0.265	-1.058**
	(0.213)	(0.223)	(0.258)	(0.495)
Central	-0.296**	-0.192	-0.068	-1.324***
	(0.139)	(0.160)	(0.195)	(0.498)
North	-0.199	-0.165	-0.255	-1.206**
	(0.142)	(0.149)	(0.181)	(0.478)
East	-0.068	0.086	0.183	-0.866
	(0.274)	(0.300)	(0.302)	(0.658)
Constant	3.549***	2.455***	4.574***	10.207***
	(0.808)	(0.790)	(1.067)	(2.078)
Number of Observations	229	229	229	229
R-squared	0.773	0.752	0.741	0.538

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

The share of Kurdish population in provinces has a significantly negative impact on teacher-to-student and teacher-to school age children ratio except at high school level for teacher-to school age children. However, the sizes of Kurdish population's coefficient on teacher-to-student ratio are greater for high schools compared to primary and middle schools. Given the high school enrollment rates, this finding shows that the education investments in Kurdish majority provinces were neglected especially at the higher levels of schooling. All the other variables have the expected signs: provinces with higher GDP per capita have more favorable teacher-to-student and especially teacher-to-school age children ratios; more

densely populated provinces and provinces with faster growth in school age children have more crowded classrooms.

We generally find insignificant effect of armed conflict on teacher-to-student and teacher-to-school age ratios except for primary level. At primary level, our findings indicate that conflict increased teacher-to school age children ratio. This is an unexpected outcome considering that PKK's attacks on teachers discussed in Section 2.2.4 made teaching in the conflict region very undesirable for teachers and costly for the Turkish State. Table 5 presents a separate analysis that uses interaction terms- lags of Kurdish population shares multiplied by the year dummy variables for the years of conflict and post-conflict- rather than the conflict variable. Similar to Tables 3 and 4, Table 5 shows a negative impact of the Kurdish population, which supports the argument that the historical neglect in Kurdish provinces exists regardless of the conflict. The interaction terms with insurgency years have statistically

Table 4: Pooled OLS Estimates for Teacher-School Age Children Ratio (1980, 2000, 2012)

	Number of teachers per 100 children			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.247	-0.058	-0.213	-0.262
	(0.440)	(0.688)	(0.651)	(0.809)
Log of Kurdish % t-1	-0.399***	-0.360***	-0.277***	-0.145
	(0.087)	(0.104)	(0.094)	(0.111)
Log of security and civilian fatalities prev. 10 years	-0.008	0.155***	-0.208*	-0.094
	(0.061)	(0.055)	(0.108)	(0.101)
Urban t-1	0.444	-0.283	0.865	2.106***
	(0.459)	(0.484)	(0.694)	(0.658)
Log of gdp pc t-1	0.554***	0.740***	0.567***	1.283***
	(0.108)	(0.137)	(0.153)	(0.175)
Log of pop. density t-1	-0.423***	-0.174	-0.386***	-0.543***
	(0.099)	(0.105)	(0.139)	(0.120)
5-14 pop. gr. previous 10 years	-0.236***	-0.311***	-0.288***	-0.263***
	(0.023)	(0.033)	(0.031)	(0.041)
2000 dv	1.201***	-1.411***	1.744***	0.694**
	(0.143)	(0.156)	(0.217)	(0.274)
2012 dv	2.187***	1.033***	3.695***	2.183***
	(0.159)	(0.203)	(0.240)	(0.315)
South	0.116	0.076	0.093	-0.035
	(0.175)	(0.242)	(0.176)	(0.194)
Central	-0.077	-0.086	-0.228	-0.316
	(0.132)	(0.185)	(0.166)	(0.207)
North	-0.151	-0.431**	-0.262	0.257
	(0.121)	(0.174)	(0.164)	(0.181)
East	0.135	0.274	0.100	-0.164
	(0.247)	(0.265)	(0.245)	(0.314)
Constant	1.486*	1.156	-0.020	-4.588***
	(0.750)	(0.901)	(0.990)	(1.112)
Number of Observations	229	229	229	229
R-squared	0.901	0.848	0.912	0.876

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

significantly negative signs for combined school levels, which hints the effects of armed conflict on teacher-to-student and teacher-to-school age children ratios might be indirect. Our data shows that the conflict was significantly more intense in provinces such as Şırnak, Hakkari, Siirt, Bingöl, Bitlis, Mardin and Tunceli than other provinces with a Kurdish majority. However, we find a significant effect of conflict not with number causalities but with interaction terms for the years of insurgency. In other words, the conflict might have discouraged white-collar workers from working in all Kurdish majority provinces regardless of the intensity of the conflict. This avoidance of serving in the region could either take the form of teacher absenteeism or make recruitment and retention of teachers in public schools in Kurdish regions costlier.

Table 5: Period-Based Effect of Kurdish Speakers' Share (Pooled OLS estimates; 1980, 2000, 2012)

	All levels	Primary	Middle	High
Teacher-to-student				
Gini coef. for land distr. t-1	0.318	0.258	0.849	2.740
Log of Kurdish % t-1	-0.212**	-0.166	-0.488***	-1.000***
Log of Kurdish % t-1 * 2000	-0.202***	-0.143**	0.002	0.274
Log of Kurdish % t-1 * 2012	-0.263***	-0.241**	-0.168	0.263
Number of Observations	229	229	229	229
R-squared	0.782	0.758	0.744	0.540
Teacher-to-children				
Gini coef. for land distr. t-1	0.209	0.009	-0.308	-0.426
Log of Kurdish % t-1	-0.306***	-0.467***	-0.111	0.202*
Log of Kurdish % t-1 * 2000	-0.135**	0.366***	-0.528***	-0.568***
Log of Kurdish % t-1 * 2012	-0.218***	0.174**	-0.270**	-0.845***
Number of Observations	229	229	229	229
R-squared	0.904	0.856	0.920	0.905

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively. Tables C2 and C3 in Appendix C present the complete results for these regressions.

The impact of conflict at different school levels is more complicated. The intensity of armed conflict significantly positively affected the Teacher-to-school age children ratio at primary level (Table 4). Moreover, the interaction terms between the share of Kurdish population and 2000 and 2012 dummies are also statistically significantly positive (Table 5). Hence, primary schools had a different experience in terms of the conflict's impact. As discussed in Section 2.2.2, teaching Turkish has historically been seen as an important tool for avoiding possible conflicts through "integrating Kurds" (Yeğen, 2007; Yayman, 2011). Consistent with this, after the start of the conflict between the PKK and the Turkish State, the Turkish State implemented several measures for promoting primary school enrollment in the regions/provinces with a Kurdish majority. These measures might have increased the demand on primary school education, although the supply of teachers was still insufficient.

Top half of Table 5 shows that the interaction terms between Kurdish population and years of armed conflict are statistically insignificant for teacher-to-student ratios at middle

and high school levels. Finally, for the teacher-to-school age children ratios in middle and high schools, we find negative coefficients for interaction terms for years 2000 and 2012. This finding suggests that Turkish governments' efforts were mainly focused on primary education for "integrating Kurds".

4. Discussion: Mechanism behind the regional gaps

In this section, we discuss the main factors that led to the regional gaps in Figure 1 and Figure 2 by referring to the economic significance of the coefficients estimated. For our analysis, we multiplied the coefficient estimates from Tables 2, 3 and 4 with Southeastern Turkey's and the rest of Turkey's means for respective independent variables to decompose the contribution of independent variables. Then we take the difference of variables' contribution to calculate the contribution of each variable to the difference between Southeastern Turkey and the rest of the country. In our analysis, we focus on the contributions of the share of land Gini coefficient, Kurdish population, and the number of civilian and security fatalities in conflict between the PKK and the Turkish State. The "other" factors include both the contribution of control variables as well as the unobserved variables. Following Ziliak and McCloskey (2004, 2008)'s critiques on the dismissal of statistically insignificant variables, we account for the effects of variables that are statistically insignificant in our analysis.

