When and Where Do We See Regional Poverty Reduction and Convergence?

Lessons from the Roof of Turkey

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Abstract

In the past decade, Turkey has experienced a notable level of poverty reduction at all levels (extreme poor, poor, and vulnerable). The steady decline in poverty was also resilient to the decline in gross domestic product per capita growth during the crisis. However, although poverty convergence was strong before the financial crisis, there was an absence of regional convergence afterward. This paper analyzes poverty trends, poverty convergence, economic mobility, and the determinants of poverty reduction at the regional level over the period 2006–13. The analysis finds that agricultural growth in the east was an important contributor to Turkey’s regional poverty reduction. In addition, employment growth in the services sectors boosted poverty reduction throughout the entire country. From a fiscal perspective, the amount of per capita central spending is also linked to poverty reduction, although more strongly for regions in the west.

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When and Where Do We See Regional Poverty Reduction and Convergence? Lessons from the Roof of Turkey

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1. Introduction

This paper analyzes the drivers of regional poverty reduction and poverty convergence in Turkey. First, the paper discusses imputation techniques to estimate poverty at the NUTS2 sub-national level. Regional poverty studies at the NUTS2 level of disaggregation have not been previously available in Turkey since accessible surveys do not have sufficient regional identifiers. The study finds that Turkey has been able to reduce poverty over the last decade, but the progress has been spatially uneven. The paper moves on to estimate poverty convergence across regions. Over the recent period of 2006 to 2013, Turkey has experienced some poverty convergence in terms of its population living under the poverty line, but there is no parallel trend at the regional level. The convergence has also been uneven and inconsistent over time. Moreover, economic mobility has been divergent across the country, with higher levels of churning in the East and Southeast regions of the country. The analysis shows that people living in these regions are also subject to a higher rate of chronic poverty than the rest of the country. Lastly, the paper explores determinants of regional poverty reduction. The primary economic drivers of poverty reduction are the growth of employment in the services sector, and agriculture GVA growth in the East. From a fiscal standpoint, central government spending is correlated with poverty reduction, but more so for the Western regions.

There has been consistent poverty reduction (consumption based) in Turkey since the early 2000s. Remarkably, 89 percent of this decline has been driven by growth (Azevedo and Atamanov, 2014). The bottom 40 has also benefitted from growth, and the proportion of the middle-class increased by 20 percentage points. At the household level, poverty reduction has been primarily driven by labor markets, demographics, pensions, and social assistance.

This paper, which uses imputed income based poverty for its analysis, shows that there has been large amounts of poverty reduction in Turkey. Furthermore, the process of poverty alleviation has been uneven across regions. In particular, the central and southern parts of the country (Mediterranean, Anatolian Tigers and Southeastern regions) were significantly more successful in poverty reduction than the Eastern mountainous areas. Poor regions in the East have not succeeded in reducing poverty at a similar rate to the West. In fact, poverty has increased in certain parts of Eastern Turkey. Over time, there are also differences in the speed of convergence, with stronger poverty convergence before and during the financial crisis in comparison to the aftermath. Differences in the speed of poverty reduction is also seen in other countries. For example in China, provinces with higher initial inequality experienced slower speeds of poverty reduction through lower growth and a lower growth-poverty elasticity (Ravallion and Chen, 2007). Yet, the presence of poverty convergence itself in some form is still laudable since poverty convergence has generally not been observed at the cross-country level (Ravallion, 2012). Poverty convergence alongside overall poverty reduction is not trivial. Therefore, Turkey’s experience is unique and serves as an example for understanding why poverty has fallen even when growth has not been shared in the aftermath of the financial crisis.

There are multiple reasons for the presence of sub-national poverty convergence despite the absence of convergence at a global level. One reason is the ability of a national government to coordinate and distribute funds in a targeted manner. A national government will be more familiar with regions that are falling behind or are self-sufficient. For example, in the case of Brazil, social spending has been found to be a primary channel for poverty reduction in the absence of growth (Ferreira, Leite, and Ravallion, 2010). However, while targeted schemes can alleviate poverty in certain country cases, fiscal targeting may only lead to small poverty alleviation impacts if there are political constraints (Baker and Grosh, 1994; Ravallion, 1993).

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1 Primarily at the NUTS2 level, and between 2006 and 2013 but varies based on data availability
2 The Nomenclature of Territorial Units for Statistics
3 Geographic identifiers and data to measure welfare aggregates are not found in the same data set. Data challenges are discussed further in Section 2.
4 In this paper, the East is defined as TRA1, TRA2, TRB1 and TRB2. The West is defined as the rest of the country.
Moreover, regions within a country are also more connected and have freer movement of labor and goods in comparison to the connectivity between states at the global level. In this respect, the drastic increase in Turkey’s connectivity over the last decade, might have had a positive impact on poverty convergence in the country.

Turkey is a regionally diverse country in terms of economic development, with poorer regions located mostly in the Eastern and Southeastern parts of the country. Regions are diverse in their production activities and have experienced varying degrees of economic growth. To understand the patterns of poverty reduction as well as regional poverty convergence, we analyze NUTS2 regional level data (Figure 18). The literature has focused on regional determinants of poverty reduction from “patterns of growth” and “initial conditions”. The patterns of growth theory assumes that growth across sectors may influence poverty reduction and the poor differently than aggregate growth. For example, growth in labor intensive sectors will have more poverty reduction impacts than growth in capital intensive sectors (Loayza and Raddatz, 2010). Initial conditions such as education levels, demographic structure, migration patterns, and mortality rates are also important from a growth perspective. Between the paper’s period of analysis (2006 and 2013), poverty rates decline heterogeneously across regions. This paper follows the literature on patterns of growth to identify more precisely the channels of poverty dynamics between NUTS2 regions in Turkey.

Studies have shown that sector composition and labor intensity have an impact on the amount of regional poverty reduction at a global scale. The size of economic growth does matter, but its composition in terms of intensive use of unskilled labor is also important since, this channel of growth enables the poor to contribute to the production process (Loayza and Raddatz, 2010). At a sector level, growth in services has been found to be major contributors to poverty reduction in Brazil, Indonesia, and India (Ferreira, Leite, Ravallion, 2010; Suryahadi, Suryadarma, and Sumarto, 2009; Ravallion and Datt 1996 and 2002). Since agricultural jobs tend to be very labor intensive and is a common line of work for the poor, growth in this sector has also associated with poverty reduction in Indonesia and China (Suryahadi, Suryadarma, and Sumarto, 2009; Montalvo and Ravallion, 2010).

In the case of Turkey, regional poverty reduction is primarily explained, in GVA terms, by growth of agricultural sectors in the East. The positive impact of agricultural growth in the East might be partially due to the shift towards agriculture during the financial crisis as jobs in the services and industrial sectors became scarcer as a result of the economic slowdown. Surprisingly, growth of value added of the services sector was not found to impact poverty reduction, even though construction and real estate have been high growth sectors. One reason for this may be due to the access of gross value added data, which is limited to 2006 to 2011. Moreover, GVA excludes subsidies, and the Turkish government gives substantial amounts of subsidies to the services and industrial sectors. When using employment levels as a primary determinant, employment growth in the services sector is found to contribute to poverty reduction in both the East and West during the period 2006 to 2013. In terms of the impact of services to poverty alleviation, the diverging trends between GVA and employment indicators relating to this sector is noteworthy. These difference may in fact be due to the previously explained data related issues; however, another possibility is the relatively higher level of wages in the services sector compared to low-skilled agricultural and industrial jobs. As a result of this discrepancy in wage levels, switching to the services sector (measured by employment) might have a poverty reducing effect, while increasing wage levels in services (captured in GVA) do not reduce poverty since services employees are already over the poverty line.

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5 Turkey is divided into 12 NUTS1 and 26 NUTS2 regions. Each NUTS2 region, with the exception of Istanbul Ankara and Izmir which are NUTS2 regions on their own, consists of multiple provinces within Turkey. Since provinces are the main units of administration within the government structure, this paper’s results should be interpreted bearing in mind these different geographical classifications in terms of policy recommendations.

6 The East includes regions TRA1, TRA2, TRB1, and TRB2 NUTS2 regions.
In terms of fiscal expenditures, total central government expenditures are strongly correlated to poverty reduction, but primarily in the West. A very large proportion of central spending reflects its size, well over half of central government spending in the regions are on personnel costs. When disaggregating central expenditures, both purchases of goods and services and personnel costs are related to poverty reduction. These two variables could be a proxy for how large a presence the government has in a region. Local expenditures are correlated to poverty reduction only among the Western regions. A very positive result is that per capita social assistance is related to poverty reduction. Initial conditions are also controlled for in regressions, but these variables are less descriptive. In terms of importance, economic variables are the most explanatory of poverty reduction, followed by fiscal expenditures.

Regional poverty is a relevant and vital policy issue in Turkey. The National Strategy for Regional Development (NSRD, 2014-2023) demonstrates the Turkish government’s specific commitment to reducing regional differences, as it offers strategies from a regional perspective to promote growth and development. Turkey’s Tenth Development Plan (2014-2018) and NSRD both aim to reduce regional disparities and increase competitiveness at the regional level. The Tenth Development Plan sets specific targets for 2018 and 2023 in terms of GDP and GDP per capita growth, total exports, and unemployment. The report also states “reducing regional development disparities” and “high, stable, and sustainable growth structure” as two of its eight main goals. The GDP target for 2018 is at $1.3 trillion while the GDP per capita target is $16,000.

The strategy suggests a three-fold plan for the least developed areas. First, is to trigger development in low-income regions through regional centers of attraction. The development of regional centers of attraction is proposed through the promotion of urban economies and increased human and social capital. The second part is to ensure the convergence of priority development provinces by increasing access to services, agricultural productivity, skilled labor force and integration with national economic and social structure. The third and final portion of the plan is to accelerate the development of rural areas and support their cooperation with urban areas. This development and increased cooperation is aimed to be achieved through increased employment opportunities in rural areas, improved human capital, and reduced poverty while preserving natural resources and the environment.

Based on the importance of economic factors found in this paper, the NSRD’s plan to focus on regional centers could be important for a successful strategy of growth and poverty reduction. Additionally, the paper’s results might be useful while thinking about the spatial and functional targeting mechanisms of the development strategy.

The remainder of the paper is divided as follows. Section 2 describes the poverty imputation methodology, poverty trends, poverty convergence, and economic mobility. Section 3 analyzes the regional determinants of poverty dynamics. Section 4 concludes the analysis and provides possible next steps.
2. Poverty Trends and Poverty Convergence

Creating a data set to analyze regional poverty merits acknowledgement and discussion. As recent as early 2015, publicly accessible data sets of Turkey’s Household Income, Consumption and Expenditure Survey (HICES) and the Survey of Income and Living Conditions (SILC) did not have regional variables at the NUTS2 level. Econometric techniques were employed to impute welfare measures at the NUTS2 level.

Poverty

Turkey has experienced a large amount of poverty reduction (consumption based) in recent years (Azevedo and Atamanov, 2014). However, most of what we know about welfare, poverty, and shared prosperity is limited to the national level. NUTS2 regional level poverty and welfare measures used in this paper are computed using survey-to-survey imputation methods. Data access limits which data set can be used to analyze poverty. The Turkish Statistical Institute (TUIK) has been conducting three nationally representative surveys annually since 2005; the Household Income and Consumption Expenditure Survey (HICES), the Survey on Income and Living Conditions (SILC) and the Labor Force Survey (LFS). However the HICES, which is the national survey that is used to measure poverty, does not have geographic identifiers. The SILC contains geographic identifying variables, but only at the NUTS1 level.

Table 1. Survey Comparison and Data Availability

|       | Years Available | Income or Consumption | Geographic Identifier | Spatial Deflation |
|-------|----------------|-----------------------|-----------------------|-------------------|
| HICES | 2003-2012      | Consumption, income   | National, urban/rural | No                |
| SILC  | 2009-2012      | Income                | NUTS1                 | No                |
| LFS   | 2009-2013      | Imputed Income        | NUTS2                 | Yes               |

This paper applies well established econometric techniques of survey to survey imputation (Elbers, Lanjouw, and Lanjouw, 2003) to estimate poverty rates at the NUTS2 level (26 regions in Turkey) by combining information from the SILC with the Turkish Labor Force Survey (LFS). This approach is necessary since, as in most other countries in the world, income collected by the LFS includes only wage income from employment, which is insufficient for measuring of total household income used for welfare measurement. By definition, total household income should include both labor and non-labor components. In the LFS, important sources of non-labor income such as social assistance, pensions, asset liquidation or private transfers are missing. Total household income and household characteristics from the SILC are used to impute total household income into the LFS. Moreover, the fact that Turkey has both the LFS and SILC conducted in parallel allowed the use of different vector of coefficients between 2006-2011. In the case of the 2005, the coefficients from 2006 are used (given that there are concern regarding the quality of the first year of implementation of the SILC 2006, and in 2012 and 2013, the coefficients of the 2011 are used). As a result of the imputation, poverty is measured as total household income poverty in per capita terms. Another advantage of using the LFS is the availability of CPI at the NUTS2 level in Turkey which allows for spatial deflation.

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7 Turkish Statistical Institute (TUIK) has started to collect NUTS2 level data in the 2014 SILC at the NUTS2 level. This data should be made available to the public in 2016.
8 Wage income is only available for regular and casual employees in the LFS which accounts for around 60% of total employment. There is no other monetary income value for the rest of the working population.
9 It is important to notice that the time dimension used in this paper refers to the period of reference of the income variable from the survey, and not the official survey year. This is particularly relevant to the case of the SILC, which in the survey year T, reports the income for the period of reference T-1.
The NUTS1 spatial effects interacted with a vector of other observable household characteristics have shown to be a good proxy for welfare dynamics and increase the accuracy of the imputation model, as shown by a number of external validation exercises conducted (See Annex). Poverty trends using imputed income can be compared at the NUTS1 level between the LFS and SILC. Figure 30 illustrates an external validation exercise for 2007 where observed income poverty using the SILC data set is compared with imputed income poverty using the LFS at the NUTS1 level. As the results show, the imputed regional income poverty rates from the LFS are matched closely to the SILC. It is impossible to externally validate the LFS imputed income poverty at the NUTS2 level since there is no other data set where households can be regionally identified at the NUTS2 and also have a full income profile.

In terms of imputed income poverty, Turkey has been able to reduce its poverty level at the $5/day 2005PPP (moderate) line but has not been able to expand this performance to the $2.5/day 2005PPP (extreme) poverty line between 2006 and 2013 (Figure 13). During this period, moderate poverty decreased slightly from 23.80 to 22.22 percent while extreme poverty rose from 5.46 to 7.62 percent. A more detailed look at the annual change in Turkey’s poverty reduction shows that the country’s financial crisis experience significantly affected the number of poor. With the impact of the crisis, moderate poverty and extreme poverty both increased between 2006 and 2008. In the immediate aftermath of the crisis, Turkey was able to recover swiftly as poverty rates fell between 2009 and 2011. However after 2011, extreme poverty started to increase once again despite the continuing improvement in moderate poverty. This decoupling between the trends suggests that the poorest of the poor was not able to escape extreme poverty while those among the poor that were closer to the $5 line moved upward after 2011.

The overall findings are consistent with the poverty trends measured in consumption terms (Azevedo and Atamanov, 2014), although it is clear that an income based poverty measure, as one would expect, is able to capture the effect of the global financial crisis 2007-2009 much better than a consumption based poverty number. This results from the ability of households to make decisions that can smooth consumption, while wages and other sources of income cannot be similarly smoothed. As a result, during the financial crisis, Turkey experienced a larger increase in income poverty in comparison to consumption based poverty. An additional factor behind the difference of the two poverty measures might be the increasing level of household debt in Turkey, which almost tripled in real terms between 2006 and 2013. If households spend more than they earn, there could be a faster decline in consumption based poverty or even a decoupling between the trends of income and consumption measures (Figure 14).

