

DISCUSSION PAPER SERIES

IZA DP No. 13795

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Projects and Political Support**

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## ABSTRACT

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# Expressway to Power: Infrastructure Projects and Political Support\*

This paper provides causal evidence on how political parties consolidate power in an electoral democracy. We collect administrative data on expressway construction by the Justice and Development Party (AKP) in Turkey, and use province-by-year variation in expressway construction to show that vote shares for the AKP increased in response to the expressways. For the average province in which the length of the expressway network increased from 51km to 193km, the estimates imply that the expressway expansion increased the AKP's vote share by 4.2 percentage-points or one-third of the increase from 2002 to 2011. Electoral gains by the AKP primarily came at the expense of its more established rivals. The estimates account for province and year fixed effects, which allows us to control for any fixed province characteristics and time-specific factors that might be related to expressway expansion and vote shares. We further show that the estimates are robust to arbitrary region-specific time trends, province-specific quadratic time trends, and are not driven by province-by-year variation in other investments undertaken by the AKP. Examining mechanisms, we do not find evidence that increased economic growth due to the expressways drove increased vote shares for the AKP. We find evidence that the visibility and success of the expressway expansion project signalled competence and stability. The electoral benefits of the expressway were stronger in provinces that experienced greater political instability between 1995 and 2002, losses for the rival parties were greater in provinces they previously controlled indicating changes in perception, and there were no similar electoral gains to less visible projects.

**JEL Classification:** H54, N45, N95, O18, P16

**Keywords:** expressways, political economy, voting, Turkey

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# 1 Introduction

The world has become more democratic over the past 100 years, with democratic governance increasingly becoming the norm in much of the developing world. The global trend toward democratization cannot be taken for granted, however, with many countries switching between democracy and autocracy over the same time period.<sup>1</sup> A key factor in the stability of democratic governance is the stability and strength of political parties, and how they are able to build broad support over time (LeBas, 2013). Issues of strength, stability, and efficacy, are especially important given that instability and weakness of political parties in developing countries have been cited as reasons why autocracies might be better for economic growth.<sup>2</sup> Therefore, it is important to understand how political parties can build stability, strength, and stabilize democratic regimes, especially in developing countries.

This paper demonstrates that shows of efficacy can help to strengthen and stabilize political support in democracies. Specifically, we study the political effects of the expressway building program initiated in 2003, as part of the Emergency Road Action Plan (Acil Eylem Planı in Turkish), by the Justice and Development Party (AKP) in Turkey (KGM, 2014). The AKP won its first general elections in 2002 with about 34.3% of the popular vote and went on to become the first party in Turkey to win three consecutive elections while increasing their share of the vote (46.6% in 2007 and 49.8% in 2011 (YSK 2020)). The increase in vote shares for the AKP coincided with rapid growth in the Turkish economy, at over 7.8% a year between 2002 and 2011, and an expansion in infrastructure projects and public services. In particular, the nationally planned and executed expressway network in Turkey tripled over this time period and became a point of pride for the AKP in its election campaigns (Raiser & Wes, 2014).<sup>3</sup> We study the contribution of the expansion of the expressway network to the rise of the AKP.

Planning documents from the General Directorate of Highways show that the Emergency Road Action Plan prioritized expanding Turkey's expressway capacity in order to maintain a national and international network and enhance traffic safety (KGM, 2014). The primary goal was to connect *all* provincial centres in order to form a grid that spans the whole country. Construction began in provinces that were closer to the major provincial centers with pre-existing expressways and then expanded to other provinces over time (AKP, 2015). Therefore, the expansion project was systematic and not politically targeted. Evidence in Figure 3 and Table 1

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<sup>1</sup>See the data collected by Boix et al. (2013) showing that more than 50% of the world's population now live in democracies and the rate is increasing in the developing world.

<sup>2</sup>Political parties in democracies are often viewed as ineffective. Easterly & Pennings (2016) presents some of the arguments in the democracy versus autocracy debates, and Acemoglu et al. (2019) provides a thorough empirical assessment on the value of democracy.

<sup>3</sup>A popular campaign slogan for the AKP is *Durmak yok, yola devam*, which is roughly translated as "No stopping, keep going" or "No stopping, continue on the road", a clear play on the success of the visible expressway construction projects and its perceived effects on the economy. Turkey's expressway network is generally a point of pride for Turkish votes when compared to neighbouring countries (AKP, 2015; Raiser & Wes, 2014).

show that the increase in the expressway did not differ by distance to Istanbul, the most important province in the country. The results also provide evidence that provinces closer to Istanbul initially experienced an increase in earlier years, followed by provinces farther away in latter years.