4.1 Enrollment

Figure 6 and Figure 7 respectively decompose the factors that led to the total difference in school enrollment between Southeastern Turkey and the rest of the country. Figure 6 shows that girls' primary school enrollment rate was around 40 percentage points lower in Southeastern Turkey compared to the rest of Turkey in 1970. The gap declined over time as primary school education became more common. The Kurdish share emerges as the factor that has the largest effect on the regional gaps in girls' primary school enrollment and accounts for 16.2-19.1 percentage points of the gap. The Kurdish share's contribution on boys' primary school enrollment is smaller as it accounts 5.1-6.1 percentage points of the gap. Nevertheless, the share of Kurdish population appears to have a large impact only on the regional gaps in primary school enrollment. Its contribution to the regional gaps is negative for girls' middle or high school enrollment and less than three percentage points for boys' enrollment at middle or high school (Figure 7). The fact that girls' primary school enrollment is more strongly affected by the share of Kurds in a province suggests that the burden of 'being Kurdish' is larger for girls for the reasons discussed above.

We find consistent evidence for the negative relationship between land distribution inequality and school enrollment. Specifically, land inequality explains 2.7-5.3 percentage points of the regional gap in both girls' and boys' primary and middle school enrollments. The most likely mechanism in this relationship is the poverty channel. Poverty is more likely to be prevalent in provinces with more unequal distribution of land and hence poverty

compels parents to forgo education because they need their children's labor income or they cannot afford to send the kids to school. The land inequality's effect is only 1.3-2.0 percentage points of the regional gap and is insignificant for girls' high school enrollment. This is probably because high school education was not widespread between 1970 and 2000.

Figure 6: Girls' Net Enrollment Rate: Predicted contribution of each factor on the differences between Southeastern and rest of Turkey over the years

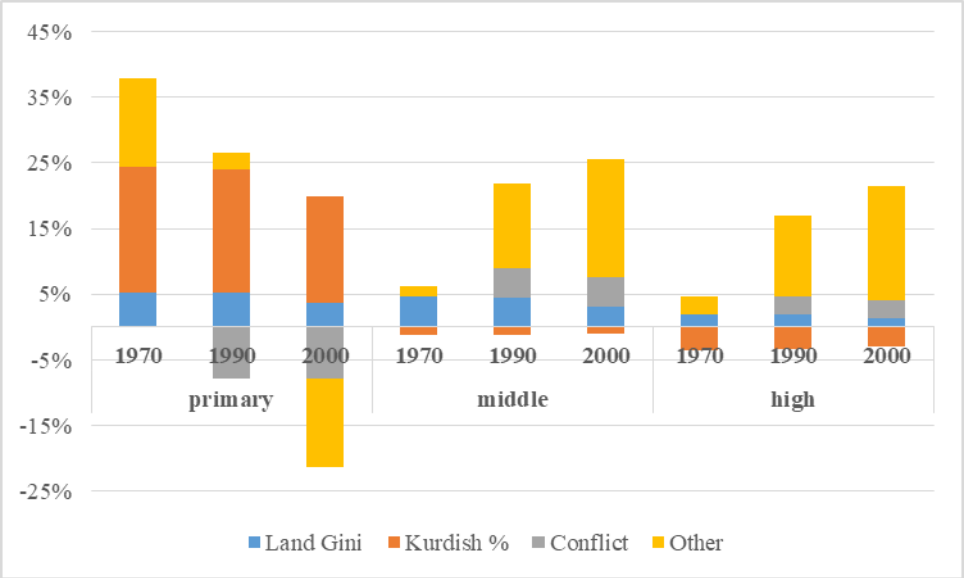
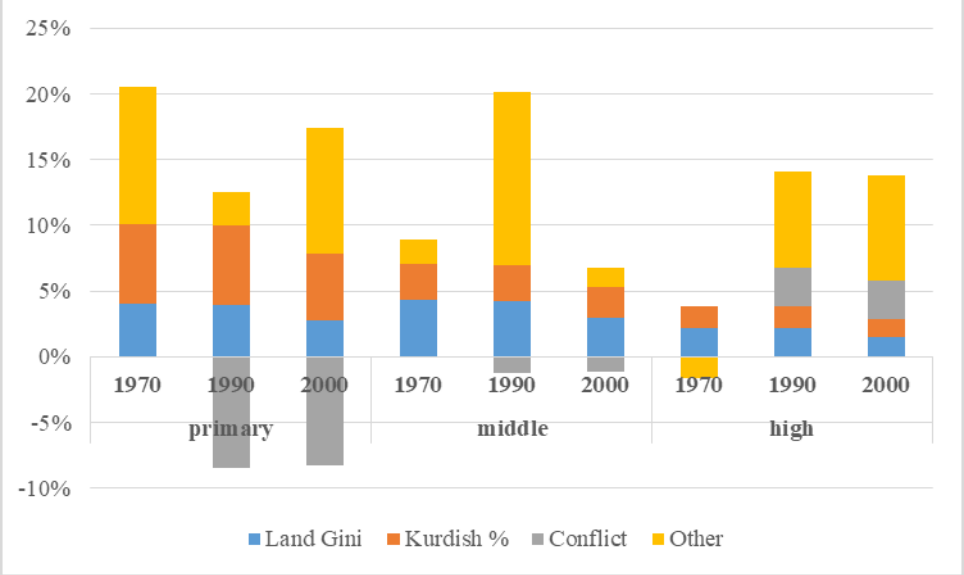


Figure 7: Boys' Net Enrollment Rate: Predicted contribution of each factor on the differences between Southeastern and rest of Turkey over the years



Last, the insurgency between the PKK and the Turkish State contributes to the regional gaps by roughly by 4.5 percentage points for girls' middle school and roughly by 3 percentage points for boys' high school enrollment during the conflict era. The coefficients for the conflict are respectively significant at 10% level for the former and at 1% for the latter. Hence, the conflict reduced the enrollment rates at some levels as expected. Unexpectedly, we find that the conflict helped to partially close the regional gaps in both boys' and girls' primary school enrollment by 7.8-8.4 percentage points.

4.2 Teacher-Student and Teacher-Children Ratios

We perform a similar exercise for teacher-to-student and teacher-to-school age children ratios employing coefficient estimates from Table 3 and Table 4. Inspecting Figure 8 and Figure 9 reveals some commonalities and differences. The direct impact of intensity of conflict has a small effect throughout years and education levels except for teacher-to school age children at primary and middle school levels.

The impact of Kurdish population share is significant for both indicators. Moreover, for all levels, it contributes to the regional gaps between Southeastern Turkey and other provinces more than land inequality and the intensity of conflict variables. According to our estimates for all levels, we find that 0.53-0.62 of the teacher per 100 students gap between Southeastern and other provinces is explained merely by the share of Kurdish population in Southeastern Turkey. Similarly, the dominant share of Kurdish population made number of teachers per 100 school age children in Southeastern Turkey 0.69-0.81 lower than the rest of the country.

Our findings support the view that Kurdish majority provinces receive less public spending even after controlling for a host of confounding factors including intensity of armed conflict. The effect of ethnicity in allocation of public spending holds for every decade studied in this paper. One potential reason for this preference in allocation of public spending/investment is that electoral returns of public spending in Kurdish majority provinces are low for majority parties. Güvenç and Kirmanoğlu (2009) show that over a long period of time (from 1950 to 2009; 16 general elections) the Kurdish majority regions (East and South-east) are more likely to support "independents" or candidates from an ever-changing cast of smaller parties emphasizing Kurdish ethnic identity. In other words, there is a limit to how much a national party can garner support from Kurdish majority provinces only with public investment without any overtures to ethnic identity.