At the NUTS2 level, 21 of 26 regions experienced moderate poverty reduction between 2006 and 2013 (Figure 1). Moderate poverty reduction was heterogeneous in Turkey both in terms of geography and the initial rate of poverty in the region.10 Three of the five NUTS2 regions (TRA1, TRA2, and TRB1) that had increasing poverty rates between 2006 and 2013 were already among the poorest regions of Turkey in 2006. On the other hand, the three poorest regions (TRC1, TRC2, TRC3) in 2006 were successful in declining poverty over the next seven years, which suggests that the poverty reduction story in Turkey is too complex to pin down to one specific factor such as initial rate of poverty. Moreover, the two other regions that experienced an increase in poverty, TR10 and TR42, had significantly lower poverty rates than the national average in 2006. Differences in initial rates of poverty among these groups demonstrate the heterogeneity in Turkey’s poverty reduction performance.

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10 The results discussed in this paper are based on the poverty measure after spatial deflation.
Geographically, the Mediterranean-Aegean coast encompasses a majority of the regions that reduced poverty at the highest rate (Figure 2). Poverty went down from 29.9 percent to 20.3 percent in TR61 and from 27.4 percent to 21.5 percent in TR62, both of which are located along the Mediterranean. On the other hand, six of the seven poorer NUTS2 regions of Turkey located in the East and Southeast performed below average in relative poverty reduction. Only TRC1, which includes Gaziantep, the regional hub in Southeast Turkey, diminished poverty at a higher rate than the national trend. One important factor that provides context for the slower relative reduction in East and Southeast Turkey is that these regions have the highest initial rates of poverty in Turkey which diminishes the size of their relative reduction. However, this impact is more relevant for Southeast Turkey since many regions in Eastern Turkey actually experienced a poverty increase. In absolute terms, TRC1 was the most successful NUTS2 region in Turkey as poverty fell from 57.90 percent to 47.31 percent in seven years.

Grey lines show the 95% confidence interval for the imputation results.
From 2006 to 2013, most regions experienced population growth. Comparing the change in poverty rate and the number of poor, we see that in the best performing regions, the population of poor also reduced (TR2, 6, and 8). While the number of poor increased in Istanbul and the Eastern regions, the population of the middle class increased as well (Figure 3). Only in TRA, did the size of the middle class shrink from 2006 to 2013. In TRC, which is among the regions with the highest rate of absolute poverty reduction, the number of poor actually increased. However, since the overall size of the population grew through a remarkable expansion of the middle class, the headcount ratio fell at a significant level.

**Figure 2. NUTS2 Map of Moderate Poverty Reduction, 2006-2013**

Source: LFS, SILC 2006-2013; authors’ calculations.

**Figure 3. The Population of Poor, Vulnerable, and Middle Class (2006 & 2013)**

Notes: Based on OLS imputed income, spatially deflated.
Source: LFS, SILC 2006-2013; authors’ calculations.
The 2006-2013 time period includes the global financial crisis of 2007. Turkey, similar to many countries, was impacted negatively from the crisis both in terms of growth and poverty. Therefore it is useful to look at Turkey’s poverty reduction performance more specifically in two sub-time periods; the crisis period\textsuperscript{12} 2006-2009 and the post-crisis period 2009-2013.

Between 2006 and 2009, with the effect of the crisis, only 7 of 26 NUTS2 regions reduced poverty in Turkey (Figure 15). The Mediterranean region was clearly the best performer in this time period as TR61, TR62 and TR63 all achieved significant poverty reduction despite the ongoing crisis. On the other hand, TR10-Istanbul, and TR41 and TR42 (industrial provinces in Istanbul’s periphery) took the most substantial hit from the financial deterioration. Regional variance in poverty reduction between the more agricultural and services based South Coast versus the industrial Marmara region suggests that falling into poverty during the crisis was more likely in the industrial powerhouses of Turkey. However, NUTS2 regions in the more agricultural Black Sea Coast, and Eastern Turkey which has the highest share of workers in husbandry also experienced sizable increases in poverty rates.

In the high growth post-crisis period, Turkey was able to recover impressively as 24 of the 26 NUTS2 regions decreased their poverty rates (Figure 16). Interestingly, regions in the Mediterranean were relatively less successful in reducing poverty after 2009. The Black Sea coast, Central Anatolia (heartland of Anatolian tigers), as well as the industrialized west decreased poverty substantially. On the other hand, Eastern Turkey had subpar performance in poverty reduction. NUTS2 regions in East Turkey were the four least successful performers in the post-crisis period, two of which (TRA1 and TRB1) experienced an increase in their poverty levels.

As Figure 4 shows, there are some classifiable differences in the poverty reduction performance across regions. First, the majority of NUTS2 regions are located in the lower left quadrant, where initial poverty in 2006 is lower and there is a high level of poverty reduction. Istanbul (TR10) stands out as the only region with low initial poverty but experienced a significant increase in poverty from 2006 to 2013. In the data, a natural break in poverty rates exists for Eastern regions that have much higher rates of poverty. However, TRC regions in the East performed better, experiencing high levels of poverty reduction. The remaining regions experienced either very low levels of poverty reduction or increasing poverty.

\textsuperscript{12} This could be further divided into pre-crisis, crisis, and post-crisis period, however, data availability only allows for this division at the NUTS2 level.
Figure 4. Initial Poverty Levels (2006) and Poverty Reduction (2006-2013)

Notes: Initial poverty rates are in 2006. Poverty line is $5/day PPP per capita, OLS imputed income poverty, spatially deflated. Source: LFS, SILC 2006-2013; authors’ calculations.

**Poverty Gap**

Fluctuations in Turkey’s poverty rate explain only a portion of the entire poverty story as the headcount rate shows only the number of people living under a certain amount of income or consumption level. Supporting this headcount rate with the poverty gap index is valuable for obtaining a more complete picture of poverty in Turkey. The poverty gap measures the depth of poverty by taking into account the distance between the poverty line and the observed level of income/consumption of the poor. As the poverty gap increases, people under the poverty line have to increase their income/consumption at proportionally higher rate in order to escape poverty.

The relationship between moderate poverty rate and poverty gap is analogous to the previously explained trend between moderate and extreme poverty rates (Figure 17). The moderate poverty gap and headcount ratio both increase with the impact of the financial crisis but recover in the immediate aftermath. However, after 2011, the poverty gap starts to increase despite a continued decline in the headcount ratio. This divergence, which can also be seen between moderate and extreme poverty, suggests that the distance between the poverty line and people who are in moderate poverty is increasing despite a fall in the ratio of people living under $5 PPP a day. As a result, there is a net increase in the moderate poverty gap between 2006 and 2013 despite a simultaneous poverty reduction.
The increase in the poverty gap is prevalent across most NUTS2 regions in Turkey. Between 2006 and 2013, only one out of the 26 regions, TR61, experienced a fall in its poverty gap (Figure 5). Amongst the 25 regions in which the poverty gap rises, the four least successful performers are located in Eastern Turkey (TRA1, TRA2, TRB1, and TRB2). Just as before, breaking down the time period into crisis and post-crisis components produces noteworthy results for changes in the poverty gap. During the crisis period, the poverty gap and the headcount ratio were mostly parallel. Five of the 6 NUTS2 regions that reduced poverty were also successful in diminishing the poverty gap. These regions were both able to move people out of poverty and decrease the depth of poverty at the same time. Conversely, after 2009, the poverty gap diminished in only two of the 24 regions that experienced a reduction in moderate poverty. In this respect, even though Turkey was successful in removing people out of moderate poverty after the crisis, a similar achievement could not be accomplished in lessening the depth of moderate poverty.

![Figure 5. Change in the Poverty Headcount and the Poverty Gap, NUTS2 2006-2013](image)

Notes: OLS imputed income poverty, spatially deflated.
Source: LFS, SILC 2006-2013; authors' calculations.

**Is There Regional Poverty Convergence?**

In principle, poverty convergence implies that regions with higher initial poverty rates should also experience higher rates of growth in consumption or income and subsequently higher rates of poverty reduction. The implication will be poverty rates gradually becoming similar across countries or regions. Cross-country studies do not find evidence of this effect (Ravallion, 2012). This is because other effects cancel out mean convergence. Two factors dampen the effects of poverty convergence; the initial level of poverty slows the impact of poverty reduction, and there is also a lower poverty-to-growth elasticity when initial poverty levels are high.

13 See Ravallion (2012) on methodological notes on estimating poverty convergence.
Poverty convergence elasticity is defined as $\frac{\partial g_r(H_{rt})}{\partial \ln(H_{rt-1})}$ and can be decomposed into three components (Ravallion, 2012):

(i) *Mean convergence effect* which is the interaction between the initial level of non-poverty and elasticity of the initial poverty rate with respect to the original mean of consumption;

(ii) *Direct effect of poverty* which takes into account the level of the initial non-poverty, and

(iii) *Poverty elasticity effect* which is the interaction between the growth of the mean consumption and poverty rate in the initial period.

Figure 6 illustrates descriptive statistics of a scatter plot of annualized growth of the poverty rate from 2006 to 2013, and initial poverty rates in 2006. The illustrations reveal interesting and polarizing trends on poverty convergence in Turkey. Namely, when looking at the country as a whole, there is a lack of poverty convergence, which is related to poor poverty reduction performance of the Eastern regions. When excluding the East from the scatter plot, there is very clear poverty convergence; regions with higher initial poverty rates in 2006 had the largest reductions in poverty from 2006 to 2013.

Table 2 summarizes the decomposition of poverty convergence elasticity for cases without population weights. Excluding population weights gives equal representation to each region. Poverty convergence is examined and decomposed for all NUTS2 regions, as well as when excluding the Eastern regions. The exclusion of Eastern region is very descriptive of the uneven speed of poverty convergence in the country. Second, we examine convergence at the $2.5/day 2005$PPP and $5/day 2005$PPP poverty lines.

Across all regions and over the period 2006 to 2013, there is a lack of poverty convergence both at the $2.5/day$ and $5/day$ PPP poverty lines. The only effect that is negative is the poverty elasticity effect which shows that poverty declined where there were episodes of high growth. The lack of poverty convergence is

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14 The variable $g_r(H_{rt})$ is the growth rate of the headcount for region r and in year t, and $\ln(H_{rt-1})$ is the log of the initial headcount for region r (lagged one year).
due to the polarizing trends of the Eastern regions (TRA and TRB) of Turkey compared with the rest of the country. While the rest of the country consistently has poverty rates around 20-30 percent, the Eastern regions have an average poverty rate that is much higher ranging from 40-60 percent. Moreover, the East has not experienced a high rate of poverty reduction.

Table 2. Poverty Convergence Trends (2006-2013)

|                     | $2.5/day PPP |          | $5/day PPP |          |
|---------------------|--------------|----------|------------|----------|
|                     | Headcount    | Poverty  | Headcount  | Poverty  |
|                     |              | Gap      | Gap        | Gap      |
|                     |              | Squared  | Squared    |          |
| All Regions         |              |          |            |          |
| Mean convergence    | 0.015        | -0.040   | 0.000      | 0.009    |
| Direct poverty effect| 0.001        | 0.000    | 0.000      | 0.003    |
| Poverty elasticity  | -0.008       | -0.008   | -0.002     | -0.008   |
| Convergence Elasticity | 0.007       | -0.048   | -0.002     | 0.004    |
|                      |              |          |            | 0.008    |
|                      |              |          |            | 0.011    |
| No Eastern Regions (East=TRA, TRB) | $2.5/day PPP |          | $5/day PPP |          |
| Mean convergence    | -0.077       | 0.074    | 0.010      | -0.056   |
| Direct poverty effect| -0.017       | -0.004   | -0.002     | -0.053   |
| Poverty elasticity  | -0.008       | -0.006   | 0.001      | -0.010   |
| Convergence Elasticity | -0.102      | 0.065    | 0.009      | -0.119   |
|                      |              |          |            | -0.126   |
|                      |              |          |            | -0.145   |

Notes: Income based poverty. Following the methodology in Ravallion (2012). No population weights.
Source: SILC and LFS 2006-2013, authors’ calculations.

When examining poverty convergence and excluding the Eastern regions, the convergence story changes. In the rest of the country there is a very large degree of poverty convergence at both poverty lines, the poverty convergence elasticity is -0.102 at the $2.5/day PPP line and -0.119 at the $5/day PPP line. This is impressive since across the world, poverty convergence has generally been absent due to poverty effects and poverty elasticity effects offsetting mean convergence effects. Additionally, at the $5/day PPP line, there is also convergence in the poverty gap and squared poverty gap indices.

Poor outcomes in the roof of Turkey (TRA, TRB) dampened the effects of poverty convergence. The Eastern regions in Turkey are primarily agriculture and there are also ethnic differences. Low poverty reduction is not from a lack of job growth; the Eastern regions have high employment growth rates (Figure 25). The issues are more likely related to the type of jobs that are being created. In 2006, the Eastern regions had poverty rates that were much higher than the rest of the country (Figure 6). Yet TR6 and TR5 regions also had similarly high levels and were able to experience much higher rates of poverty reduction. The growth of TR6 is due to expanding services sector along the Mediterranean coast, especially a tourist boom during the crisis period. From 2007 to 2012, new enterprises opened in inland cities in the Anatolia regions, but almost no businesses opened in the Eastern regions (World Bank 2014, Figure 5.5).

However, when using population weighted results, poverty convergence exists. This means that distribution of poverty across regions are not converging, but poverty among the number of poor is declining (see Table 18 for poverty convergence results with population weights). Regional disparities still exist despite overall poverty reduction at the national level.
There are also disparities in poverty convergence across time. The Financial Crisis is a point in time where economic downturn swept through the country, and given different regional attributes, coping mechanisms and recovery have varied after the crisis. With the impact of the crisis, Turkey’s GDP shrank while the income based poverty rate ($5/day PPP) and inequality started to increase between late 2007 and 2009. However, GDP growth recovered quickly starting in 2010, and the poverty rate started to fall once again. During the same period, Turkey’s inequality did not follow the positive trends in GDP and rate of poverty as the Gini rose significantly between 2010 and 2012.

As a result, the nature of growth seems to have changed in Turkey after the crisis, which endangers the level of shared prosperity going into the future. Inequality decreased before the crisis and increased in the post-crisis period. The recession of 2007-2009 did not drastically change the observed patterns in poverty reduction. Despite a sharp economic downturn in 2008 and 2009, poverty increased only marginally in 2009 and average consumption growth of the bottom 40 percent of the population was still positive during 2007-2009. More worrisome is that the period after the crisis (2008-onwards) is marked by a gradual increase in inequality. Consumption-based poverty has been falling at all poverty lines, and relatively independent of the changes in GDP per capita (Figure 7). While GDP per capita dipped below zero in 2009, poverty increased only a little bit. Reduction in poverty growth in the latest years has been accompanied by an increase in inequality.

During the financial crisis period, the least poor were more negatively affected by the crisis. After the financial crisis, the Gini coefficient increased, the country experienced top heavy growth, and the rich benefitted more from growth. Figure 8 illustrates the very different trends in poverty convergence before and after the crisis. Before the crisis, regions with higher initial poverty rates in 2006 tended to experience larger poverty reduction. However, after the crisis, the poorest regions experienced the least amount of poverty reduction.

\[ \text{Source: HCES, WDI, Azevedo, Atamanov (2014)} \]

\[ \text{15 $2.5$/day PPP (extreme poor), $5$/day PPP, and $10$/day PPP.} \]
Poverty convergence was present before the financial crisis. Over the period 2006 to 2009, the poverty convergence elasticity at the $2.5/day PPP line was -0.132 and -0.058 at the $5/day PPP line (Table 3). However, this convergence was also driven by slowing growth in Istanbul and richer regions in 2009. In the pre-crisis period (2006 to late 2007), Turkey experienced successful GDP growth and reduction both in terms of poverty and inequality. Since the period 2006 to 2009 includes both high growth and crisis years, the poverty elasticity effect was also very close to zero. From 2010 to 2013, the poverty convergence elasticity was negative at both the $2.5 and $5/day PPP poverty lines, illustrating that after the crisis, growth was effective in reducing poverty. While the poverty elasticity effect became negative in this period, the mean convergence and direct poverty effects became positive. Poorer regions grew slower, and regions with higher initial levels of poverty reduced poverty at a slower rate or even saw poverty increase.

As the results show, poverty convergence over the period 2006 and 2013 was uneven. Some parts of the country experienced high amounts of poverty reduction while other regions lagged behind. Across time, there are also differences in convergence as growth became less pro-poor after the financial crisis. These particularities all contribute to understanding the patterns of regional poverty convergence and reduction for Turkey.
Table 3. Poverty Convergence was strong before the financial crisis

| $2.5/day PPP | $5/day PPP |
|-------------|------------|
| $2.5/day PPP | Headcount  | Poverty Gap | Poverty Gap Squared | Headcount  | Poverty Gap | Poverty Gap Squared |
| Mean convergence | -0.106 | -6.143 | -0.047 | -0.028 | -0.083 | -0.155 |
| Direct poverty effect | -0.031 | -0.019 | 0.007 | -0.035 | -0.044 | -0.040 |
| Poverty elasticity | 0.005 | 0.006 | 0.004 | 0.004 | 0.005 | 0.005 |
| Poverty Convergence Elasticity | **0.254** | **-0.416** | **-0.109** | **0.138** | **0.244** | **0.348** |

Notes: Income based poverty. Following the methodology in Ravallion (2012). No population weights

Source: SILC and LFS 2006-2013, authors' calculations

Where Is There Economic Mobility?

Economic mobility measures the portion of the population that moves either above or below a selected threshold of welfare. The paper’s analysis examines the population’s movement across the $5/day PPP poverty line between 2006 and 2013. The population is categorized in to four groups as follows: those who are above the poverty line in both periods - “Non-Poor”; those who are below the line in both periods - “Chronic Poverty”; those who are poor in the first period but move above the line in the second period - “Upward Mobility”, and finally those who start out as not poor but fall below the line - “Downward Mobility”. Measurements of economic mobility in and out of poverty are computed following the methodology of Dang et al (2014). This methodology allows for measures of mobility using a synthetic panel when actual panel data is unavailable. Thus, the population across Turkey and within each region is assumed to be constant between 2006 and 2013.

At the national level, the level of upward and downward mobility is similar between 2006 and 2013 (Figure 9). In other words, the percentage of people who fell under the poverty line of $5 PPP is at a parallel level to the proportion of people who escaped poverty. In total, around 25 percent of the population experienced a change in their moderate poverty status. Moreover, approximately 10 percent of the population was in chronic poverty meaning that one in ten people in Turkey were under the poverty line both in 2006 and 2013.

Economic mobility was heterogeneous across regions. Eastern and Southeastern regions experienced higher rates of churning as a greater proportion of people moved either above or below the poverty line in these areas. However, even among these regions with high mobility, there were significant differences. Regions in the roof, which are lagging in terms of poverty reduction, had significantly more people moving below the poverty line in comparison to the group that experienced upward mobility. The high level of churning in Eastern Turkey alongside the increase in poverty rates suggest that despite the existence of opportunities to help people escape poverty, there is a simultaneous high level of vulnerability among the people who are
not poor. On the other hand, Southeastern regions had more individuals climbing above the poverty line relative to those that fell into poverty. The high level of downward mobility suggests that economic vulnerability is also a significant issue in this area that must be addressed going forward.

Additionally, the mobility analysis shows that chronic poverty is an important issue for East and Southeast parts of the country. More than one in four people were living in chronic poverty in regions TRA2, TRB2, TRC1, TRC2 and TRC3. This regional pattern indicates that despite instances of remarkable upward mobility in poorer parts of Turkey, there is still a substantial part of the local population that needs to be reached to boost poverty alleviation.

Figure 9. Economic Mobility in at National and NUTS2 Levels

| Region  | Non-Poor | Upward Mobility | Downward Mobility | Chronic Poverty |
|---------|----------|-----------------|-------------------|-----------------|
| National| 9.69     | 12.52           | 11.64             | 66.15           |
| Urban   | 8.80     | 10.93           | 9.47              | 73.80           |
| Rural   | 8.24     | 16.01           | 16.39             | 49.36           |
| TR10    | 10.41    | 5.61            | 81.88             |                 |
| TR21    | 10.86    | 10.13           | 75.42             |                 |
| TR22    | 10.94    | 9.95            | 75.18             |                 |
| TR31    | 8.42     | 9.34            | 78.19             |                 |
| TR32    | 10.39    | 11.21           | 71.76             |                 |
| TR33    | 10.57    | 11.49           | 73.57             |                 |
| TR41    | 9.35     | 7.04            | 81.35             |                 |
| TR42    | 10.77    | 7.58            | 78.78             |                 |
| TR51    | 8.59     | 8.61            | 79.90             |                 |
| TR52    | 10.67    | 12.69           | 71.71             |                 |
| TR61    | 8.76     | 11.59           | 16.61             | 63.04           |
| TR62    | 8.36     | 13.11           | 15.31             | 63.22           |
| TR63    | 13.31    | 14.72           | 17.31             | 56.66           |
| TR71    | 6.78     | 13.52           | 12.60             | 67.11           |
| TR72    | 6.94     | 13.69           | 12.48             | 66.89           |
| TR81    | 11.86    | 13.54           | 71.07             | 68.88           |
| TR82    | 12.26    | 12.23           | 71.07             |                 |
| TR83    | 12.25    | 13.76           | 67.46             |                 |
| TR90    | 5.49     | 13.28           | 12.00             | 69.23           |
| TRA1    | 16.24    | 21.24           | 12.90             | 49.65           |
| TRA2    | 15.09    | 23.97           | 14.65             | 36.28           |
| TRB1    | 20.00    | 20.16           | 14.71             | 45.12           |
| TRB2    | 33.65    | 21.90           | 15.69             | 28.76           |
| TRC1    | 75.84    | 17.48           | 19.78             | 32.91           |
| TRC2    | 41.50    | 17.29           | 19.49             | 21.71           |
| TRC3    | 39.46    | 17.50           | 19.52             | 23.52           |
3. Estimating the Drivers and Determinants of Regional Poverty

The estimation strategy to understand regional determinants of poverty is based on an existing literature associating growth composition, labor, and other regional variation to poverty reduction. Explanatory factors of the evolution of regional poverty has generally be classified as either “patterns of growth” or “initial conditions”. The methodology in this paper follows closely previous literature (Ferreira, Leite, Ravallion, 2010; Suryahadi, Suryadarma, and Sumarto, 2009; Montalvo and Ravallion, 2010; Loayza and Raddatz, 2010).

Our data set comprises of 26 NUTS2 regions from 2006 to 2013. Descriptive variables at the regional level are not available for all years and depending on the specification, results will have fewer observations. In terms of patterns of growth, we consider regional and spatial variations in economic variables, shifts in sectoral growth, the composition of growth, fiscal spending. In terms of initial conditions, we control for demographic and infrastructure variables.

Patterns of Growth

The starting point estimation is a first difference equation (Eq 1). The dependent variable is the headcount ratio based on the Foster-Greer-Thorbecke family of poverty indices. The headcount ratio or poverty rate is based on imputed annual household income per capita and international poverty lines. The change in a poverty index is regressed onto changes in the value added of sector $s$ in region $r$ and at time $t$. The primary sector is agriculture ($s=1$), the secondary sector is industry ($s=2$), and the tertiary sector is services ($s=3$). This is the most basic specification for estimating the impact of the “pattern of growth”.

$$
\Delta \ln FGT^0_{rt} = \alpha + \beta_1 \Delta \ln Y^1_{rt} + \beta_2 \Delta \ln Y^2_{rt} + \beta_3 \Delta \ln Y^3_{rt} + \epsilon_{rt}
$$

Since the equation is a first difference, any time-invariant regional level fixed effects are removed. From the poverty convergence results earlier, it is evident that the impact of growth patterns by sector will be uneven regionally. Therefore, it is also necessary to interact the regressors with a regional dummy. There are two regional groupings that are tested in this paper for robustness; East and West, and a 3-region grouping proposed by the OECD. Table 17 lists these groupings in detail. The West region excludes the NUTS1 regions of TRA and TRB. TRA and TRB are mountainous regions and geographically harsher than the rest of the country; they can also be referred to as the “roof” of Turkey. The OECD (2014) groups Turkey’s regions into three groups: the Developed West, Anatolian Tigers, and the rest of the country.

Overall, western and coastal regions are more developed with more modern industrial and agricultural production along with professional services compared to the eastern regions. TR1-Istanbul is the only region that has negligible agricultural production in terms of its sectoral gross value added (GVA) breakdown (Figure 10). Only 0.2 percent of Istanbul’s production comes from agriculture compared to the national average of 9 percent. Most of Istanbul’s economy consists of professional services such as finance, communication and information along with manufacturing. TR4-Doğu Marmara is the most industrialized region in the country with large-scale industrial production and manufacturing firms. TR5-Bati Anadolu, includes the capital and second largest city Ankara. It has the second lowest agricultural share in terms of its GVA after Istanbul. Government jobs and other professional services along with sizable manufacturing and constructing industries make TR5-Bati Anadolu one of the more developed regions in Turkey.
TR-6 Akdeniz and TR-3 Ege are the two most touristic regions in Turkey. They also share the fertile land along the Mediterranean-Aegean coast which has led to industrial agricultural production in both regions. TR-3 Ege includes Izmir, the third largest city in Turkey, which houses various professional service and manufacturing jobs. TR7-Orta Anadolu has the second largest agricultural share of GVA among all regions at 18.3 percent. The region also includes some of the “Anatolian Tiger” provinces which have experienced large growth levels over the last decade through small and medium sized companies that specialize in manufacturing and other industrial sectors. TR8-Bati Karadeniz and TR-9 Dogu Karadeniz share the heavy rainfall of the Black Sea coast which leads to dense forests suitable for forestry and specific types of agricultural products. Tea and hazelnut are the two most recognizable of these products which are grown in TR9-Dogu Karadeniz. TR8-Bati Karadeniz also has a substantial mining industry with large coal and steel mines that has played a key role in the industrialization of the region.

TRA-Kuzey Dogu Anadolu, TRB-Orta Dogu Anadolu, and TRC-Guney Dogu Anadolu are the three poorest regions in Turkey. Each region has a significantly higher agricultural share of GVA compared to the national average. TRA-Kuzey Dogu Anadolu, and TRB-Orta Dogu Anadolu are the most mountainous regions in Turkey making the regions less suitable for large-scale agricultural production. Husbandry and forestry, along with light manufacturing sectors account for most of the production in the regions. TRC-Guney Dogu Anadolu, despite having high levels of poverty similar to TRA and TRB, has a more developed industrial agricultural system and higher levels of manufacturing production. All three regions have experienced large growth in their respective construction sectors between 2006 and 2012, which has contributed to the increasing level of industrialization in Eastern Turkey.

Compared to ECA countries with analogous GVA per capita values, regions in Turkey have higher poverty rates. For example Russia and TR3-Ege have similar GVA per capita values, but TR3-Ege’s poverty rate is more than double of Russia’s level of poverty. TR1-Istanbul stands out with a high productivity level, falling behind only Slovakia in terms of GVA per capita in ECA. Nonetheless, there are 6 countries with lower poverty rates than TR1-Istanbul in the ECA region, five of which have relatively lower levels of productivity. Regional determinants of poverty are level value added, fiscal variables, and initial conditions.
These variables are obtained from TUIK and the Ministry of Finance, and have varying levels of data availability.

The sectoral composition of regions has direct implications on the labor intensity and skill composition of workers. These factors are strong predictors of wages and hence poverty and welfare. At the NUTS1 level, Istanbul has the largest share of national GVA owing in large part to a highly diversified services and industry sectors (Figure 23). However, this series is also limited and only available from 2006 to 2011. Moreover, GDP by sector and region are not available from administrative sources. Since industries can receive large amounts of subsidies, GVA may give an inaccurate snapshot of the size of sectors across regions.

Table 4 illustrates the estimation results of Equation (1). Coefficients can be interpreted as elasticities. In estimations without regional interaction terms, GVA growth in agriculture appears to be the only sector driving reductions in poverty. However, when allowing the growth effects to be heterogeneous between East and West regions, it becomes clearer that agriculture primarily benefitted Eastern regions, and to a lesser extent Western regions. Notice, that the R-squared, or explanatory power of the regressions almost doubles as well when the regional interaction is added, highlighting the importance of regional differences in the patterns of growth.

|                  | (1)       | (2)       | (3)       | (4)       |
|------------------|-----------|-----------|-----------|-----------|
| $\Delta \ln Y^1_{t}$ | -0.107*** | -0.102*** |           |           |
|                   | (0.0295)  | (0.0313)  |           |           |
| $\Delta \ln Y^2_{t}$ | 0.0245    | 0.0232    |           |           |
|                   | (0.0321)  | (0.0303)  |           |           |
| $\Delta \ln Y^3_{t}$ | -0.00682  | -0.00467  |           |           |
|                   | (0.0579)  | (0.0582)  |           |           |
| $\Delta \ln Y^4_{t}$* $I_{West}$ | -0.0859*** | -0.0801** |           |           |
|                   | (0.0289)  | (0.0314)  |           |           |
| $\Delta \ln Y^4_{t}$* $I_{East}$ | -0.429*** | -0.442*** |           |           |
|                   | (0.106)   | (0.106)   |           |           |
| $\Delta \ln Y^5_{t}$* $I_{West}$ | 0.186***  | 0.201**   |           |           |
|                   | (0.0638)  | (0.0849)  |           |           |
| $\Delta \ln Y^5_{t}$* $I_{East}$ | -0.00669  | -0.00140  |           |           |
|                   | (0.0635)  | (0.0674)  |           |           |
| $\Delta \ln Y^6_{t}$* $I_{West}$ | 0.471***  | 0.562***  |           |           |
|                   | (0.0698)  | (0.132)   |           |           |
| $\Delta \ln Y^6_{t}$* $I_{East}$ | -0.00422* | -0.00264* | -0.00641*** | -0.00158 |
|                   | (0.00223) | (0.00134) | (0.00198) | (0.00126) |

NUTS1 Controls | X | X | X |
Number of Observations | 104 | 104 | 104 | 104 |
R-Squared | 0.137 | 0.246 | 0.292 | 0.373 |

Notes: Table 22 show full regression results under various region groupings. Results from Equation 1 are shown. Regressions are limited to the 2007-2011 period. + p<0.10, * p<0.05, ** p<0.01
Source: TUIK, LFS, SILC 2007-2011, author’s calculations

When using the OECD regional groupings, again we find that agricultural gross value added was significant for poverty reduction, but other terms are insignificant (Table 22). Under the OECD classifications, the R-squared also reduced, which signals perhaps a poorer classification than simply an East-West indicator.
Since growth in sectors will impact poverty differently, the growth of GVA is also weighted by the sector share\(^\text{16}\) to account for sectors not being equally represented across regions. This is especially important since sectors that are labor intensive, rural, and also where the most poor are most likely to work in (Loayza and Raddatz, 2010). As in equation (1), these growth patterns are allowed to vary between Eastern and Western regions of Turkey and other geographic classifications.

(2)

\[
\Delta \ln FGT^0_{r,t} = \alpha_r + \beta_r \sum_{s=1}^{3} \left(s^s_{r,t-1} \ast \Delta \ln Y^s_{r,t} \right) + \varepsilon_{r,t}
\]

Table 5 shows results from equation (2). Elasticity is the coefficient multiplied by the average share. Weighted sector shares highlight the significance and size of the sector. The significance and signs of the coefficients generally are the same as in the previous specification.