The rising conflict can also partially explain the lack of educational investments in provinces with Kurdish majorities. Figures 8 and 9 reflect that the conflict had small direct effect on regional gaps in teacher-to-student and teacher-to-school age population ratios. Nevertheless, the exercise with interaction terms in Table 5 show that the influence of the share of Kurdish population on teacher-to-student and teacher-to-school age population ratios are exerted indirectly.

Figure 8: Teacher-to-student Ratio: Predicted contribution of each factor on the differences between Southeastern and rest of Turkey over the years

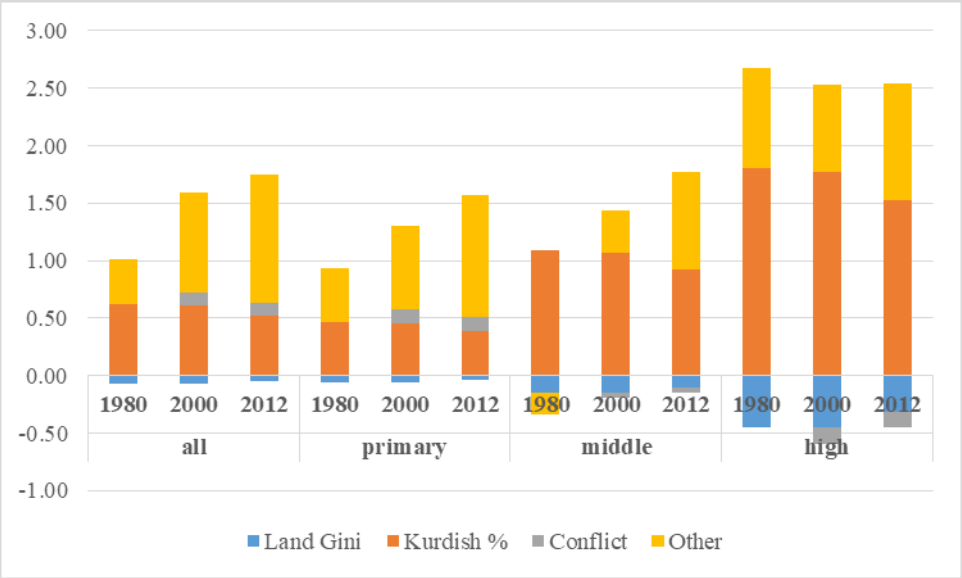
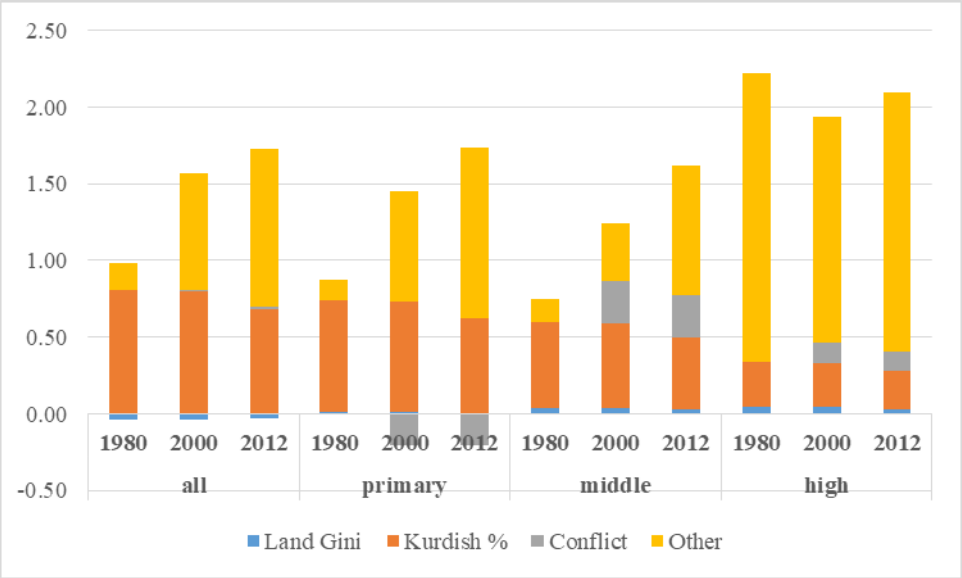


Figure 9: Teacher-to-children Ratio: Predicted contribution of each factor on the differences between Southeastern and rest of Turkey over the years



5. Conclusion

In this paper, we have investigated the role of ethnicity, conflict intensity and agricultural land inequality on the lower school enrollment rate and educational investment in Southeastern Turkey. We find that province-level land inequality is an important factor behind the gaps in school enrollment between Southeastern Turkey and the rest of the country. Higher land inequality leads to a higher level of rural poverty, which constrains the choices of poorest

households. We also find that share of Kurdish population in a province significantly reduces primary school enrollment rates and the negative effect is larger for girls' enrollment rate. However, provinces with higher share of Kurdish speakers consistently received less educational investment per student or per child at every level. Moreover, we find that land inequality at province level does not affect education spending in a province. We believe that this unexpected finding is the result of centralized financing of education spending in Turkey.

Finally, we find both positive and negative effects of conflict intensity in Southeastern Turkey on school enrollment and education spending depending on the level of education. On the one hand, the intensity of ethnic conflict both has increased enrollment at primary school level and decreased enrollment at middle and high school levels. We believe that the increase in primary school enrollment is due to forced agglomeration of small rural hamlets to larger villages or towns with schools. Successive Turkish governments also devoted more resources to primary schooling in order to quicken the integration of Kurds. On the other hand, the intensity of ethnic conflict has reduced enrollment at both middle and high school levels. The relative lagging of enrollment in conflict regions at middle and high school levels might be due to security concerns for travel or reduced expected returns from formal education due to lower learning outcomes for Kurdish speakers. We do not have enough evidence to determine the exact channels for lower enrollment at middle and high school levels.

Moreover, our results do not show a direct significant negative impact of the insurgency in Southeastern Turkey on teacher per student and teacher per school-age children ratios. However, the negative impact of the share of Kurdish population increases during years of armed conflict. This suggests that the effect of insurgency is spilling over to the neighboring Kurdish majority areas, which did not experience intense armed conflict, but are associated with the conflict. In these regions of conflict, recruitment and retention of teachers is probably harder and more expensive.

Our results suggest that wealth redistribution policies or policies favoring small farmers would also increase the levels of education. Moreover, we believe that the Turkish State should put greater emphasis on reducing the socioeconomic gaps between Southeastern Turkey and the rest of Turkey. This requires greater public spending on socioeconomic investments in Southeastern Turkey. Also, the resolution of on-going ethnic tension and armed struggle in Southeastern Turkey would be an important step in reducing the regional socioeconomic gaps. However, the policies for ending the ethnic conflict in Southeastern Turkey are beyond the scope of this paper. These policies might include a greater recognition of Kurdish cultural identity by the Turkish State and also the possible steps that both the Turkish State and Kurdish Nationalist Movement can take to end the violence in the area. Last, we believe that the education in Kurdish mother tongue might reduce the impediments on education especially of girls.