In the Eastern regions, agricultural growth is the most significant explanatory variable for poverty reduction. While, growth in the agricultural sector is reducing poverty, GVA data is available only up to 2011. The time period highlights the role of agriculture during the financial crisis where individuals fell back into agriculture as employment decreased in other sectors. Although employment in agriculture fell from 2011 to 2013.

Table 5. Sector patterns of growth weighted by sector shares (2006-2011)

| (1) | (2) | (3) | (4) |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| \((s^1_{r,t-1} \ast \Delta \ln Y^1_{r,t})\) | -0.696*** | -0.670*** | -0.589*** | -0.548** |
| (0.187) | (0.196) | (0.192) | (0.209) |
| \((s^2_{r,t-1} \ast \Delta \ln Y^2_{r,t})\) | -0.0120 | 0.00485 | -1.771*** | -1.817*** |
| (0.115) | (0.111) | (0.437) | (0.406) |
| \((s^3_{r,t-1} \ast \Delta \ln Y^3_{r,t})\) | 0.0571 | 0.0419 | 0.0275 | 0.0402 |
| (0.0934) | (0.0904) | (0.100) | (0.103) |
| \((s^1_{r,t-1} \ast \Delta \ln Y^1_{r,t})\) \ast I_{West} | -0.00409* | -0.00250** | -0.00658*** | -0.00170 |
| (0.00223) | (0.00120) | (0.00198) | (0.00116) |
| \((s^1_{r,t-1} \ast \Delta \ln Y^1_{r,t})\) \ast I_{East} | 0.730*** | 0.959*** | 0.730*** | 0.959*** |
| (0.0650) | (0.214) | (0.0650) | (0.214) |

Notes: Table 23 show full regression results under various region groupings. Results from Equation 2 are shown. 2007-2011 period because regional GVA data is limited to this period. + p<0.10, * p<0.05, ** p<0.01

Source: TUIK, LFS, SILC 2007-2011, author’s calculations

\(^{16}\) The sector share of sector \(s = s^s_{r,t-1} = Y^s_{r,t}/Y^s_{r,t-1}\)
Notice the impact of the services sector is insignificant over the period. In the long run, the services sector has helped growth but, due to the limited time series that is available, the dynamism of the services sector is not captured over the period 2006 to 2011 where GVA data are available.

The average poverty elasticity of GVA growth across NUTS2 regions is only -0.19 and -0.11 from 2008 to 2010 during the crisis. The elasticity improved after the crisis from 2010 to 2011 at -0.68 (See Table 26). GVA excludes subsidies and taxes and this is one possible reason for why GVA does not exhibit poverty reducing impacts in the expected sectors: services and industry. Government subsidies are much higher in services and industry, therefore GVA is not a full measure of the size of the industrial and services sectors. Changes in the amount of government subsidy into each region can bias the results and also generate sporadic trends.

Changes in employment have a much larger explanatory power on poverty reduction than growth in GVA. As Azevedo and Atamanov (2014) find, employment and job creation are the main drivers of poverty reduction. When examining regressions of an identical structure but using employment variables, there is a much stronger story on the importance of the services sector as a channel of poverty reduction.

Employment data are available for more years than the value-added series and can also be more informative of welfare changes since employment and wages result in direct poverty reduction effects. The services sector is the only sector that maintained positive employment growth every year from 2006 to 2013 (Figure 11). It is impressive that during the crisis period, employment did not decrease in aggregate. Only employment in industry declined from 2008 to 2009 but this was offset by growth in services and agricultural employment. Agriculture was beneficial in some regions as people fell back into agriculture during the financial crisis, which is why there is strong growth in agriculture from 2009-2010 and also from 2010-2011. However, as the country began its recovery from the crisis, employment in agriculture shrank while the services sector remained strong in attracting and retaining workers.

![Figure 11. Employment Trends by Sector](image)

Source: Ministry of Finance – General Directorate of Public Accounts

Figure 24 also illustrates regional changes in the number of employed by sector from 2006 to 2013. Agriculture employment grew in the south west and central regions while reducing in the north. Employment in industry increased in every region, though at moderate levels. Employment in the services sector showed the most impressive growth; over 700,000 in Istanbul region. Only North regions of TR83 and TR90 experienced declines in the number of jobs in services from 2006 to 2013.
Overall, from 2006 to 2013, employment increased in all regions except TR22, TR83, and TR90 (Figure 25). Istanbul had the most impressive growth, over 811,000 new jobs were created from 2006 to 2013; there was also a lot of internal migration to this region as well. In terms of growth, the south-eastern regions had consistently high levels of growth. TRC performed exceptionally well, with almost 50 percent growth in the number of jobs from 2006 to 2013.

Turkey’s ability to create jobs even during a crisis period is a large accomplishment. From 2009 to 2013, 4.2 million jobs were created in Turkey, while the number of jobs in the EU declined by 2 million (World Bank, 2014). The reasons for this labor market success story is tentative but can be related to growth in services such as construction and structural change that is occurring throughout the country. Wages are higher in the West. Over time, workers are becoming better educated and structural shifts contribute to increasing wages. New jobs are characterized by being of better quality, having higher wages, and employing more highly educated people.

Table 6 illustrates regression results using employment as a determining factor. The coefficients can be interpreted as elasticities. At all levels of aggregation, it is clear that growth in the services sector has large effects on poverty reduction. Moreover, the poverty reduction impact of employment from services exists across all regions. Nationally on average, the elasticity of poverty to services employment is significant at -0.136 and when controlling for NUTS1 regions, the absolute value of the elasticity is even higher at -0.142. In columns (3) and (4) with East and West interactions, employment growth in agriculture is also important in the East, but this significance is lost when using the three region grouping (columns 5 and 6).

Table 6. Employment growth in the services sector has a strong relation to poverty reduction (2006-2013)

| No Regional Interactions | With East/West Regional Interactions | With 3 Regional Interaction Terms |
|--------------------------|------------------------------------|-----------------------------------|
|                          | (1) | (2) | (3) | (4) | (5) | (6) |
| (Δln Emp$_{T}$) | -0.00776 | -0.00957 | (Δln Emp$_{T}$)*West | 0.00185 | 0.000494 | (Δln Emp$_{T}$)*R1 | -0.0188 | -0.0217 |
| (Δln Emp$_{T}$) | (0.00973) | (0.0104) | (Δln Emp$_{T}$)*East | -0.0794** | -0.112** | (Δln Emp$_{T}$)*R2 | 0.0150 | 0.0157 |
| (Δln Emp$_{T}$) | 0.00308 | -0.00337 | (Δln Emp$_{T}$)*East | -0.0290 | -0.0174 | (Δln Emp$_{T}$)*R1 | 0.00506 | 0.00870 |
| (Δln Emp$_{T}$) | (0.0172) | (0.0202) | (Δln Emp$_{T}$)*West | 0.0357 | 0.0447 | (Δln Emp$_{T}$)*R2 | (0.00260) | (0.0281) |
| (Δln Emp$_{T}$) | (0.0405) | (0.0394) | (Δln Emp$_{T}$)*East | 0.0439** | 0.0142 | (Δln Emp$_{T}$)*R1 | 0.0147 | 0.009490 |
| (Δln Emp$_{T}$) | -0.136*** | -0.142*** | (Δln Emp$_{T}$)*West | -0.130*** | -0.127*** | (Δln Emp$_{T}$)*R2 | -0.0428 | -0.0307 |
| (Δln Emp$_{T}$) | (0.0272) | (0.0300) | (Δln Emp$_{T}$)*East | -0.242** | -0.304*** | (Δln Emp$_{T}$)*R2 | (0.0280) | (0.0313) |
| (Δln Emp$_{T}$) | (0.108) | (0.0908) | NUTS1 controls | X | NUTS1 controls | X | NUTS1 controls | X |
| Constant | 0.00108 | -0.00212*** | Constant | 0.00164 | -0.00159*** | Constant | 0.000441 | -0.00258*** |
| (0.00200) | (0.000477) | (0.00197) | (0.000538) | (0.00181) | (0.000687) |

Notes: Table 24 show regression results limited to the period 2007-2011 to match periods with GVA. R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Period is 2006-2013.
Source: TUIK, LFS, SILC 2007-2011, author’s calculations
The eastern regions appear to have enjoyed the largest poverty reduction impact from growth in the services sector. In the 3-region classification (columns 5 and 6), Mediterranean regions are included in R1 “rest of the country”, which experienced a boom in hotels and was one of the only regions to weather the financial crisis. By sector, employment growth in the services sector has been the strongest, with positive growth in all years. Additionally, the services sector employs the most people, about half of all workers. Moreover, growth and improvements in infrastructure were catalysts to growth, creating stronger connectivity throughout the country.

Employment in industry shrank during the crisis (2008-2009), and in recent years, employment in agriculture has been declining as well. However, just as in gross value added, there is strong regional variations in sectoral employment.

As a robustness check, when restricting the sample to the same time period in which GVA is available (2007-2011), the impact from growth in employment in services is only present in the West (Table 25). Any poverty reduction impacts from services is not present in the Eastern regions.

**Fiscal**

Next, fiscal variables are included into the specification. Government expenditures can be poverty reducing when correctly targeted. In the case of Brazil, social spending was found to be the saving grace and primary driver of poverty reduction in the absence of economic growth (Ferreira, Leite, and Ravallion, 2010). Equation (3) extends the specification of equation (2) with the inclusion of average central or local expenditures in log 2005 PPP per capita values.

\[
\Delta \ln FGT_r^t = \alpha_r + \beta_r^e (1 - I_{West_r}) \sum_{s=1}^{3} (s_{it-1}^s \cdot \Delta \ln Y_t^s) + \varphi \Delta \ln Exp_r + \epsilon_{rt}
\]

Fiscal variables are collected from the Ministry of Finance, General Directory of Accounts and are available from 2007 to 2013. Fiscal expenditures are categorized as either expenditures disbursed by the central government or local government. Central and local spending cannot be combined since part of central spending includes transfers to local governments but this amount is not clearly categorized using available data; transfers from central to local governments are a sub-category of Current Transfers. The combination of the two sources would double-count transfers. The impact of fiscal central and local expenditures are examined separately at both total and disaggregated levels.

At both the local and central aggregations of spending, expenditures on personnel comprise the largest proportion of government expenditures. Therefore, fiscal spending per capita is very much a measure of the presence of government and disaggregation of spending will also be important.

Central government expenditures are disaggregated by cities as well as an aggregation at the national level. The national level central expenditures includes transfers to regions as well as other government spending that is of high national importance such as the construction of multi-regional highways. This amount is also very large, about half of total central spending; in other words, about half of central spending is allocated to regions. Central spending at the national level probably includes some funds that are used at the regional level, but these figures are not included in the analysis. The majority of non-regional expenditures are current transfers which include remittances, donations, taxes, and foreign aid.
Figure 23 illustrates average per capita expenditures at the national level (See Figure 27 and Figure 28 for regional disaggregation). Total central expenditure spending ranges from about 1,000 to 1,400 per capita in 2005PPP. The level of local expenditures per capita is much lower.

In total, central spending is about three times higher than local spending. Therefore, in the upcoming analysis, it will not be surprising that central spending also has larger poverty reduction impacts. The largest amounts of central spending are personnel costs followed by purchases of goods and services and capital spending. In terms of local spending, purchases of goods and services is the category with the highest amounts of spending.

Across regions, the east has higher amounts of central spending but lower amounts of local spending. One aspect of this is higher personnel expenditures in the east which includes defense spending.

Table 7 illustrates regression results from equation (3), and using central spending. There is low explanatory power from fiscal variables, the R-squared is very low. But the R-squared is higher by many fold with addition of sectoral growth variables. Also differences in results with and without sector controls can be due to either the control of sector variables or the difference in time frame. In regressions with the addition of sector growth variables, fiscal variables still remain significant. The impacts of total spending disaggregated by east and west also have disparate impacts on changes in poverty; the poverty reducing impacts of central spending is much stronger in the West. Figure 27 shows the average level of per capita central spending in eastern and western parts of the country. While in eastern regions, total spending is higher, this is due primarily to the category on personnel costs, which also includes defense personnel. At the grouping of three regions, total central spending is the most poverty reducing in region R2 (Anatolian Tiger). However, as already mentioned, government spending includes personnel costs that do not necessarily trickle down to the population.
### Table 7. Regressions with fiscal variables – total central per capita spending/expenditure

|                          | (1)       | (2)       | (3)       | (4)       | (5)       | (6)       |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| ΔTotal Central Spending per capita | -0.114**  | -0.130**  |           |           |           |           |
|                          | (0.0496)  | (0.0565)  |           |           |           |           |
| ΔTotal Central Spending per capita*West | -0.138*** |           |           |           |           |           |
|                          | (0.0417)  |           |           |           |           |           |
| ΔTotal Central Spending per capita*East |           | 0.0155    |           |           | -0.0440   |           |
|                          |           | (0.0915)  |           |           | (0.111)   |           |
| ΔTotal Central Spending per capita*R1 |           |           | -0.135*   | -0.120    |           |           |
|                          |           |           | (0.0775)  | (0.100)   |           |           |
| ΔTotal Central Spending per capita*R2 |           |           | -0.172**  | -0.196**  |           |           |
|                          |           |           | (0.0678)  | (0.0801)  |           |           |
| ΔTotal Central Spending per capita*R3 |           |           | -0.0743** | -0.0834*  |           |           |
|                          |           |           | (0.0320)  | (0.0442)  |           |           |
| Constant                 | -0.000122 | 0.00417   | -0.000161 | 0.00170   | 0.000470  | 0.000283  |
|                          | (0.00280) | (0.00405) | (0.00260) | (0.00348) | (0.00307) | (0.00474) |
| Sector Shares            | X         | X         | X         |           |           |           |
| Spatial Fixed Effects    |           |           |           |           |           |           |
| Observations             | 156       | 104       | 156       | 104       | 156       | 104       |
| R-squared                | 0.068     | 0.217     | 0.108     | 0.356     | 0.084     | 0.285     |

Notes: R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 3 are shown. Regressions without sector controls are over the period 2007-2013. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01

Source: Ministry of Finance, LFS, SILC 2007-2011; authors’ calculations.

Initial conditions can also be a strong explanatory factor of the degree of poverty reduction. What are the demographic characteristics such as average educational levels and health indicators? These “initial conditions” may help explain the differences across regions as well. To take into account these additional variables of interest, equation 5 includes a vector of Demographic and Fiscal variables.

Educational PSIA score is increasing but there literacy disparities. Despite increased spending on education in recent years, educational outcomes have not improved in the East. Western regions are by far much more literate than eastern regions. Between 2001 and 2011, per capita government investment in education shifted largely to underserved Eastern regions but educational attainment in these regions are still lagging (World Bank, 2014, Fig 7.10).

Controlling for additional characteristics of the region does not change results. Expanding estimates from Table 7, the addition of controls were added such as schooling enrollment rates, higher education staff, physicians per capita, female labor force participation, and employment shares by education type. The addition of these variables did not significantly change the role of central government spending or sectoral growth.

Table 8 illustrates complementary results from Equation (3) using local per capita expenditures. Local expenditures are not as explanatory of poverty changes as central spending; the R-squared from these regressions are much lower than regressions with central expenditures. Moreover, poverty is higher in the East when there is higher local expenditures. Local expenditures may not be as explanatory as central spending simply due to its smaller size and smaller impact on the local economy. Figure 27 and Figure 28 illustrate average central and local expenditures respectively and local expenditures are about a fourth or fifth the amount of per capita central spending.
Table 8. Regressions with fiscal variables – total local per capita spending/expenditure

|                          | (1)       | (2)       | (3)       | (4)       | (5)       | (6)       |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| ΔTotal Local Spending per capita | 0.0165    | 0.0368    | (0.0226)  | (0.0289)  |           |           |
| ΔTotal Local Spending per capita*West | -0.0191   | -0.0178   | (0.0182)  | (0.0234)  |           |           |
| ΔTotal Local Spending per capita *East | 0.118***  | 0.121***  | (0.0192)  | (0.0388)  |           |           |
| ΔTotal Local Spending per capita*R1 | 0.0410    | 0.0701*   | (0.0338)  | (0.0393)  |           |           |
| ΔTotal Local Spending per capita*R2 | -0.0140   | -0.0231   | (0.0107)  | (0.0279)  |           |           |
| ΔTotal Local Spending per capita*R3 | -0.00770  | -0.0107   | (0.0127)  | (0.0176)  |           |           |
| Constant                 | -0.00774***| -0.00551**| -0.00730***| -0.00569**| -0.00783***| -0.00685***|
| Observations             | 156       | 104       | 156       | 104       | 156       | 104       |
| R-squared                | 0.00165   | 0.00243   | 0.00153   | 0.00218   | 0.00160   | 0.00231   |

Notes: R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 3 are shown. Regressions without sector controls are over the period 2007-2013. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01

Source: Ministry of Finance, LFS, SILC 2007-2011; authors’ calculations.

Table 27 illustrates results regressing by disaggregated central and local expenditures categories. Results using the OECD regional groupings are excluded since the R-squared is lower and regional interactions with fiscal expenditures are insignificant. At the national level, government personnel, social security payments, and purchases are related to poverty reduction. However, social security payments are only poverty reducing in the west. While personnel and purchases are poverty reducing in both the east and west. Sector and economic growth is still more important in explaining changes in poverty; the R-squared increases when including sector growth GVA variables.

Table 28 illustrates results using local fiscal expenditures, and there are even less explanatory items. Which is consistent with regressions on total central and local expenditures, that local expenditures are less correlated to changes in poverty. Interestingly, Anatolian tiger regions have low amounts of central spending compared to the Developed West or the Rest of the Country (Figure 27).

4. Conclusion

This paper examined poverty rates, poverty convergence, and determinants for Turkey at the NUTS2 level from 2006 to 2013. There is strong regional variation in regional poverty reduction. Poverty reduction across the country benefited from growth in the agriculture sector from a GVA standpoint. On the other hand, employment numbers show that increases in the services sector have a statistically significant relationship with poverty reduction across the entire country. When comparing these two effects, it is also important to bear in mind that job creation, which is captured by employment, was the main driver of poverty reduction (consumption based) in Turkey between 2002 and 2012.

In terms of government spending, increases in central spending are significantly more correlated with poverty reduction than the rise in expenditure at the local level. However, the causality of this relationship is not clear. Spending at the local level might be increasing as a response to higher poverty rates in the region. Another complicating factor is the high level of aggregation in the spending data. Despite the analysis conducted at the functionally disaggregated levels, a deeper breakdown that identifies expenditure
in education or social assistance can produce more nuanced results. In any case, the study is not able to find any positive relationship between local spending and poverty alleviation while it identifies a link between central government spending and reduction in poverty. This link is especially strong in terms of expenditure in social security payments in the non-eastern part of the country and spending on the purchases of goods and services in eastern Turkey.

From a poverty convergence perspective, the results differ across different temporal and geographical factors. Between 2006 and 2013, there is no regional poverty convergence in Turkey, mainly because of the lagging areas in the roof of Turkey. These mountainous regions in Turkey that have a distinct complexion compared to the rest of the country in terms of climate and topography were not able reduce poverty over the years of analysis. Since these regions in the roof had high initial rates of poverty, rising poverty negatively impacted convergence at a national level despite significant improvements in certain other parts of Turkey. As a consequence, removing the Eastern regions results in poverty convergence for the rest of the country.

Another important aspect in terms of convergence is the impact of the financial crisis on the regional growth composition of Turkey. Between 2006 and 2009, an interval that encompasses the pre-crisis and post-crisis periods in Turkey, there was strong regional poverty convergence at the national level. This trend was driven by poverty reduction in multiple initially poorer regions and an increase in poverty for the majority of regions that were more developed at the outset. This relationship was interrupted in the aftermath of the crisis. Even though poverty reduction was more significant compared to previous years, regions with higher initial development levels were able to diminish their poverty rates at a faster pace than the poorer ones. Consequently, there was no poverty convergence in Turkey between 2010 and 2013.

Finally, one important nuance in Turkey’s regional poverty convergence analysis is that population weighted results do actually show convergence unlike the unweighted analysis. This difference indicates that even though convergence between the regions’ poverty headcount ratios is not present, there is convergence in the number of poor across NUTS2 regions in Turkey.

This paper’s results show that the Turkish government’s goal of addressing regional differences as a part of the national strategy for development is appropriate, since there is a high level of geographic disparity in the country’s moderate and extreme poverty rates. Turkey’s performance demonstrates that poverty reduction is possible in regions with high initial levels of poverty. Going into the future, the main challenge in tackling spatial discrepancies will be expanding this performance to areas with more strenuous geographical conditions while focusing on suitable sectors and patterns of growth for each region through targeted private and public channels of improvement.
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FIGURES

Figure 13- Poverty Rates, National 2006-2013

Notes: OLS imputed income poverty, spatially deflated. Source: LFS, SILC 2006-2013; authors’ calculations.

Source: LFS, SILC 2006-2013 authors’ calculations. ECAPOV data. Household liability figures from Turkish Central Bank, Financial Stability Reports (2006-2013)

Figure 14 Poverty Measures ($5 PPP, %) and Household Liabilities (annual, per capita $PPP)\(^{17}\)

Source: LFS, SILC 2006-2013 authors’ calculations. ECAPOV data. Household liability figures from Turkish Central Bank, Financial Stability Reports (2006-2013)

\(^{17}\) Household liabilities consist of credits taken from banks and consumer financing companies, credit card balances, liabilities relating to non-performing personal loans that have been transferred to wealth management companies and unpaid mortgages to the Housing Development Administration of Turkey. Population of 2006 back-casted from the 2007 population taken from the Address Based Population Registration System of Turkish Statistical Institute.
Figure 15 - Poverty Rates, NUTS2 2006-2009

Notes: OLS imputed income poverty, spatially deflated.
Source: LFS, SILC 2006-2013; authors’ calculations.

Figure 16 - Poverty Rates, NUTS2 2009-2013

Notes: OLS imputed income poverty, spatially deflated.
Source: LFS, SILC 2006-2013; authors’ calculations.
Figure 17  - Poverty Gap, National 2006-2013

Notes: OLS imputed income poverty, spatially deflated.
Source: LFS, SILC 2006-2013; authors’ calculations.
Figure 18. NUTS1, NUTS2 and NUTS3 (provinces) regions of Turkey
Figure 19. Change in Poverty Rates, by geographic area

Notes: OLS imputed income poverty, spatially deflated.
Source: LFS, SILC 2006-2013; authors’ calculations.
Figure 20. Poverty Rates at the NUTS2 Level 2006, 2013 and Relative Change ($5 PPP)

Poverty Rates (%, 2006)

Poverty Rates (%, 2013)

Relative Change in Poverty Rates (2006-2013)

Source: LFS, SILC 2006-2013; authors’ calculations. Results computed from imputed LFS data
Figure 21. Economic Mobility Maps

Chronic Poverty

Upward Mobility

Downward Mobility

Source: LFS, SILC 2006-2013; authors’ calculations. Results computed form imputed LFS data
Figure 22 Annual Real GVA Growth

Source: Turkish Statistical Institute data compiled from following institutions: Central Bank, Undersecretariat of Treasury, Ministry of Agriculture and Rural Affairs, Ministry of Forestry, Ministry of Environment, State Railways, Maritime Lines, Airlines, Turkish Telecommunications, Post Enterprises, State Hydraulic Works, Turkish Electricity Distribution and Production Companies, Petroleum Pipeline Corporation, Banks, Mutual funds, Foreign Exchange Dealers, Insurance Companies, non-Profit Institutions, Municipalities, General and Annexed Budget Agencies, The State Economic Enterprises, The Revolving Funds Organizations, Special Provincial Administration.

Figure 23. Share of National GVA across Regions (2011)

Source: Turkish Statistical Institute data compiled from following institutions: Central Bank, Undersecretariat of Treasury, Ministry of Agriculture and Rural Affairs, Ministry of Forestry, Ministry of Environment, State Railways, Maritime Lines, Airlines, Turkish Telecommunications, Post Enterprises, State Hydraulic Works, Turkish Electricity Distribution and Production Companies, Petroleum Pipeline Corporation, Banks, Mutual funds, Foreign Exchange Dealers, Insurance Companies, non-Profit Institutions, Municipalities, General and Annexed Budget Agencies, The State Economic Enterprises, The Revolving Funds Organizations, Special Provincial Administration.
Figure 24. Change in Employment 2006-2013

Agriculture

Services

Industry

Source: Turkish Statistical Institute data compiled from Household Labour Force Statistics (publication), Household Labour Force Data Base (internet)
Figure 25. Change in employment (,000) from 2006 to 2013

| Level | Percent Change |
|-------|---------------|
| Source: Turkish Statistical Institute data compiled form Household Labour Force Statistics (publication), Household Labour Force Data Base (internet) |

Figure 26. Non-Agricultural Employment Breakdown

Source: Turkish Statistical Institute data compiled from Annual Industry and Service Statistics
Figure 27. Fiscal Spending - Central

Notes: Monetary values are in thousands and 2005PPP
Source: Ministry of Finance – General Directorate of Public Accounts
Notes: Monetary values are in thousands and 2005PPP
Source: Ministry of Finance– General Directorate of Public Accounts
### Table 9. Turkey National Income Based Poverty Rates

| Poverty Line | Year | Poverty Rate (%, $PPP) | Standard Error |
|--------------|------|------------------------|----------------|
| 5            | 2006 | 23.80                  | 0.37           |
| 5            | 2007 | 25.23                  | 0.38           |
| 5            | 2008 | 26.67                  | 0.39           |
| 5            | 2009 | 25.39                  | 0.33           |
| 5            | 2010 | 24.91                  | 0.32           |
| 5            | 2011 | 23.46                  | 0.29           |
| 5            | 2012 | 22.76                  | 0.27           |
| 5            | 2013 | 22.22                  | 0.28           |
| 2.5          | 2006 | 5.46                   | 0.20           |
| 2.5          | 2007 | 6.07                   | 0.22           |
| 2.5          | 2008 | 7.21                   | 0.22           |
| 2.5          | 2009 | 6.23                   | 0.20           |
| 2.5          | 2010 | 5.91                   | 0.19           |
| 2.5          | 2011 | 5.85                   | 0.19           |
| 2.5          | 2012 | 6.60                   | 0.17           |
| 2.5          | 2013 | 7.62                   | 0.19           |

**Notes:** OLS imputed income poverty, spatially deflated. Poverty estimates have standard errors.

**Source:** LFS, SILC 2006-2013; authors’ calculations.

### Table 10. Turkey Regional NUTS1 Income Based Poverty Rates from SILC ($5 PPP)

| Region                | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|-----------------------|------|------|------|------|------|------|
| TR1-Istanbul          | 2.68 | 7.39 | 7.55 | 9.01 | 8.30 | 6.89 |
| TR2-Bati Marmara      | 13.72| 15.77| 18.97| 17.87| 16.11| 14.02|
| TR3-Ege               | 16.31| 18.49| 14.99| 16.03| 13.81| 10.64|
| TR4-Dogu Marmara      | 10.06| 10.44| 11.03| 16.05| 12.72| 12.28|
| TR5-Bati Anadolu      | 12.46| 17.00| 17.15| 15.56| 15.60| 11.77|
| TR6-Akdeniz           | 32.51| 31.00| 29.15| 22.72| 25.95| 27.65|
| TR7-Orta Anadolu      | 24.69| 30.57| 30.01| 27.67| 25.74| 21.76|
| TR8-Bati Karadeniz    | 24.61| 29.38| 27.72| 25.71| 21.63| 20.22|
| TR9-Dogu Karadeniz    | 15.29| 20.28| 20.39| 26.23| 22.56| 15.76|
| TRA-Kuzey Dogu Anadolu| 40.23| 46.19| 51.98| 50.60| 47.41| 51.07|
| TRB-Orta Dogu Anadolu | 53.90| 58.75| 60.62| 59.25| 58.23| 53.35|
| TRC-Güney Dogu Anadolu| 72.66| 67.45| 66.46| 65.60| 64.99| 62.87|

**Notes:** SILC observed data.

**Source:** LFS, SILC 2006-2013; authors’ calculations.
Table 11. Turkey Regional NUTS1 Income Based Poverty Rates from SILC ($2.5 PPP)

| Region               | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  |
|----------------------|-------|-------|-------|-------|-------|-------|
| TR1-Istanbul         | 0.26  | 1.45  | 0.69  | 1.01  | 0.44  | 0.47  |
| TR2-Bati Marmara     | 2.28  | 3.08  | 2.99  | 2.77  | 3.13  | 1.80  |
| TR3-Ege              | 1.53  | 3.52  | 1.92  | 1.75  | 1.45  | 1.39  |
| TR4-Dogu Marmara     | 1.38  | 0.82  | 2.18  | 2.03  | 1.38  | 1.76  |
| TR5-Bati Anadolu     | 0.57  | 2.45  | 1.68  | 2.68  | 2.44  | 1.50  |
| TR6-Akdeniz          | 8.67  | 4.77  | 4.21  | 3.82  | 4.21  | 4.29  |
| TR7-Orta Anadolu     | 1.49  | 5.72  | 4.68  | 6.45  | 4.92  | 3.90  |
| TR8-Bati Karadeniz   | 4.37  | 4.98  | 6.78  | 6.60  | 4.24  | 3.81  |
| TR9-Dogu Karadeniz   | 3.11  | 3.60  | 4.66  | 3.53  | 1.19  | 2.38  |
| TRA-Kuzey Dogu Anadolu | 13.94 | 17.32 | 19.61 | 19.30 | 16.87 | 17.32 |
| TRB-Orta Dogu Anadolu | 17.43 | 18.53 | 21.49 | 22.10 | 23.66 | 17.09 |
| TRC-Güney Dogu Anadolu | 27.07 | 29.97 | 30.21 | 28.76 | 30.25 | 26.43 |

Notes: SILC observed data.
Source: LFS, SILC 2006-2013; authors’ calculations.