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Appendix A: Construction of Net School Enrollment Ratio Data

Ministry of Education (MoE) did not produce official enrollment ratio (net or gross) statistics at province level until late-1990s. However, MoE annual statistical yearbooks provide number of students at state and private schools for each year at each level of education. Some of the statistical yearbooks also provide the age or year of birth for students at each school level. We also obtained the number of boys and girls at 5-9, 10-14 and 15-19 age groups for each province from the population censuses, which would allow us to calculate the net enrollment ratios (for 1970, 1990, and 2000; 2012 is readily available from Turkstat web-site) as well as gross enrollment ratios both for girls and boys. For net enrollment ratio at primary school we use the following formula: "Number of students aged between 7 and 11 enrolled at school at the beginning of school year" divided by "0.6 times the number of 5-9 years olds in the province plus 0.4 times the number of 10-14 years olds in the province". For middle school net enrollment rate we use the following formula: "Number of students aged between 12 and 14 enrolled at school at the beginning of school year" divided by "0.6 times the number of 10-14 years olds in the province". For high school net enrollment rate we use the following formula: "Number of students aged between 15 and 17 enrolled at school at the beginning of school year" divided by "0.6 times the number of 15-19 years olds in the province".

Appendix B: IV-2SLS Estimates

The land inequality is commonly instrumented by the geographical and climatic characteristics (e.g. Easterly, 2007; Ramcharan, 2010). However, these characteristics can also affect other economic variables, which in return affect redistributive policies and bias IV-2SLS estimates. Still in this appendix, we instrument the land inequality with geographical and climatic characteristics and report our IV-2SLS estimates for the robustness of our analysis. We expect higher and more volatile temperature to lead to higher land inequality, since these weather conditions might increase the vulnerability of the smaller farmers. Moreover, we expect a higher gap between lowest and highest altitude in a province to reduce the land inequality, since areas with greater variation in altitude might also be hilly which would geographically divide the land and not allow large plantations to exist. Among the possible altitude variables- average altitude, standard deviation of altitude and range of altitude; estimations with range of altitude performs best in the first stage of our analysis. Other measures of land concentration such as standard deviation of rainfall and crop suitability indices, which are commonly used in the literature (Easterly, 2007; Ramcharan, 2010) did not perform well in IV diagnostic tests. We obtained average and standard deviation of temperature from TÜMAS database of Turkey State Meteorological Service (2015). We obtained crop suitability indices from and elevation range from Arbatlı and Gökmen (2015) who have constructed their Turkey indices using FAO Global Agro-Ecological Zones database.

We estimate net enrollment for primary, middle, high and all school levels with the following IV-2SLS equations:

$$Gini_{it} = \alpha_0 + \gamma_n Y_{itn} + \alpha_1 Kurd_{it} + \alpha_2 Conf_{it} + \alpha_k X_{itk} + \alpha_t + \gamma_j + e_{it} \quad \text{(B1)}$$

$$Enroll_{it} = \beta_1 Gini_{it} + \beta_2 Kurd_{it} + \beta_3 Conf_{it} + \beta_k X_{itk} + \alpha_t + \gamma_j + e_{it} \quad \text{(B2)}$$

where $Y_{i(t-1)n}$ shows the vector of instruments for land Gini coefficient. We present the estimates in Table B1.

Next, we estimate teachers per 100 students for primary, middle, high and all school levels with the following IV-2SLS equations:

$$Gini_{i(t-1)} = \alpha_0 + \gamma_n Y_{i(t-1)n} + \alpha_1 Kurd_{i(t-1)} + \alpha_2 Conf_{i(t-1)} + \alpha_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{i(t-1)} \quad \text{(B3)}$$

$$Teach/Stu_{it} = \beta_1 Gini_{i(t-1)} + \beta_2 Kurd_{i(t-1)} + \beta_3 Conf_{i(t-1)} + \beta_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{it} \quad \text{(B4)}$$

where $Y_{i(t-1)n}$ shows the vector of instruments for land Gini coefficient. We exhibit our estimates in Table B2.

Table B1: IV-2SLS Estimates for Net Enrollment (1970, 1990, 2000)

	Girls' net enrollment			Boys' net enrollment		
	Primary	Middle	High	Primary	Middle	High
Gini coef. for land distr.	-0.178	-0.469	-0.359	-0.272	-0.617**	-0.454
	(0.369)	(0.341)	(0.234)	(0.280)	(0.268)	(0.343)
Log of Kurdish %	-0.101***	0.016	0.029*	-0.028	0.005	0.008
	(0.022)	(0.020)	(0.015)	(0.019)	(0.016)	(0.019)
Log of total civilian and security fatalities	0.059***	-0.033**	-0.020*	0.063***	0.010	-0.021***
	(0.010)	(0.016)	(0.011)	(0.010)	(0.009)	(0.008)
Boys-to-girls ratio dummy	-0.010	-0.052**	-0.028*	0.005	-0.032**	-0.026**
	(0.030)	(0.021)	(0.015)	(0.025)	(0.014)	(0.013)
Urban	0.092	0.184**	0.199***	-0.106	0.165**	0.180***
	(0.073)	(0.085)	(0.056)	(0.068)	(0.084)	(0.066)
Log of gdp pc	0.104***	0.119***	0.103***	0.091***	0.127***	0.094***
	(0.024)	(0.022)	(0.018)	(0.021)	(0.020)	(0.019)
Log of pop. density	0.033**	-0.007	-0.019	0.057***	0.008	-0.023*
	(0.014)	(0.017)	(0.012)	(0.013)	(0.015)	(0.012)
1990 dv	0.076***	0.100***	0.061***	-0.057**	0.170***	0.169***
	(0.028)	(0.028)	(0.022)	(0.028)	(0.024)	(0.029)
2000 dv	0.085**	0.563***	0.166***	-0.061	0.487***	0.249***
	(0.039)	(0.041)	(0.031)	(0.039)	(0.034)	(0.040)
South	-0.012	0.012	0.007	-0.005	0.011	0.029
	(0.035)	(0.028)	(0.021)	(0.028)	(0.027)	(0.032)
Central	0.004	-0.007	-0.031*	0.004	0.017	0.019
	(0.022)	(0.024)	(0.019)	(0.021)	(0.024)	(0.018)
North	-0.098***	-0.018	-0.005	-0.055***	-0.006	0.042***
	(0.026)	(0.020)	(0.016)	(0.021)	(0.020)	(0.015)
East	0.031	-0.051*	-0.066***	0.016	0.017	0.028
	(0.033)	(0.029)	(0.025)	(0.032)	(0.026)	(0.025)
Constant	0.112	-0.429**	-0.442***	0.255	-0.362**	-0.262*
	(0.218)	(0.178)	(0.120)	(0.155)	(0.143)	(0.145)
First stage for Gini coef. for land distr. t-1						
Average temperature	0.009***	0.009***	0.009***	0.009***	0.009***	0.006***
St. dev. temp.	0.021***	0.021***	0.021***	0.021***	0.021***	
Elevation range (1000m's)	0.007	0.007	0.007	0.007	0.007	
Kleibergen-Paap rk LM stat.	22.874***	22.874***	22.874***	22.874***	22.874***	10.650***
Kleibergen-Paap rk Wald F statistic	9.994	9.994	9.994	9.994	9.994	9.584
Hansen J Statistic	2.899	0.601	2.481	1.079	0.533	-
Number of Observations	221	221	221	221	221	221
R-squared	0.745	0.933	0.835	0.455	0.925	0.878

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively. 3 IVs: Stock-Yogo weak ID critical test values are 22.30 for a 10% maximal IV size, 12.83 for a 15% maximal IV size, 9.54 for a 20% maximal IV size, and 7.80 for 25% maximal IV size. 1 IV: Stock-Yogo weak ID critical test values are 16.38 for a 10% maximal IV size, 8.96 for a 15% maximal IV size, 6.66 for a 20% maximal IV size, and 5.53 for 25% maximal IV size.