Table 12. Turkey Regional NUTS1 Income Based Poverty Rates from LFS ($5 PPP)

| Region               | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| TR1-Istanbul         | 9.13  | 11.12 | 13.21 | 13.49 | 14.03 | 14.02 | 12.86 | 12.50 |
| TR2-Bati Marmara     | 18.26 | 17.77 | 18.92 | 17.51 | 18.45 | 16.43 | 15.29 | 14.65 |
| TR3-Ege              | 16.96 | 17.72 | 16.68 | 17.09 | 15.14 | 14.15 | 13.57 | 13.53 |
| TR4-Dogu Marmara     | 12.52 | 13.26 | 15.04 | 16.71 | 17.55 | 14.86 | 13.66 | 12.58 |
| TR5-Bati Anadolu     | 14.79 | 15.55 | 14.71 | 15.17 | 15.57 | 13.69 | 13.42 | 12.81 |
| TR6-Akdeniz          | 29.12 | 27.77 | 28.47 | 24.60 | 23.70 | 24.20 | 23.53 | 22.64 |
| TR7-Orta Anadolu     | 22.33 | 26.73 | 27.45 | 25.83 | 24.20 | 22.14 | 21.99 | 20.50 |
| TR8-Bati Karadeniz   | 22.40 | 26.82 | 27.78 | 25.47 | 22.22 | 18.73 | 18.35 | 18.15 |
| TR9-Dogu Karadeniz   | 20.00 | 21.32 | 23.18 | 24.48 | 24.06 | 21.60 | 20.07 | 18.77 |
| TRA-Kuzey Dogu Anadolu | 37.68 | 44.72 | 48.77 | 43.71 | 44.15 | 46.00 | 43.39 | 43.70 |
| TRB-Orta Dogu Anadolu | 46.08 | 46.91 | 52.62 | 50.05 | 52.83 | 49.42 | 48.80 | 48.64 |
| TRC-Güney Dogu Anadolu | 61.11 | 62.76 | 66.39 | 60.75 | 58.43 | 54.78 | 55.60 | 54.63 |

Notes: LFS imputed data using OLS, regionally deflated. Poverty estimates have standard errors.
Source: LFS, SILC 2006-2013; authors’ calculations.
Table 13. Turkey Regional NUTS1 Income Based Poverty Rates from LFS ($2.5 PPP)

| Region                  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| TR1-Istanbul            | 0.84  | 1.24  | 1.76  | 1.66  | 1.65  | 1.85  | 2.11  | 2.61  |
| TR2-Bati Marmara        | 2.61  | 2.36  | 2.70  | 2.29  | 2.54  | 2.31  | 2.60  | 3.13  |
| TR3-Ege                 | 2.29  | 2.53  | 2.25  | 2.29  | 1.84  | 1.85  | 2.14  | 2.71  |
| TR4-Dogu Marmara        | 1.42  | 1.55  | 2.07  | 2.16  | 2.17  | 1.88  | 2.12  | 2.46  |
| TR5-Bati Anadolu        | 2.00  | 2.08  | 2.14  | 1.98  | 2.09  | 1.84  | 2.23  | 2.70  |
| TR6-Akdeniz             | 5.84  | 5.22  | 5.88  | 4.32  | 3.96  | 4.81  | 5.44  | 6.24  |
| TR7-Orta Anadolu        | 3.82  | 5.14  | 5.95  | 5.26  | 4.46  | 4.49  | 5.38  | 6.14  |
| TR8-Bati Karadeniz      | 3.51  | 5.06  | 5.69  | 4.46  | 3.44  | 2.90  | 3.48  | 4.34  |
| TR9-Dogu Karadeniz      | 2.89  | 3.27  | 4.10  | 4.26  | 4.14  | 3.87  | 4.15  | 4.75  |
| TRA-Kuzey Doğu Anadolu  | 9.24  | 13.69 | 17.06 | 13.33 | 15.38 | 16.29 | 19.27 |
| TRB-Orta Doğu Anadolu   | 14.29 | 14.86 | 20.53 | 18.81 | 20.37 | 18.77 | 20.45 | 23.27 |
| TRC-Güney Doğu Anadolu  | 22.96 | 25.03 | 29.14 | 24.77 | 22.77 | 21.67 | 24.79 | 27.45 |

Notes: LFS imputed data using OLS, regionally deflated. Poverty estimates have standard errors.
Source: LFS, SILC 2006-2013; authors’ calculations.

Table 14. Turkey Regional NUTS2 Income Based Poverty Rates from LFS ($5 PPP)

| Region       | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|
| TR10         | 9.13  | 11.12 | 13.21 | 13.49 | 14.03 | 14.02 | 12.86 | 12.50 |
| TR21         | 17.71 | 17.11 | 18.10 | 16.18 | 18.14 | 16.50 | 15.22 | 14.45 |
| TR22         | 18.74 | 18.37 | 19.68 | 18.76 | 18.75 | 16.36 | 15.37 | 14.87 |
| TR31         | 15.27 | 15.25 | 13.56 | 12.96 | 13.71 | 12.31 | 12.02 | 11.47 |
| TR32         | 18.53 | 19.64 | 18.62 | 19.31 | 17.22 | 16.04 | 14.80 | 15.03 |
| TR33         | 17.69 | 19.14 | 18.96 | 19.45 | 16.06 | 14.80 | 14.52 | 14.94 |
| TRA1         | 32.23 | 36.82 | 39.90 | 34.86 | 37.43 | 39.83 | 37.78 | 37.45 |
| TRA2         | 42.96 | 52.25 | 57.07 | 51.87 | 50.19 | 51.41 | 48.30 | 49.06 |
| TRB1         | 34.32 | 35.22 | 41.87 | 39.54 | 42.16 | 39.57 | 39.84 | 40.16 |
| TRB2         | 55.86 | 56.44 | 61.44 | 58.60 | 61.49 | 57.47 | 56.08 | 55.55 |
| TRC1         | 57.90 | 60.27 | 62.06 | 55.84 | 54.02 | 51.77 | 51.03 | 47.31 |
| TRC2         | 63.31 | 63.45 | 67.88 | 63.23 | 60.71 | 56.73 | 57.88 | 58.80 |
| TRC3         | 61.51 | 64.71 | 69.24 | 62.77 | 60.21 | 55.36 | 57.65 | 56.96 |

Notes: LFS imputed data using OLS, regionally deflated. Poverty estimates have standard errors.
Source: LFS, SILC 2006-2013; authors’ calculations.
Table 15. Turkey Regional NUTS2 Income Based Poverty Rates from LFS ($2.5 PPP)

| Label | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|-------|------|------|------|------|------|------|------|------|
| TR10  | 0.84 | 1.24 | 1.76 | 1.66 | 1.65 | 1.85 | 2.11 | 2.61 |
| TR21  | 2.50 | 2.10 | 2.41 | 1.93 | 2.30 | 2.15 | 2.39 | 2.85 |
| TR22  | 2.70 | 2.60 | 2.97 | 2.63 | 2.77 | 2.46 | 2.82 | 3.41 |
| TR31  | 1.94 | 2.06 | 1.54 | 1.61 | 1.44 | 1.44 | 1.77 | 2.12 |
| TR32  | 2.67 | 2.99 | 2.73 | 2.78 | 2.22 | 2.31 | 2.44 | 3.14 |
| TR33  | 2.38 | 2.74 | 2.72 | 2.71 | 2.00 | 1.95 | 2.36 | 3.12 |
| TR41  | 1.23 | 1.29 | 1.63 | 1.68 | 1.85 | 1.58 | 1.73 | 2.09 |
| TR42  | 1.63 | 1.85 | 2.56 | 2.68 | 2.52 | 2.22 | 2.55 | 2.86 |
| TR51  | 1.71 | 1.71 | 1.91 | 1.72 | 1.90 | 1.62 | 1.95 | 2.36 |
| TR52  | 2.58 | 2.83 | 2.63 | 2.51 | 2.49 | 2.29 | 2.84 | 3.43 |
| TR61  | 6.14 | 5.19 | 5.12 | 3.48 | 3.22 | 3.91 | 4.25 | 4.84 |
| TR62  | 5.36 | 4.93 | 5.51 | 4.01 | 3.60 | 4.34 | 5.21 | 6.10 |
| TR63  | 6.21 | 5.60 | 6.99 | 5.42 | 5.05 | 6.16 | 6.76 | 7.63 |
| TR71  | 3.72 | 4.80 | 5.79 | 5.62 | 4.47 | 4.41 | 5.33 | 6.08 |
| TR72  | 3.89 | 5.36 | 6.05 | 5.02 | 4.45 | 4.54 | 5.40 | 6.17 |
| TR81  | 2.95 | 4.46 | 5.10 | 3.39 | 2.52 | 2.58 | 3.18 | 3.82 |
| TR82  | 2.69 | 4.52 | 5.35 | 4.29 | 3.52 | 2.91 | 3.31 | 4.00 |
| TR83  | 3.93 | 5.43 | 6.00 | 4.90 | 3.77 | 3.02 | 3.64 | 4.64 |
| TR90  | 2.89 | 3.27 | 4.10 | 4.26 | 4.14 | 3.87 | 4.15 | 4.75 |
| TRA1  | 7.17 | 9.80 | 12.36 | 8.83 | 9.31 | 11.82 | 12.97 | 15.13 |
| TRA2  | 11.24 | 17.40 | 21.45 | 17.48 | 16.06 | 18.50 | 19.20 | 22.83 |
| TRB1  | 8.51 | 8.73 | 12.70 | 11.44 | 12.70 | 12.39 | 14.42 | 17.19 |
| TRB2  | 19.11 | 19.84 | 26.96 | 24.82 | 26.60 | 23.98 | 25.35 | 28.22 |
| TRC1  | 20.60 | 22.92 | 25.80 | 21.03 | 19.55 | 19.80 | 22.20 | 23.02 |
| TRC2  | 24.68 | 26.17 | 30.62 | 27.27 | 25.39 | 23.76 | 26.79 | 31.19 |
| TRC3  | 23.09 | 25.82 | 30.82 | 25.31 | 22.53 | 20.62 | 24.81 | 26.87 |

Notes: LFS imputed data using OLS, regionally deflated. Poverty estimates have standard errors.
Source: LFS, SILC 2006-2013; authors’ calculations.

Table 16. Literature on patterns of growth and poverty reduction

| Country | Aggregation | Primary Drivers of Poverty Reduction |
|---------|-------------|---------------------------------------|
| Brazil, 1985-2004 (Ferreira, Leite, and Ravallion, 2010) | Region, Industry, Year | Social Spending Services Sector |
| Indonesia, 1984-2002 (Suryahadi, Suryadarma, and Sumarto, 2009) | Sector, urban-rural, year | services growth and rural agricultural growth in rural areas |
| Global cross-country (Loayza and Raddatz, 2010) | | Unskilled labor intensive sectors |
| China, 1984-2004 (Montalvo and Ravallion, 2010) | Province, year | Growth in the agricultural sector |
### Table 17. NUTS2 Regional Groupings

| Region Code | Region Name                                                                 | Region Grouping |
|-------------|------------------------------------------------------------------------------|-----------------|
| TR10        | Istanbul                                                                     | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR21        | Tekirdag Edirne, Kirkkareli                                                 | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR22        | Balikesir, Canakkale                                                        | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR31        | Izmir                                                                        | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR32        | Aydin, Denizli, Mugla                                                        | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR33        | Manisa, Afyonkarahisar, Ktahya, Usak                                        | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR41        | Bursa, Eskişehir, Bilecik                                                   | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR42        | Kocaeli, Sakarya, Dzce, Bolu, Yalo                                          | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR51        | Ankara                                                                       | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR52        | Konya, Karaman                                                               | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR61        | Antalya, Isparta, Burdur                                                     | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR62        | Adana, Mersin                                                                | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR63        | Hatay, Kahramanmaras Osmaniye                                               | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR71        | Kirikkale, Aksaray, Nigde, Nevsehir                                          | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR72        | Kayseri, Sivas, Yozgat                                                      | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR81        | Zonguldak, Karabk, Bartin                                                   | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR82        | Kastamonu, ankiri, Sinop                                                    | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR83        | Samsun, Tokat, unnamed, Amasya                                              | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TR90        | Trabzon, Ordu, Giresun, Rize, Artvi                                         | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TRA1        | Erzurum, Erzincan, Bayburt                                                  | 1=East, 2=West, 3=Rest (East), 4=Anatolian Tigers, 5=Developed West |
| TRA2        | Agri, Kars, Igdır, Ardahan                                                  | 1=East, 2=West, 3=Rest (East), 4=Anatolian Tigers, 5=Developed West |
| TRB1        | Malatya, Elazig, BingolTunceli                                              | 1=East, 2=West, 3=Rest (East), 4=Anatolian Tigers, 5=Developed West |
| TRB2        | Van, Mus, Bitlis, Hakkari                                                  | 1=East, 2=West, 3=Rest (East), 4=Anatolian Tigers, 5=Developed West |
| TRC1        | Gaziantep, Adiyaman, Kilis                                                 | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TRC2        | Sanliurfa, Diyarbakir                                                       | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |
| TRC3        | Mardin, Batman, Sirnak, Siirt                                               | 0=East, 1=West, 2=Rest (East), 3=Anatolian Tigers, 4=Developed West |

**Notes:** The East/West groupings are based on altitude, TRA and TRB are high altitude regions are also known as the roof of Turkey. The three-region grouping is based on OECD (2014).
Table 18. Poverty Convergence Decomposition, Population Weighted

|                      | $2.5/day PPP | $5/day PPP |
|----------------------|--------------|------------|
|                      | Headcount    | Poverty Gap| Poverty Gap Squared|
| Mean convergence effect | -0.265       | 0.055      | 0.064              |
| Direct effect of poverty | -0.038      | -0.006     | -0.017              |
| Poverty elasticity effect | -0.008      | -0.003     | 0.010              |
| total                | -0.311       | 0.045      | 0.057              |

|                      | $2.5/day PPP | $5/day PPP |
|----------------------|--------------|------------|
|                      | Headcount    | Poverty Gap| Poverty Gap Squared|
| Mean convergence effect | -0.262       | 0.010      | 0.141              |
| Direct effect of poverty | -0.035      | -0.001     | -0.040               |
| Poverty elasticity effect | -0.008      | -0.001     | 0.012              |
| total                | -0.305       | 0.008      | 0.114               |

Notes: Methodology follows Ravallion (2012). Using population weights. Source: Author’s calculations, Turkish Labor Force Survey (2006-2013)
Table 19. Poverty Convergence Decomposition by Time Period, Not Population Weighted

| 2006-2009 | All regions (no weights) | $2.5/day PPP | $5/day PPP |
|-----------|--------------------------|--------------|------------|
|           | Headcount | Poverty Gap | Poverty Gap Squared | Mean convergence effect | -0.106 | -6.143 | -0.047 | Mean convergence effect | -0.028 | -0.083 | -0.155 |
|           | Direct effect of poverty | -0.031 | -0.019 | 0.007 | Direct effect of poverty | -0.035 | -0.044 | -0.040 |
|           | Poverty elasticity effect | 0.005 | 0.006 | 0.004 | Poverty elasticity effect | 0.004 | 0.005 | 0.005 |
| total     | -0.132 | -6.156 | -0.036 | total | -0.058 | -0.122 | -0.189 |

| 2006-2009 | No Eastern Regions (East=TRA, TRB) (no weights) | $2.5/day PPP | $5/day PPP |
|-----------|-------------------------------------------------|--------------|------------|
|           | Headcount | Poverty Gap | Poverty Gap Squared | Mean convergence effect | -0.131 | 0.423 | -0.044 | Mean convergence effect | -0.064 | -0.126 | -0.199 |
|           | Direct effect of poverty | -0.033 | -0.012 | 0.008 | Direct effect of poverty | -0.066 | -0.058 | -0.043 |
|           | Poverty elasticity effect | 0.003 | 0.002 | 0.001 | Poverty elasticity effect | 0.003 | 0.003 | 0.003 |
| total     | -0.161 | 0.413 | -0.035 | total | -0.127 | -0.181 | -0.239 |

| 2010-2013 | All regions (no weights) | $2.5/day PPP | $5/day PPP |
|-----------|--------------------------|--------------|------------|
|           | Headcount | Poverty Gap | Poverty Gap Squared | Mean convergence effect | 0.229 | -0.416 | -0.149 | Mean convergence effect | 0.088 | 0.193 | 0.314 |
|           | Direct effect of poverty | 0.044 | 0.011 | 0.023 | Direct effect of poverty | 0.070 | 0.071 | 0.054 |
|           | Poverty elasticity effect | -0.019 | -0.012 | 0.018 | Poverty elasticity effect | -0.021 | -0.021 | -0.020 |
| total     | 0.254 | -0.416 | -0.109 | total | 0.138 | 0.244 | 0.348 |

| 2010-2013 | No Eastern Regions (East=TRA, TRB) (no weights) | $2.5/day PPP | $5/day PPP |
|-----------|-------------------------------------------------|--------------|------------|
|           | Headcount | Poverty Gap | Poverty Gap Squared | Mean convergence effect | 0.073 | -0.016 | -0.131 | Mean convergence effect | -0.012 | 0.047 | 0.107 |
|           | Direct effect of poverty | 0.008 | 0.001 | 0.019 | Direct effect of poverty | -0.019 | 0.010 | 0.011 |
|           | Poverty elasticity effect | -0.021 | -0.005 | 0.027 | Poverty elasticity effect | -0.027 | -0.026 | -0.023 |
| total     | 0.060 | -0.021 | -0.085 | total | -0.059 | 0.031 | 0.096 |

Notes: Methodology follows Ravallion (2012)
Source: Author’s calculations, Turkish Labor Force Survey (2006-2013)
Table 20. Poverty Convergence Decomposition by Time Period, Population Weighted

### 2006-2009

**All regions (population weights)**

|                | $2.5/day PPP |          |          | $5/day PPP |          |          |
|----------------|--------------|----------|----------|------------|----------|----------|
|                | Headcount    | Poverty Gap | Poverty Gap Squared |            | Headcount  | Poverty Gap | Poverty Gap Squared |
| Mean convergence effect | -0.230 | 0.076 | 0.029 |          | Mean convergence effect | -0.110 | -0.182 | -0.345 |
| Direct effect of poverty    | -0.035 | -0.009 | -0.008 |          | Direct effect of poverty    | -0.095 | -0.066 | -0.043 |
| Poverty elasticity effect | 0.005 | 0.003 | -0.004 |          | Poverty elasticity effect | 0.006 | 0.006 | 0.005 |
| total         | -0.260 | 0.069 | 0.017 |          | total         | -0.199 | -0.242 | -0.383 |

**No Eastern Regions (East=TRA, TRB) (weights)**

|                | $2.5/day PPP |          |          | $5/day PPP |          |          |
|----------------|--------------|----------|----------|------------|----------|----------|
|                | Headcount    | Poverty Gap | Poverty Gap Squared |            | Headcount  | Poverty Gap | Poverty Gap Squared |
| Mean convergence effect | -0.185 | 0.023 | 0.060 |          | Mean convergence effect | -0.117 | -0.169 | -0.290 |
| Direct effect of poverty    | -0.027 | -0.003 | -0.018 |          | Direct effect of poverty    | -0.100 | -0.060 | -0.034 |
| Poverty elasticity effect | 0.003 | 0.001 | -0.003 |          | Poverty elasticity effect | 0.004 | 0.003 | 0.003 |
| total         | -0.210 | 0.021 | 0.038 |          | total         | -0.214 | -0.225 | -0.321 |

### 2010-2013

**All regions (population weights)**

|                | $2.5/day PPP |          |          | $5/day PPP |          |          |
|----------------|--------------|----------|----------|------------|----------|----------|
|                | Headcount    | Poverty Gap | Poverty Gap Squared |            | Headcount  | Poverty Gap | Poverty Gap Squared |
| Mean convergence effect | 0.313 | -0.001 | -0.124 |          | Mean convergence effect | 0.157 | 0.294 | 0.522 |
| Direct effect of poverty    | 0.030 | 0.000 | 0.021 |          | Direct effect of poverty    | 0.090 | 0.072 | 0.043 |
| Poverty elasticity effect | -0.021 | 0.000 | 0.034 |          | Poverty elasticity effect | -0.028 | -0.027 | -0.022 |
| total         | 0.322 | -0.001 | 0.069 |          | total         | 0.220 | 0.339 | 0.543 |

**No Eastern Regions (East=TRA, TRB) (weights)**

|                | $2.5/day PPP |          |          | $5/day PPP |          |          |
|----------------|--------------|----------|----------|------------|----------|----------|
|                | Headcount    | Poverty Gap | Poverty Gap Squared |            | Headcount  | Poverty Gap | Poverty Gap Squared |
| Mean convergence effect | 0.099 | 0.007 | -0.060 |          | Mean convergence effect | 0.064 | 0.137 | 0.233 |
| Direct effect of poverty    | 0.003 | 0.000 | -0.001 |          | Direct effect of poverty    | 0.017 | 0.022 | 0.012 |
| Poverty elasticity effect | -0.023 | 0.007 | 0.036 |          | Poverty elasticity effect | -0.034 | -0.032 | -0.024 |
| total         | 0.079 | 0.014 | -0.025 |          | total         | 0.047 | 0.127 | 0.221 |

**Notes:** Methodology follows Ravallion (2012)

**Source:** Author’s calculations, Turkish Labor Force Survey (2006-2013)
Table 21. Main Regional Activities

| Region             | Main Sector of Employment | Main Activities\(^\text{18}\)                                                                 | Population (millions, 2013) |
|--------------------|---------------------------|-----------------------------------------------------------------------------------------------|-----------------------------|
| TR1 - Istanbul     | Services                  | Largest city in terms of economy and population. Highly diversified; industry, finance, services, high tech, etc. | 14.2                        |
| TR2 - Bati Marmara | Services                  | Industrial agriculture, textile manufacturing, tourism and other services                      | 3.3                         |
| TR3 - Ege          | Services                  | Industrial agriculture in the inner parts of the region and manufacturing. Includes Izmir, the 3rd largest city in the country, important tourism destination. | 9.9                         |
| TR4 - Dogu Marmara | Services                  | Services, heavy industries, manufacturing, most industrialized region                          | 7.2                         |
| TR5 - Bati Anadolu | Services                  | Includes Ankara, capital and second largest city in the country, Diversified industrial production, services (administrative and government jobs) | 7.4                         |
| TR6 - Akdeniz      | Services                  | Primary touristic destination, industrial agriculture                                          | 9.8                         |
| TR7 - Orta Anadolu | Services                  | Manufacturing, agriculture. Anatolian Tigers (lots of medium and small size firms)             | 3.9                         |
| TR8 - Bati Karadeniz | Services, Agriculture   | Mining, forestry, industrial production, services                                              | 4.5                         |
| TR9 - Dogu Karadeniz | Agriculture              | Agriculture (specialized products: tea and hazelnuts), forestry                               | 2.6                         |
| TRA - Kuzey Dogu Anadolu | Agriculture         | Husbandry, forestry, less-industrialized agriculture, industrialization through increased construction | 2.2                         |
| TRB - Orta Dogu Anadolu | Agriculture            | Husbandry, lower skill agriculture, light manufacturing, industrialization through increased construction | 3.8                         |
| TRC - Guney Dogu Anadolu | Services              | Developing industrialization (textiles and manufacturing), industrialized agriculture, services | 8.1                         |

Source: Turkish Statistical Institute data compiled form Household Labour Force Statistics (publication), Household Labour Force Data Base (internet)

\(^{18}\) Does not include all activities. Regional specializations within the country
Table 22. Sector patterns of growth (ln GVA)

|                  | (1)                | (2)                | (3)                | (4)                | (5)                | (6)                |
|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| \((\Delta \text{ln} Y^1_{\tau})\) | -0.107***          | -0.102***          |                    |                    |                    |                    |
|                  | (0.0295)           | (0.0313)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\) | 0.0245             | 0.0232             |                    |                    |                    |                    |
|                  | (0.0321)           | (0.0303)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\) | -0.00682           | -0.00467           |                    |                    |                    |                    |
|                  | (0.0579)           | (0.0582)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^1_{\tau})\)*I\_West |                    |                    | \(-0.0859***\)     | \(-0.0801**\)      |                    |                    |
|                  |                    |                    | (0.0289)           | (0.0314)           |                    |                    |
| \((\Delta \text{ln} Y^1_{\tau})\)*I\_East |                    |                    | \(-0.429***\)      | \(-0.442***\)      |                    |                    |
|                  |                    |                    | (0.106)            | (0.106)            |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\)*I\_West | \(0.000813\)      | \(0.00419\)       |                    |                    |                    |                    |
|                  | (0.0357)           | (0.0360)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\)*I\_East | \(0.186***\)      | \(0.201**\)       |                    |                    |                    |                    |
|                  | (0.0638)           | (0.0849)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\)*I\_West | \(-0.00669\)      | \(-0.00140\)      |                    |                    |                    |                    |
|                  | (0.0635)           | (0.0674)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\)*I\_East | \(0.471***\)      | \(0.562***\)      |                    |                    |                    |                    |
|                  | (0.0698)           | (0.132)            |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^1_{\tau})\)*R1 |                    |                    | \(-0.196***\)      | \(-0.186***\)      |                    |                    |
|                  |                    |                    | (0.0391)           | (0.0443)           |                    |                    |
| \((\Delta \text{ln} Y^1_{\tau})\)*R2 |                    |                    | \(-0.0779***\)     | \(-0.0831***\)     |                    |                    |
|                  |                    |                    | (0.0213)           | (0.0293)           |                    |                    |
| \((\Delta \text{ln} Y^1_{\tau})\)*R3 |                    |                    | \(-0.00798\)       | \(-0.000269\)      |                    |                    |
|                  |                    |                    | (0.0378)           | (0.0338)           |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\)*R1 | \(0.0359\)        | \(0.0234\)        |                    |                    |                    |                    |
|                  | (0.0502)           | (0.0462)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\)*R2 | \(0.0252\)        | \(0.0279\)        |                    |                    |                    |                    |
|                  | (0.0455)           | (0.0517)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^2_{\tau})\)*R3 | \(0.0164\)        | \(0.0350\)        |                    |                    |                    |                    |
|                  | (0.0443)           | (0.0406)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\)*R1 | \(0.0818\)        | \(0.0940\)        |                    |                    |                    |                    |
|                  | (0.0780)           | (0.0669)           |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\)*R2 | \(0.0242\)        | \(0.0759\)        |                    |                    |                    |                    |
|                  | (0.122)            | (0.114)            |                    |                    |                    |                    |
| \((\Delta \text{ln} Y^3_{\tau})\)*R3 | \(-0.0732\)       | \(-0.125*\)       |                    |                    |                    |                    |
|                  | (0.0510)           | (0.0704)           |                    |                    |                    |                    |
| Constant         | \(-0.00422*\)     | \(-0.00264*\)     | \(-0.00641***\)   | \(-0.00158\)       | \(-0.00490**\)    | \(-0.00636***\)   |
|                  | (0.00223)          | (0.00134)          | (0.00198)          | (0.00126)          | (0.00212)          | (0.00239)          |
| NUTS1 controls   | X                  | X                  | X                  | X                  | X                  | X                  |
| Observations     | 104                | 104                | 104                | 104                | 104                | 104                |
| R-squared        | 0.137              | 0.246              | 0.292              | 0.373              | 0.222              | 0.329              |

Notes: R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 1 are shown. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01
Source: TUIK,LFS, SILC 2007-2011; authors' calculations.
Table 23. Sector patterns of growth weighted by sector shares (2006-2011)

|                               | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| \((s^2_{t-1} \times \Delta \ln Y^1_{t})\) | -0.696***    | -0.670***    | (0.187)      | (0.196)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^2_{t})\) | -0.0120      | 0.00485      | (0.115)      | (0.111)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^3_{t})\) | 0.0571       | 0.0419       | (0.0934)     | (0.0904)     |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^4_{t})\) | -0.589**     | -0.548**     | (0.192)      | (0.209)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^5_{t})\) | -1.771***    | -1.817***    | (0.437)      | (0.406)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^6_{t})\) | -0.0490      | -0.0451      | (0.123)      | (0.122)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^7_{t})\) | 1.012***     | 1.156**      | (0.239)      | (0.425)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^8_{t})\) | 0.0275       | 0.0402       | (0.100)      | (0.103)      |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^9_{t})\) | 0.730***     | 0.959***     | (0.0650)     | (0.214)      |              |              |

|                               | (0.0650)     | (0.214)      |              |              |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^{10}_{t})\) | -0.00409*    | -0.00250**   | (0.00223)    | (0.00120)    |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^{11}_{t})\) | -0.00658***  | -0.00170     | (0.00198)    | (0.00116)    |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^{12}_{t})\) | -0.00521***  | -0.00553***  | (0.00208)    | (0.00176)    |              |              |
| \((s^2_{t-1} \times \Delta \ln Y^{13}_{t})\) | -0.00521***  | -0.00553***  | (0.00208)    | (0.00176)    |              |              |

Notes: R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 1 are shown. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01
Source: TUIK, LFS, SILC 2007-2011; authors’ calculations.
Table 24. Sector patterns of growth weighted by employment shares (2006-2011)

|                  | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) | -0.306***    | -0.305***    |              |              |              |              |
|                  | (0.0872)     | (0.100)      |              |              |              |              |
| \( s_{1t-1}^2 \Delta \ln y_{1t}^2 \) | 0.0429       | 0.0600       |              |              |              |              |
|                  | (0.120)      | (0.114)      |              |              |              |              |
| \( s_{1t-1}^3 \Delta \ln y_{1t}^3 \) | -0.0350      | -0.0327      |              |              |              |              |
|                  | (0.129)      | (0.115)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* I_{West} | -0.243**     | -0.219**     |              |              |              |              |
|                  | (0.0926)     | (0.103)      |              |              |              |              |
| \( s_{1t-1}^2 \Delta \ln y_{1t}^2 \) \* I_{East} | -0.788***    | -0.791***    |              |              |              |              |
|                  | (0.151)      | (0.175)      |              |              |              |              |
| \( s_{1t-1}^3 \Delta \ln y_{1t}^3 \) \* I_{West} | 0.0190       | 0.0239       |              |              |              |              |
|                  | (0.131)      | (0.126)      |              |              |              |              |
| \( s_{1t-1}^3 \Delta \ln y_{1t}^3 \) \* I_{East} | 1.722***     | 1.950**      |              |              |              |              |
|                  | (0.541)      | (0.826)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R1  | -0.438***    | -0.452***    |              |              |              |              |
|                  | (0.108)      | (0.137)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R2  | -0.266**     | -0.286**     |              |              |              |              |
|                  | (0.0983)     | (0.131)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R3  | 0.0320       | 0.0316       |              |              |              |              |
|                  | (0.0886)     | (0.0869)     |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R1  | 0.281        | 0.245        |              |              |              |              |
|                  | (0.272)      | (0.247)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R2  | 0.158        | 0.209        |              |              |              |              |
|                  | (0.166)      | (0.202)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R3  | -0.123       | -0.0763      |              |              |              |              |
|                  | (0.111)      | (0.0965)     |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R1  | 0.00556      | 0.0707       |              |              |              |              |
|                  | (0.212)      | (0.159)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R2  | -0.0221      | 0.0677       |              |              |              |              |
|                  | (0.317)      | (0.298)      |              |              |              |              |
| \( s_{1t-1}^1 \Delta \ln y_{1t}^1 \) \* R3  | 0.0138       | -0.0570      |              |              |              |              |
|                  | (0.127)      | (0.162)      |              |              |              |              |
| Constant         | -0.00368     | -0.00345***  | -0.00663***  | -0.00205     | -0.00459*    | -0.00665***  |
|                  | (0.00235)    | (0.00145)    | (0.00203)    | (0.00140)    | (0.00226)    | (0.00235)    |

NUTS1 controls

|                  | X            | X            | X            |
|------------------|--------------|--------------|--------------|
| Observations     | 104          | 104          | 104          |
| R-squared        | 0.127        | 0.247        | 0.398        |

Notes: W1=West, W0=East, R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 2 are shown. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01