Table B2: IV-2SLS Estimates for Number of Teachers per 100 Students (1980, 2000, 2012)

	Number of teachers per 100 student			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	2.143	2.163	4.675*	1.375
	(1.943)	(1.992)	(2.607)	(5.111)
Log of Kurdish % t-1	-0.375***	-0.299**	-0.685***	-0.837***
	(0.129)	(0.136)	(0.172)	(0.301)
Log of security and civilian fatalities prev. 10 years	-0.086	-0.097**	0.021	0.108
	(0.067)	(0.050)	(0.109)	(0.149)
Urban t-1	0.087	-0.264	-0.116	1.557
	(0.498)	(0.434)	(0.780)	(1.179)
Log of gdp pc t-1	0.545***	0.631***	0.159	0.383
	(0.115)	(0.115)	(0.138)	(0.308)
Log of pop. density t-1	-0.509***	-0.430***	-0.413***	-0.826***
	(0.104)	(0.098)	(0.148)	(0.212)
5-14 pop. gr. previous 10 years	-0.268***	-0.252***	-0.268***	-0.242***
	(0.027)	(0.031)	(0.034)	(0.081)
2000 dv	-0.365**	-0.622***	0.441**	-2.816***
	(0.164)	(0.160)	(0.207)	(0.506)
2012 dv	0.547***	0.725***	2.035***	-3.689***
	(0.212)	(0.214)	(0.265)	(0.599)
South	-0.078	-0.111	0.040	-0.981*
	(0.241)	(0.252)	(0.313)	(0.585)
Central	-0.341**	-0.240	-0.167	-1.291**
	(0.153)	(0.174)	(0.197)	(0.516)
North	-0.221	-0.188	-0.304	-1.189**
	(0.142)	(0.150)	(0.185)	(0.468)
East	-0.101	0.051	0.112	-0.842
	(0.267)	(0.294)	(0.297)	(0.660)
Constant	2.930***	1.810**	3.236**	10.662***
	(0.938)	(0.914)	(1.473)	(2.519)
First stage for Gini coef. for land distr. t-1				
Average temperature	0.008***	0.008***	0.008***	0.008***
St. dev. temp.	0.021***	0.021***	0.021***	0.021***
Elevation range (1000m's)	0.002	0.002	0.002	0.002
Kleibergen-Paap rk LM statistic.	23.127***	23.127***	23.127***	23.127***
Kleibergen-Paap rk Wald F statistic	10.637	10.637	10.637	10.637
Hansen J Statistic	1.347	1.349	1.047	1.155
Number of Observations	229	229	229	229
R-squared	0.764	0.743	0.716	0.537

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.3 IVs: Stock-Yogo weak ID critical test values are 22.30 for a 10% maximal IV size, 12.83 for a 15% maximal IV size, 9.54 for a 20% maximal IV size, and 7.80 for 25% maximal IV size.

Last, we test for the number of teachers per 100 school age children ($Teach/Child_{it}$) with similar equations and present the results in Table B3.

$$Gini_{i(t-1)} = \alpha_0 + \gamma_n Y_{i(t-1)n} + \alpha_1 Kurd_{i(t-1)} + \alpha_2 Conf_{i(t-1)} + \alpha_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{i(t-1)} \quad \text{(B5)}$$

$$Teach/Child_{it} = \beta_1 Gini_{i(t-1)} + \beta_2 Kurd_{i(t-1)} + \beta_3 Conf_{i(t-1)} + \beta_k X_{i(t-1)k} + \alpha_t + \gamma_j + e_{it} \quad \text{(B6)}$$

Table B3: IV-2SLS Estimates for Number of Teachers per School-age Children (1980, 2000, 2012)

	Number of teachers per 100 school age children			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	1.703	1.985	-0.687	-1.821
	(1.721)	(2.061)	(2.465)	(2.380)
Log of Kurdish % t-1	-0.456***	-0.440***	-0.259*	-0.084
	(0.115)	(0.132)	(0.138)	(0.146)
Log of security and civilian fatalities prev. 10 years	-0.013	0.148***	-0.206**	-0.089
	(0.062)	(0.053)	(0.104)	(0.095)
Urban t-1	0.339	-0.431	0.900	2.218***
	(0.457)	(0.472)	(0.699)	(0.618)
Log of gdp pc t-1	0.544***	0.726***	0.570***	1.294***
	(0.105)	(0.132)	(0.150)	(0.173)
Log of pop. density t-1	-0.427***	-0.180*	-0.385***	-0.539***
	(0.096)	(0.104)	(0.136)	(0.117)
5-14 pop. gr. previous 10 years	-0.249***	-0.330***	-0.284***	-0.249***
	(0.027)	(0.035)	(0.033)	(0.041)
2000 dv	1.258***	-1.331***	1.725***	0.633**
	(0.164)	(0.174)	(0.244)	(0.259)
2012 dv	2.266***	1.143***	3.669***	2.099***
	(0.192)	(0.220)	(0.287)	(0.311)
South	0.030	-0.045	0.121	0.058
	(0.197)	(0.278)	(0.217)	(0.235)
Central	-0.115	-0.139	-0.216	-0.276
	(0.138)	(0.195)	(0.169)	(0.201)
North	-0.170	-0.457***	-0.256	0.277
	(0.118)	(0.172)	(0.156)	(0.175)
East	0.107	0.236	0.109	-0.134
	(0.238)	(0.266)	(0.233)	(0.294)
Constant	0.973	0.438	0.146	-4.040***
	(0.890)	(1.102)	(1.153)	(1.265)
First stage for Gini coef. for land distr. t-1				
Average temperature	0.008***	0.008***	0.008***	0.008***
St. dev. temp.	0.021***	0.021***	0.021***	0.021***
Elevation range (1000m's)	0.002	0.002	0.002	0.002
Kleibergen-Paap rk LM statistic	23.127***	23.127***	23.127***	23.127***
Kleibergen-Paap rk Wald F statistic	10.637	10.637	10.637	10.637
Hansen J Statistic	1.750	2.866	2.480	1.946
Number of Observations	229	229	229	229
R-squared	0.898	0.842	0.912	0.874

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively. 3 IVs: Stock-Yogo weak ID critical test values are 22.30 for a 10% maximal IV size, 12.83 for a 15% maximal IV size, 9.54 for a 20% maximal IV size, and 7.80 for 25% maximal IV size.

Appendix C: Year Interaction Terms

We are also concerned that the armed insurgency might have indirect negative effects on education in provinces with higher Kurdish population. Moreover, simultaneous inclusion of Kurdish speakers' share and conflict intensity can result in multicollinearity problem. We find 0.55 correlation between two variables. Therefore, in this appendix, we aim to estimate the effect of conflict with the share of Kurdish speakers interacted with year dummies (Table C1, Table C2, Table C3).