Source: TUIK, LFS, SILC 2007-2011; authors’ calculations.
Table 25. Employment growth in the services sector has a strong relation to poverty reduction (2007-2011)

|                | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|
| \(\Delta \ln \text{Emp}_{t-1}^1\)   | -2.46e-05    | -0.00111     | (0.0125)     | (0.0126)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^2\)   | 0.0267       | 0.0222       | (0.0199)     | (0.0239)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^3\)   | -0.132**     | -0.142**     | (0.0488)     | (0.0541)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^1\) \*West |              |              |              |              |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^2\) \*East | -0.0628      | -0.111       | (0.0574)     | (0.103)      |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*West | -0.00795     | 0.00760      | (0.0275)     | (0.0316)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^2\) \*East | 0.0556*      | 0.0304       | (0.0318)     | (0.0450)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*West | -0.142***    | -0.146***    | (0.0403)     | (0.0445)     |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*East | -0.171       | -0.289       | (0.188)      | (0.234)      |              |              |
| \(\Delta \ln \text{Emp}_{t-1}^1\) \*R1 |              |              |              |              | -0.00986    | -0.00916     |
| \(\Delta \ln \text{Emp}_{t-1}^2\) \*R2 |              |              |              |              | 0.0128      | 0.0182       |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*R3 |              |              |              |              | 0.00197     | 0.00214      |
| \(\Delta \ln \text{Emp}_{t-1}^1\) \*R1 |              |              |              |              | 0.0479      | 0.0383       |
| \(\Delta \ln \text{Emp}_{t-1}^2\) \*R2 |              |              |              |              | -0.0112     | -0.00116     |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*R3 |              |              |              |              | 0.0177      | -0.000856    |
| \(\Delta \ln \text{Emp}_{t-1}^1\) \*R1 |              |              |              |              | -0.212**    | -0.206**     |
| \(\Delta \ln \text{Emp}_{t-1}^2\) \*R2 |              |              |              |              | -0.0794*    | -0.0680      |
| \(\Delta \ln \text{Emp}_{t-1}^3\) \*R3 |              |              |              |              | -0.0374    | -0.107*      |
| Constant       | -0.00458*    | -0.00567*    | -0.00384     | -0.00517**   | -0.00529**   | -0.00877     |
|                | (0.00229)    | (0.00286)    | (0.00268)    | (0.00227)    | (0.00252)    | (0.00572)    |
| Years          | 2007-2011    | 2007-2011    | 2007-2011    | 2007-2011    | 2007-2011    | 2007-2011    |
| Region Controls | X            | X            | X            | X            | X            |              |
| Observations   | 104          | 104          | 104          | 104          | 104          | 104          |
| R-squared      | 0.124        | 0.247        | 0.183        | 0.313        | 0.172        | 0.275        |

Notes: W1=West, W0=East, R1=Rest of the country, R2=Anatolian Tigers, R3=developed west. Results from Equation 2 are shown. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01
Source: TUIK,LFS, SILC 2007-2011; authors’ calculations.
|     | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 |
|-----|-----------|-----------|-----------|-----------|
| TR10| 21.28     | -0.25     | 4.06      | -0.01     |
| TR21| 2.09      | 1.18      | 1.87      | -1.20     |
| TR22| 0.86      | 1.08      | -0.02     | -1.52     |
| TR31| -46.03    | -0.13     | -1.92     | -0.45     |
| TR32| -688.00   | -0.60     | -6.07     | -1.14     |
| TR33| -0.17     | -0.51     | -9.43     | -0.80     |
| TR41| -7.63     | -0.87     | **-42.72**| -1.49     |
| TR42| 7.36      | -1.32     | 0.20      | -1.41     |
| TR51| -4.10     | -0.91     | **28.50** | -1.99     |
| TR52| -2.62     | -0.61     | 2.20      | -1.12     |
| TR61| 1.10      | 3.46      | -0.85     | 0.47      |
| TR62| -22.42    | 2.50      | -0.88     | 0.33      |
| TR63| 1.05      | 1.60      | -0.75     | 0.19      |
| TR71| 1.87      | 0.46      | -1.21     | -0.94     |
| TR72| 1.57      | 1.83      | -1.18     | -1.39     |
| TR81| -1.17     | 1.69      | **29.28** | -0.72     |
| TR82| -41.21    | 1.89      | -2.13     | -3.61     |
| TR83| 0.35      | 0.84      | -4.02     | -1.99     |
| TR90| 2.28      | -0.80     | -0.37     | -3.70     |
| TRA1| 1.84      | -7.49     | 1.76      | 0.99      |
| TRA2| 10.11     | -3.42     | -0.30     | 1.06      |
| TRB1| 15.70     | -3.47     | 2.20      | -0.95     |
| TRB2| 2.37      | -1.07     | 0.80      | 6.58      |
| TRC1| -1.96     | 3.61      | -0.29     | -0.77     |
| TRC2| -2.26     | -2.18     | -0.41     | -0.96     |
| TRC3| -9.86     | -1.54     | -0.32     | -1.23     |
| Average| -29.14    | -0.19     | -0.11     | -0.68     |

Notes: GVA growth – to poverty elasticity. Poverty line is $5/day per capita PPP.  
Source: LFS, SILC 2007-2011; authors’ calculations.
| Table 27. Regressions with fiscal variables – disaggregated central spending per capita |
|-----------------|-----------------|-----------------|-----------------|
|                  | (1)             | (2)             | (3)             | (4)             |
| \(\Delta\)Total Personnel Spending per capita | -0.251***       | -0.296***       |                 |                 |
|                  | (0.0466)        | (0.0721)        |                 |                 |
| \(\Delta\)Total Social Security Spending per capita | -0.0663***      | -0.0537***      |                 |                 |
|                  | (0.0148)        | (0.0176)        |                 |                 |
| \(\Delta\)Total Purchases on Goods and Services per capita | -0.0471***      | -0.0403*        |                 |                 |
|                  | (0.0118)        | (0.0229)        |                 |                 |
| \(\Delta\)Total Current Transfers per capita | 0.00890         | 0.0143          |                 |                 |
|                  | (0.00860)       | (0.00860)       |                 |                 |
| \(\Delta\)Total Capital Spending per capita | 0.0118          | 0.00953         |                 |                 |
|                  | (0.00764)       | (0.00979)       |                 |                 |
| \(\Delta\)Total Capital Transfers per capita | -0.00102        | -0.00107        |                 |                 |
|                  | (0.00113)       | (0.00200)       |                 |                 |
| \(\Delta\)Total Personnel Spending per capita*West | -0.224***       | -0.308***       |                 |                 |
|                  | (0.0463)        | (0.0943)        |                 |                 |
| \(\Delta\)Total Personnel Spending per capita*East | -0.367***       | -0.426***       |                 |                 |
|                  | (0.0576)        | (0.128)         |                 |                 |
| \(\Delta\)Total Social Security Spending per capita*West | -0.0671***      | -0.0501**       |                 |                 |
|                  | (0.0167)        | (0.0202)        |                 |                 |
| \(\Delta\)Total Social Security Spending per capita*East | 0.00397         | 0.0626          |                 |                 |
|                  | (0.0203)        | (0.0524)        |                 |                 |
| \(\Delta\)Total Purchases on Goods and Services per capita*West | -0.0374***      | -0.0174         |                 |                 |
|                  | (0.0127)        | (0.0284)        |                 |                 |
| \(\Delta\)Total Purchases on Goods and Services per capita*East | -0.0673***      | -0.143***       |                 |                 |
|                  | (0.0131)        | (0.0172)        |                 |                 |
| \(\Delta\)Total Current Transfers per capita*West | 0.000624        | 0.0106          |                 |                 |
|                  | (0.00658)       | (0.00894)       |                 |                 |
| \(\Delta\)Total Current Transfers per capita*East | 0.0191*         | 0.0164*         |                 |                 |
|                  | (0.00976)       | (0.00857)       |                 |                 |
| \(\Delta\)Total Capital Spending per capita*West | -0.000906       | -0.00307        |                 |                 |
|                  | (0.00715)       | (0.00823)       |                 |                 |
| \(\Delta\)Total Capital Spending per capita*East | 0.05399**       | 0.0219          |                 |                 |
|                  | (0.0208)        | (0.0180)        |                 |                 |
| \(\Delta\)Total Capital Transfers per capita*West | -7.66e-05       | -0.000868       |                 |                 |
|                  | (0.00106)       | (0.00246)       |                 |                 |
| \(\Delta\)Total Capital Transfers per capita*East | -0.00983***     | -0.0116**       |                 |                 |
|                  | (0.00287)       | (0.00493)       |                 |                 |
| Constant          | 0.00731**       | 0.00971**       | 0.00823**       | 0.00981**       |
|                  | (0.00325)       | (0.00432)       | (0.00343)       | (0.00411)       |
| Sector Shares     | X               | X               |                 |                 |
| Observations      | 156             | 104             | 156             | 104             |
| R-squared         | 0.268           | 0.401           | 0.378           | 0.585           |

Notes: W1=West, W0=East. Results from Equation 3 are shown. Regressions without sector controls are over the period 2007-2013. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01

Source: Ministry of Finance, LFS, SILC 2007-2011; authors’ calculations.
Table 28. Regressions with fiscal variables – disaggregated local spending per capita

|                                      | (1)       | (2)       | (3)       | (4)       |
|--------------------------------------|-----------|-----------|-----------|-----------|
| △Total Personnel Spending per capita | 0.00232   | -4.38e-05 | (0.0241)  | (0.0262)  |
| △Total Social Security per capita    | -0.0338*  | -0.0329   | (0.0190)  | (0.0224)  |
| △Total Purchases on Goods and Services per capita | 0.0239    | 0.0504**  | (0.0216)  | (0.0221)  |
| △Total Interest Payments per capita  | 0.00528   | -0.000144 | (0.00472) | (0.00494) |
| △Total Current Transfers per capita  | 0.0140*   | 0.0198*** | (0.00723) | (0.00663) |
| △Total Personnel Spending per capita*West | -0.0173   | -0.00854  | (0.0200)  | (0.0214)  |
| △Total Personnel Spending per capita*East | 0.0457    | -0.0774   | (0.0482)  | (0.120)   |
| △Total Social Security per capita*West | -0.0286   | -0.0284   | (0.0185)  | (0.0224)  |
| △Total Social Security per capita*East | -0.0867** | -0.00957  | (0.0338)  | (0.0569)  |
| △Total Purchases on Goods and Services per capita*West | 0.000195  | 0.0247    | (0.0198)  | (0.0235)  |
| △Total Purchases on Goods and Services per capita*East | 0.0660    | 0.106*    | (0.0419)  | (0.0521)  |
| △Total Interest Payments per capita*West | 0.000387  | -0.00474  | (0.00451) | (0.00618) |
| △Total Interest Payments per capita*East | 0.0173**  | -0.000668 | (0.00657) | (0.00348) |
| △Total Current Transfers per capita*West | 0.00948   | 0.0107    | (0.00681) | (0.00759) |
| △Total Current Transfers per capita*East | 0.0205*** | 0.0227**  | (0.00708) | (0.00851) |
| Constant                             | -0.00905*** | -0.00564** | (0.00271) | (0.00236) |
| Observations                         | 156       | 104       | 156       | 104       |
| R-squared                            | 0.104     | 0.302     | 0.195     | 0.424     |

Notes: W1=West, W0=East. Results from Equation 3 are shown. Regressions without sector controls are over the period 2007-2013. Regressions using sector controls are limited to 2007-2011. + p<0.10, * p<0.05, ** p<0.01

Source: Ministry of Finance, LFS, SILC 2007-2011; authors’ calculations.
ANNEX. SURVEY-TO SURVEY IMPUTATION METHODOLOGY

1. Methodology

The estimates of poverty and welfare status of the households rely on survey data with a complex consumption module containing a large set of detailed questions on prices and quantities consumed. Given its complexity, the collection and analysis of that data involves significant investment of time, money, and analytical efforts. On the other hand, there is a need for timely poverty estimates for evidence-based policies in the face of the high cost of fielding comprehensive surveys to track income and/or expenditure. This has led to the development of a variety of approaches for estimating poverty in the absence of consumption expenditure or income data.

In this section, we explore the survey-to-survey approach, which uses the common observed assets and household characteristics in order to impute a proxy for welfare. The survey-to-survey imputation requires that at least one previous comparable survey contains household-level income or consumption information. The method draws upon the imputation literature (see Brick and Kalton, 1996 for a discussion of various techniques), which utilizes non-missing data in a larger data set to predict the values for missing variables, and from the poverty targeting literature (see Grosh and Baker, 1995) which seeks proxies for poverty status from household characteristics. The survey-to-survey imputation method extends that to using common variables in two data sets, only one of which contains consumption to predict consumption values in the second data set. A common application of this method in poverty analysis is “poverty mapping,” which uses consumption and poverty estimates from a household survey imputed into census data to achieve very fine levels of geographic disaggregation. (see Rao, 2003, for a discussion of the general technique of small area estimation, and Elbers et al., 2002, specifically related to poverty mapping.) For examples of survey-to-survey imputation for poverty analysis, see Stifel and Christiaensen (2007), Tarozzi (2007), Grosse et al (2009), and Douidich et al (2013).

A more formal presentation of the S2S model is as follows. There are surveys: in Survey 1 there is information on the income or consumption as well as the set of household characteristics $X_{ch}$. In the Survey 2, the same set of household characteristics are also observed, and those characteristics are comparable between the two surveys.

The (log) of per capita household income or consumption is modeled for the first survey as:

$$\ln y_{ch} = X_{ch}'\beta + u_{ch}$$

where $y_{ch}$ is the per capita income or consumption of household $h$ residing in area $c$, $X_{ch}$ are household and area/location characteristics, and $u_{ch} = \mu_{c} + \epsilon_{ch}$ is the residual composed of the area component $\mu_{c}$ and the household component $\epsilon_{ch}$, which have zero expectations and are independent of each other.

In the second survey, where there is no income or consumption information, a set of common variables $X_{ch}$ will be used to impute the income or consumption for each household in the second survey using the estimated points and their distributions estimated from the Survey 1. Since each estimated point is fluctuated from an assumed normal distribution with its standard errors, the imputation is done through a number of simulation in order to preserve the error structure of the correlates.
Any statistics on the imputed welfare will be based on the set of imputed welfares for each household. The estimator takes the form, with $R$ denotes the number of simulation:

$$
\hat{H} = \frac{1}{R} \sum_{r=1}^{R} h(\hat{y}^r)
$$

where $h(y)$ is a function that converts the vector $y$ with (log) incomes for all households into a poverty measure (such as the head-count rate or bottom 40%), and where $\hat{y}^r$ denotes the $r$-th simulated imputed welfare.

Figure 29. Survey-to-Survey Imputation Methodology, an illustration

For the case of Turkey, we use the Survey on Income and Living Conditions survey to impute to the Labor Force Survey. Income is used instead of consumption for this paper’s analysis.

The model included variables related to: household demographics (age, gender, age composition, etc.), household characteristics (education, labor activity, etc.), household head’s characteristics (age, gender, labor, education, marital status, etc.) and household assets holding (both livestock and durables). Based on that model the simulated values of consumption (at household level) were imputed for the households in the corruption survey. This allowed for consistent ranking the households into welfare quintiles and cross-tabulation of welfare status with household characteristics and indicators derived from the survey data.

The imputation was carried out using s2sc algorithm in STATA.
Inputs:
1. Household Survey with consumption or income welfare aggregates
2. Project data/Other survey data without welfare aggregates
3. Set of harmonized common variables in both surveys

Outputs:
1. Set of imputed welfare variables for project data/other survey for each household in the data
2. Imputed welfare variables can be used for poverty, distributional analysis (quintiles or more), profiling of the poor or group of interest

Models:
1. Ordinary Least Squares (OLS)
2. Probit
3. Multiple Imputation (MI)

Table 29. Model Specification

| Variables                        | Demographic                                                                 | Characteristics of head               | Interactions with urban dummy variable | Geography                     | Interactions with Geography |
|----------------------------------|-----------------------------------------------------------------------------|--------------------------------------|----------------------------------------|------------------------------|------------------------------|
| Variables                        | Share of children, share of adults, share of adults squared and share of old (omitted) | Age, gender, and level of education  | Level of education of the head, age of the head | Dummies for regions at NUTS 1 level (12 regions) | Level of education of the head, age of the head interacted with regions at NUTS 1 level (12 regions) and urban-rural division |
2. Validation and Robustness Check

Figure 30. External Validation, NUTS1 Level $5/day PPP– Observed (SILC) & Imputed (LFS), 2007

Source: LFS, SILC, imputed OLS, regionally deflated, authors’ calculations