Table C1: Interaction of Kurdish Share and Years on School Enrollment (Pooled OLS; 1970, 1990, 2000)

	Girls' net enrollment			**Boys' net enrollment**		
	Primary	Middle	High	Primary	Middle	High
Gini coef. for land distr.	-0.259**	-0.304**	-0.138*	-0.184**	-0.252**	-0.149**
	(0.123)	(0.117)	(0.072)	(0.090)	(0.096)	(0.059)
Log of Kurdish %	-0.128***	0.026**	0.035***	-0.060***	0.003	0.009
	(0.015)	(0.010)	(0.009)	(0.013)	(0.010)	(0.008)
Log of Kurdish % * 1990	0.081***	-0.045***	-0.039***	0.077***	-0.031***	-0.041***
	(0.009)	(0.010)	(0.007)	(0.009)	(0.008)	(0.006)
Log of Kurdish % * 2000	0.134***	-0.091***	-0.062***	0.129***	-0.002	-0.052***
	(0.014)	(0.015)	(0.011)	(0.016)	(0.013)	(0.008)
Boys-to-girls ratio dummy	-0.029	-0.038**	-0.019*	-0.013	-0.035***	-0.021**
	(0.025)	(0.016)	(0.011)	(0.023)	(0.012)	(0.010)
Urban	0.092	0.186**	0.196***	-0.109*	0.151*	0.161***
	(0.071)	(0.084)	(0.056)	(0.065)	(0.082)	(0.059)
Log of gdp pc	0.112***	0.108***	0.091***	0.093***	0.112***	0.085***
	(0.021)	(0.019)	(0.015)	(0.019)	(0.018)	(0.016)
Log of pop. density	0.012	0.005	-0.011	0.034***	0.005	-0.017
	(0.014)	(0.017)	(0.012)	(0.012)	(0.015)	(0.011)
1990 dv	-0.087***	0.199***	0.155***	-0.197***	0.268***	0.272***
	(0.031)	(0.033)	(0.025)	(0.025)	(0.030)	(0.023)
2000 dv	-0.184***	0.762***	0.315***	-0.301***	0.530***	0.379***
	(0.044)	(0.049)	(0.037)	(0.042)	(0.045)	(0.032)
South	-0.013	0.005	-0.006	-0.017	-0.015	0.013
	(0.026)	(0.018)	(0.015)	(0.023)	(0.018)	(0.020)
Central	-0.007	-0.005	-0.033	-0.013	0.003	0.017
	(0.021)	(0.023)	(0.020)	(0.021)	(0.023)	(0.019)
North	-0.076***	-0.035	-0.017	-0.036*	-0.011	0.032**
	(0.023)	(0.022)	(0.017)	(0.020)	(0.020)	(0.015)
East	0.010	-0.039	-0.061**	-0.008	0.004	0.032
	(0.029)	(0.030)	(0.026)	(0.030)	(0.028)	(0.028)
constant	0.300**	-0.547***	-0.545***	0.421***	-0.431***	-0.412***
	(0.129)	(0.125)	(0.092)	(0.110)	(0.108)	(0.095)
N	221	221	221	221	221	221
R-squared	0.805	0.944	0.866	0.579	0.933	0.903

Province level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Table C2: Effect of Interaction of Kurdish Share and Years on Teacher-to-Student Ratio (Pooled OLS;1980, 2000, 2012)

	Number of teachers per 100 student			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.318	0.258	0.849	2.740
	(0.506)	(0.535)	(0.753)	(1.743)
Log of Kurdish % t-1	-0.212**	-0.166	-0.488***	-1.000***
	(0.099)	(0.108)	(0.150)	(0.276)
Log of Kurdish % t-1 * 2000	-0.202***	-0.143**	0.002	0.274
	(0.060)	(0.063)	(0.100)	(0.267)
Log of Kurdish % t-1 * 2012	-0.263***	-0.241**	-0.168	0.263
	(0.098)	(0.094)	(0.162)	(0.296)
Urban t-1	0.343	-0.024	0.288	1.348
	(0.488)	(0.444)	(0.716)	(1.285)
Log of gdp pc t-1	0.491***	0.595***	0.110	0.434
	(0.120)	(0.125)	(0.142)	(0.322)
Log of pop. density t-1	-0.459***	-0.384***	-0.388**	-0.879***
	(0.113)	(0.102)	(0.160)	(0.217)
5-14 pop. gr. previous 10 years	-0.255***	-0.237***	-0.239***	-0.252***
	(0.024)	(0.032)	(0.031)	(0.074)
2000 dv	-0.055	-0.453**	0.304	-3.286***
	(0.188)	(0.211)	(0.279)	(0.875)
2012 dv	1.011***	1.135***	2.218***	-4.167***
	(0.286)	(0.278)	(0.402)	(1.021)
South	0.031	0.008	0.253	-1.066**
	(0.212)	(0.222)	(0.256)	(0.492)
Central	-0.293**	-0.179	-0.101	-1.334***
	(0.142)	(0.163)	(0.197)	(0.484)
North	-0.260*	-0.215	-0.300	-1.145**
	(0.147)	(0.152)	(0.187)	(0.482)
East	-0.043	0.126	0.172	-0.893
	(0.275)	(0.298)	(0.294)	(0.634)
Constant	3.525***	2.389***	4.919***	10.349***
	(0.832)	(0.824)	(1.089)	(2.004)
Number of Observations	229	229	229	229
R-squared	0.782	0.758	0.744	0.540

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Table C3: Effect of Interaction of Kurdish Share and Years on Teacher-to Children Ratio (Pooled OLS;1980, 2000, 2012)

	Number of teachers per 100 school age children			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.209	0.009	-0.308	-0.426
	(0.445)	(0.649)	(0.663)	(0.742)
Log of Kurdish % t-1	-0.306***	-0.467***	-0.111	0.202*
	(0.086)	(0.102)	(0.085)	(0.115)
Log of Kurdish % t-1 * 2000	-0.135**	0.366***	-0.528***	-0.568***
	(0.052)	(0.084)	(0.061)	(0.069)
Log of Kurdish % t-1 * 2012	-0.218***	0.174**	-0.270**	-0.845***
	(0.070)	(0.078)	(0.124)	(0.111)
Urban t-1	0.583	-0.311	0.928	2.609***
	(0.465)	(0.488)	(0.676)	(0.677)
Log of gdp pc t-1	0.473***	0.749***	0.538***	0.999***
	(0.107)	(0.132)	(0.141)	(0.161)
Log of pop. density t-1	-0.394***	-0.223**	-0.315**	-0.421***
	(0.107)	(0.104)	(0.144)	(0.125)
5-14 pop. gr. previous 10 years	-0.242***	-0.315***	-0.285***	-0.284***
	(0.023)	(0.031)	(0.029)	(0.038)
2000 dv	1.485***	-2.105***	2.754***	1.848***
	(0.165)	(0.211)	(0.236)	(0.279)
2012 dv	2.670***	0.707***	4.214***	4.030***
	(0.253)	(0.256)	(0.377)	(0.440)
South	0.107	0.055	0.118	-0.054
	(0.175)	(0.236)	(0.170)	(0.180)
Central	-0.102	-0.125	-0.181	-0.382*
	(0.137)	(0.181)	(0.165)	(0.211)
North	-0.209*	-0.393**	-0.324*	0.041
	(0.125)	(0.174)	(0.163)	(0.181)
East	0.127	0.238	0.144	-0.163
	(0.251)	(0.255)	(0.240)	(0.332)
Constant	1.686**	1.642**	-0.638	-4.062***
	(0.756)	(0.822)	(0.933)	(1.012)
Number of Observations	229	229	229	229
R-squared	0.904	0.856	0.920	0.905

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Appendix D: OLS Results Without Regional Dummy Variables

OLS estimates without regional dummies for net enrollment rates, number of teachers per 100 students, and number of teachers per 100 children are reported in this appendix. In comparison to Tables 2, 3, and 4 and D1, D2, and D3 show that inclusion of regional dummy variable generally increases the other variables' coefficient size. However, the differences in coefficient sizes are not statistically significant except for Kurdish speakers' share variable for girls' primary school enrollment.

Table D1: Pooled OLS Estimates for Net Enrollment Without Regional Dummy Variables (1970, 1980, 2000)

	Girls' net enrollment			**Boys' net enrollment**		
	Primary	Middle	High	Primary	Middle	High
Gini coef. for land distr.	-0.296**	-0.251**	-0.109	-0.231**	-0.265***	-0.134*
	(0.133)	(0.118)	(0.072)	(0.092)	(0.093)	(0.068)
Log of Kurdish %	-0.067***	-0.008	-0.002	-0.015	-0.007	-0.008
	(0.012)	(0.008)	(0.006)	(0.010)	(0.008)	(0.006)
Log of total civilian and security fatalities	0.059***	-0.033*	-0.018	0.063***	0.008	-0.023***
	(0.010)	(0.017)	(0.012)	(0.010)	(0.009)	(0.007)
Number of Observations	221	221	221	221	221	221
R-squared	0.717	0.933	0.838	0.430	0.930	0.886

All other controls variables are included. Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Table D2: Pooled OLS Estimates for Number of Teachers per 100 Students Without Regional Dummy Variables (1980, 2000, 2012)

	Number of teachers per 100 student			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.376	0.270	1.117	1.502
	(0.487)	(0.521)	(0.760)	(1.883)
Log of Kurdish % t-1	-0.289***	-0.165**	-0.460***	-0.838***
	(0.060)	(0.067)	(0.103)	(0.147)
Log of security and civilian fatalities prev. 10 years	-0.056	-0.078	0.035	0.221
	(0.066)	(0.052)	(0.097)	(0.155)
Number of Observations	229	229	229	229
R-squared	0.765	0.748	0.734	0.504

All other controls variables are included. Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Table D3: Pooled OLS Estimates for Number of Teachers per 100 Children Without Regional Dummy Variables (1980, 2000, 2012)

	Number of teachers per 100 children			
	All levels	Primary	Middle	High
Gini coef. for land distr. t-1	0.333	-0.033	-0.171	-0.349
	(0.441)	(0.649)	(0.644)	(0.735)
Log of Kurdish % t-1	-0.339***	-0.207***	-0.203***	-0.219***
	(0.056)	(0.078)	(0.068)	(0.082)
Log of security and civilian fatalities prev. 10 years	-0.005	0.156***	-0.193*	-0.066
	(0.063)	(0.053)	(0.109)	(0.099)
Number of Observations	229	229	229	229
R-squared	0.899	0.838	0.909	0.872

All other controls variables are included. Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Supplementary Materials

Table S1: Summary Statistics for Enrollment Variables

		Girls net enrollment			Boys net enrollment		
year		Primary	Middle	High	Primary	Middle	High
1970	n	67	67	67	67	67	67
	mean	0.66	0.08	0.02	0.86	0.20	0.07
	st. dev.	0.22	0.05	0.02	0.13	0.07	0.03
	min	0.19	0.01	0.00	0.47	0.05	0.02
	p10	0.27	0.02	0.01	0.62	0.11	0.04
	median	0.71	0.07	0.02	0.91	0.21	0.06
	p90	0.90	0.14	0.04	0.97	0.29	0.11
	max	0.99	0.24	0.10	1.00	0.38	0.15
1990	n	73	73	73	73	73	73
	mean	0.83	0.29	0.19	0.89	0.51	0.33
	st. dev.	0.13	0.15	0.10	0.08	0.14	0.10
	min	0.42	0.04	0.02	0.70	0.16	0.07
	p10	0.63	0.08	0.05	0.77	0.32	0.19
	median	0.86	0.31	0.17	0.89	0.51	0.33
	p90	0.95	0.47	0.33	0.97	0.68	0.45
	max	1.07	0.68	0.44	1.07	0.82	0.54
2000	n	81	81	81	81	81	81
	mean	0.88	0.77	0.32	0.92	0.87	0.43
	st. dev.	0.12	0.18	0.14	0.12	0.13	0.11
	min	0.58	0.32	0.05	0.59	0.59	0.18
	p10	0.71	0.45	0.10	0.75	0.69	0.29
	median	0.89	0.81	0.32	0.94	0.90	0.44
	p90	1.02	0.97	0.51	1.06	1.02	0.56
	max	1.10	1.03	0.60	1.14	1.06	0.70
2012	n	81	81	81	81	81	81
	mean	0.98	0.93	0.73	0.98	0.93	0.70
	st. dev.	0.02	0.04	0.13	0.01	0.04	0.15
	min	0.91	0.81	0.40	0.91	0.81	0.31
	p10	0.97	0.88	0.54	0.98	0.87	0.48
	median	0.99	0.94	0.75	0.99	0.94	0.75
	p90	1.00	0.97	0.87	0.99	0.96	0.84
	max	1.00	0.98	0.97	1.00	0.98	0.91

Table S2: Summary Statistics for Teacher-to-Student Ratios and Teacher per 100 Children (6-17)

		Number of teachers per 100 students				Number of teachers per 100 children			
year		All levels	Primary	Middle	High	All levels	Primary	Middle	High
1980	n	67	67	67	67	67	67	67	67
	mean	4.30	4.14	3.37	8.52	2.52	4.03	1.05	1.21
	st. dev.	0.83	0.82	1.12	3.21	0.67	1.12	0.55	0.53
	min	3.08	2.86	0.51	3.23	1.05	1.60	0.06	0.36
	p10	3.42	3.33	2.27	4.76	1.57	2.40	0.43	0.63
	median	4.12	4.00	3.23	8.33	2.46	4.04	0.98	1.09
	p90	5.62	5.56	4.76	12.50	3.35	5.65	1.79	1.92
	max	6.33	6.25	7.14	20.00	4.07	6.44	2.82	3.29
1990	n	73	73	73	73	73	73	73	73
	mean	4.15	3.83	4.11	6.15	2.80	3.69	1.83	2.21
	st. dev.	1.06	1.08	1.07	1.41	0.85	1.09	0.79	0.84
	min	2.27	1.89	2.22	3.57	0.97	1.30	0.58	0.57
	p10	2.82	2.56	2.70	4.35	1.72	2.40	0.93	1.13
	median	4.03	3.70	4.00	5.88	2.77	3.63	1.63	2.13
	p90	5.46	5.26	5.56	8.33	3.85	5.00	3.06	3.57
	max	7.09	7.14	7.14	9.09	4.89	6.93	3.50	4.33
2000	n	81	81	81	81	81	81	81	81
	mean	4.49	4.07	4.07	6.29	4.42	3.69	3.61	3.34
	st. dev.	0.92	0.77	0.77	1.44	0.90	0.69	1.19	1.30
	min	2.00	1.89	1.89	3.57	1.98	1.89	1.03	0.78
	p10	3.14	2.94	2.94	4.35	3.13	2.80	1.66	1.31
	median	4.61	4.17	4.17	6.25	4.49	3.64	3.71	3.50
	p90	5.56	5.00	5.00	8.33	5.45	4.67	5.05	5.00
	max	6.90	6.25	6.25	9.09	6.77	5.44	6.19	6.08
2012	n	81	81	81	81	81	81	81	81
	mean	5.66	5.67	5.74	5.58	5.66	6.40	5.99	5.40
	st. dev.	1.07	1.07	1.25	1.18	1.07	1.10	1.20	1.56
	min	3.34	3.33	2.94	3.03	3.35	3.90	3.32	1.77
	p10	3.95	4.17	4.00	3.85	3.95	5.00	4.48	2.89
	median	5.85	5.88	5.88	5.56	5.84	6.47	5.94	5.63
	p90	6.71	7.14	7.14	6.67	6.71	7.86	7.27	7.13
	max	9.09	8.33	10.00	8.33	9.13	9.42	10.40	8.92

Table S3: Summary Statistics for Independent Variables

Year		Land Gini	Kurdish pop. share	Conflict intensity	Missing Girl	GDP pc	Urban	Pop. density	School age pop. growth
1970	n	67	67	67	67	67	67	67	67
	mean	0.54	0.16	-	1.05	593	0.32	54	2.52
	st. dev.	0.09	0.26	-	0.03	266	0.12	60	1.31
	min	0.37	-	-	0.94	266	0.16	11	(0.60)
	p10	0.44	0.00	-	1.02	326	0.19	25	0.80
	median	0.53	0.02	-	1.06	547	0.29	38	2.40
	p90	0.67	0.71	-	1.09	828	0.49	94	4.20
	max	0.76	0.90	-	1.13	1,772	0.73	490	6.20
1990	n	73	73	73	73	73	73	73	73
	mean	0.51	0.17	4.86	1.05	1,171	0.48	83	1.18
	st. dev.	0.09	0.27	18.97	0.02	628	0.13	139	1.63
	min	0.31	-	-	1.01	247	0.27	17	(3.00)
	p10	0.41	0.00	-	1.03	409	0.35	29	(0.90)
	median	0.50	0.04	-	1.05	1,107	0.46	51	1.30
	p90	0.61	0.71	5.22	1.07	1,946	0.70	139	3.20
	max	0.77	0.90	129.39	1.09	3,907	0.92	1,186	5.00
2000	n	81	81	81	81	81	81	81	81
	mean	0.49	0.16	12.19	1.06	1,416	0.55	103	(0.89)
	st. dev.	0.08	0.24	33.45	0.02	847	0.12	209	1.82
	min	0.33	0.00	-	0.99	320	0.26	12	(8.60)
	p10	0.41	0.01	-	1.04	544	0.42	29	(2.70)
	median	0.49	0.05	-	1.06	1,199	0.54	60	(0.90)
	p90	0.61	0.67	30.00	1.08	2,645	0.70	186	1.50
	max	0.72	0.80	180.59	1.12	4,377	0.91	1,886	2.80

Table S4: OLS estimates for Girls' Middle School Enrollment (1970, 1990, 2000)

	Gini	Kurdish	Conflict	Gini + 1	Gini + 2	Gini + 3	Gini + 4	Table 2, C2
Gini coef. for land distr.	-0.156			-0.122	-0.260**	-0.289**	-0.286**	-0.270**
	(0.130)			(0.123)	(0.120)	(0.111)	(0.109)	(0.122)
Log of Kurdish %		-0.022						0.006
		(0.016)						(0.011)
Log of total civilian and security fatalities			-0.059***					-0.033*
			(0.017)					(0.017)
Boys-to-girls ratio dummy				-0.091***	-0.087***	-0.063***	-0.062***	-0.054**
				(0.027)	(0.026)	(0.020)	(0.020)	(0.022)
Urban					0.332***	0.110	0.120	0.170**
					(0.074)	(0.078)	(0.088)	(0.085)
Log of gdp pc						0.141***	0.142***	0.117***
						(0.019)	(0.019)	(0.023)
Log of pop. density							-0.004	-0.009
							(0.016)	(0.016)
1990 dv	0.212***	0.220***	0.235***	0.205***	0.146***	0.094***	0.093***	0.113***
	(0.014)	(0.012)	(0.011)	(0.014)	(0.018)	(0.018)	(0.019)	(0.023)
2000 dv	0.697***	0.709***	0.741***	0.699***	0.613***	0.551***	0.550***	0.581***
	(0.020)	(0.018)	(0.016)	(0.019)	(0.028)	(0.029)	(0.029)	(0.034)
South	-0.051*	-0.054**	-0.056***	-0.043*	-0.035	0.011	0.010	0.000
	(0.026)	(0.022)	(0.020)	(0.025)	(0.022)	(0.020)	(0.020)	(0.021)
Central	-0.068**	-0.064*	-0.072**	-0.061*	-0.052**	0.006	0.004	-0.012
	(0.033)	(0.033)	(0.032)	(0.033)	(0.023)	(0.023)	(0.024)	(0.024)
North	-0.105***	-0.107***	-0.100***	-0.102***	-0.063***	-0.013	-0.012	-0.019
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.019)	(0.020)	(0.021)
East	-0.225***	-0.193***	-0.175***	-0.207***	-0.173***	-0.047	-0.049*	-0.053*
	(0.032)	(0.045)	(0.025)	(0.031)	(0.029)	(0.029)	(0.028)	(0.031)
Constant	0.257***	0.209***	0.218***	0.243***	0.194***	-0.668***	-0.662***	-0.484***
	(0.065)	(0.031)	(0.020)	(0.062)	(0.059)	(0.126)	(0.129)	(0.138)
Number of Observations	221	221	221	221	221	221	221	221
R-squared	0.894	0.894	0.908	0.901	0.913	0.931	0.931	0.934

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.

Table S5: OLS estimates for Teacher-to-Children ratio (all levels; 1980, 1990, 2012)

	Kurdish	Gini	Conflict	Kurdish + 1	Kurdish + 2	Kurdish + 3	Kurdish + 4	Table 4, C1
Log of Kurdish % t-1	-0.757***			-0.437***	-0.397***	-0.381***	-0.392***	-0.399***
	(0.124)			(0.093)	(0.093)	(0.081)	(0.083)	(0.087)
Gini coef. for land distr. t-1		-3.322***						0.247
		(0.961)						(0.440)
Log of total civilian and security fatalities			-0.098					-0.008
			(0.172)					(0.061)
5-14 pop. gr. previous 10 years				-0.253***	-0.287***	-0.232***	-0.233***	-0.236***
				(0.030)	(0.026)	(0.022)	(0.022)	(0.023)
Log of gdp pc t-1					0.428***	0.610***	0.559***	0.554***
					(0.110)	(0.105)	(0.106)	(0.108)
Log of pop. density t-1						-0.386***	-0.422***	-0.423***
						(0.088)	(0.102)	(0.099)
Urban t-1							0.458	0.444
							(0.462)	(0.459)
2000 dv	2.013***	1.813***	1.992***	1.423***	1.068***	1.217***	1.187***	1.201***
	(0.061)	(0.080)	(0.130)	(0.120)	(0.124)	(0.111)	(0.125)	(0.143)
2012 dv	3.330***	3.003***	3.191***	2.479***	2.022***	2.222***	2.172***	2.187***
	(0.081)	(0.094)	(0.087)	(0.121)	(0.136)	(0.139)	(0.153)	(0.159)
South	0.109	0.050	-0.194	0.066	0.196	0.154	0.132	0.116
	(0.253)	(0.319)	(0.339)	(0.207)	(0.210)	(0.173)	(0.170)	(0.175)
Central	0.221	0.005	-0.094	-0.072	0.084	-0.036	-0.067	-0.077
	(0.181)	(0.159)	(0.171)	(0.131)	(0.128)	(0.132)	(0.133)	(0.132)
North	-0.108	0.017	0.117	-0.469***	-0.277**	-0.165	-0.147	-0.151
	(0.146)	(0.170)	(0.162)	(0.127)	(0.130)	(0.118)	(0.120)	(0.121)
East	0.571	-0.750***	-0.972***	-0.058	0.302	0.166	0.143	0.135
	(0.359)	(0.262)	(0.222)	(0.244)	(0.288)	(0.239)	(0.243)	(0.247)
Constant	3.926***	4.510***	2.886***	3.244***	0.962	1.198	1.547**	1.486*
	(0.202)	(0.505)	(0.181)	(0.097)	(0.756)	(0.724)	(0.757)	(0.750)
Number of Observations	229	229	229	229	229	229	229	229
R-squared	0.817	0.780	0.760	0.873	0.882	0.900	0.901	0.901

Province-level clustered standard errors in parenthesis. *, **, *** denote 10, 5 and 1 percent confidence levels, respectively.