We collect novel administrative data on the total length of expressways in each Turkish province between 2000 and 2018.<sup>4</sup> We then use province-by-year variation in the construction of the expressway network, and data on voting results in 7 elections between 2002 and 2015 from [YSK \(2020\)](#), to show that vote shares for the AKP increased in provinces where the expressway network increased. Gains by the AKP primarily came at the expense of its main rivals, the much older Republican People’s Party (CHP) and to a lesser extent the Nationalist Movement Party (MHP). Specifically, for the average province in which the length of the expressway network increased from 51km to 193km, the estimates imply that the expressway expansion increased the AKP’s vote share by 4.2 percentage-points. This is about one-third of the total increase in the AKP’s vote share since 2002. The estimates account for province and year fixed effects, which allow us to control for any fixed province characteristics and time-specific factors that might be related to expressway expansion and vote shares. We further show that the estimates are robust to arbitrary region-specific time trends and province-specific quadratic time trends. Importantly, we account for province-by-year variation in other investments undertaken by the AKP-led government ([Cesur et al., 2017](#); [Coşar & Demir, 2016](#)) and other time varying province characteristics in order to show that the estimated effects of expressways are unchanged by these time-varying controls.<sup>5</sup> We also demonstrate that our estimates are not driven by bias due to heterogeneous treatment effects.<sup>6</sup>

Looking at the cross-sectional evidence, we also find that provinces with more expressways in 2014 were more likely to vote for the AKP in the 2014 Presidential elections, and less likely to vote for the CHP, even conditional on initial vote shares and other public investments by the AKP government. We use the methodology from [Oster \(2017\)](#) to show that the estimated effects are robust to omitted unobservable province-level characteristics. Additionally, we follow [Faber \(2014\)](#) and compute the least cost path between the 22 most populous cities in the year 2000, and

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<sup>4</sup>The data are available from Turkish General Directorate of Highways ([KGM, 2020](#)). Restrictions apply to the availability of the data, but are available from the authors with the permission of Turkish General Directorate of Highways.

<sup>5</sup>This is further evidence that the parallel trends assumption holds. Results using leads of expressway expansion also provide evidence that expressways were not targeted to provinces where vote shares for the AKP were already rising. Note that the use of province fixed effects already account for the possibility that the expressway was targeted to provinces that initially voted for the AKP.

<sup>6</sup>Recent studies show that heterogeneity in point estimates can bias results from two-way fixed effects models when different groups are treated in multiple periods. This due to the possibility of negative weights on some groups where the effects are larger. We show that the effects of expressway expansions on AKP vote shares are found in different provinces and regions of Turkey with very little variation in the estimated effects. Importantly, we compute the weights derived by [de Chaisemartin & D’Haultfoeuille \(2019\)](#) and show that they are unrelated to different measures of the intensity of treatment such as year of treatment and actual length of expressways.

use this path as an instrument for the actual expressway network. The two-stage least squares estimates continue to show that the expansion of the expressway network is associated with an increase in the vote share of the AKP at the expense of the CHP.

Why did the expansion of expressways within a province increase political support for the AKP in that province? We argue that this was due to the visible show of efficacy represented by the expressway network in an economy that had struggled through a recession and political instability between 1995 and 2002 (West II, 2005; Voigtlaender & Voth, 2014). The success of the expressway expansion project was widely seen as an object of pride in Turkey (Raiser & Wes, 2014), and the efficacy of the AKP in construction became the pillar of subsequent election campaigns (AKP, 2015; Çarkoğlu, 2012). Empirical results show that while expressway expansion within a province was associated with increased outmigration and industrial production, there was no effect on output per capita and the unemployment rate. Furthermore, the effects of expressway construction on vote shares are not significantly related to their economic effects, which suggests that the economic impact on the province is not the primary channel.<sup>7</sup> We find that the expressway was more likely to increase support for the AKP and decrease support for the CHP in provinces that experienced more political discontent in the 1990's, as represented by vote shares for the Islamist Welfare Party (RP) in 1994, and in provinces that are less conservative. Further results reveal that the relatively less visible natural gas expansion project, shown to have had positive impacts on health outcomes (Cesur et al., 2017), did not have any effects on future voting patterns.

The rest of the paper proceeds as follows. The next section describes the related literature followed by a brief historical background providing some context for the AKP's political rise and economic programs. Section 4 describes the data used in the analyses, and the identification strategy is discussed in detail in Section 5. We present the main results and robustness checks in Section 6, followed by a discussion of mechanisms and related empirical evidence. Section 8 concludes the paper.

## 2 Related Literature

This paper is closely linked to the literature on how political support is built and sustained. This includes studies on the rise of the Nazi party in Germany (Voigtlaender & Voth, 2014), the political economy of the spread of democracy (Acemoglu & Robinson, 2000), and studies of how dictatorships remain in power (Egorov & Sonin, 2014; Saiz, 2006). Saiz (2006) finds that expressways tend to increase faster in dictatorships and rationalize this as a tool of oppression. Our work differs from the pre-existing work in providing empirical evidence on how political

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<sup>7</sup>Our methodology, which relies on difference-in-differences, can only capture differential impacts on a province relative to other provinces and does not capture the general effects of the expanded expressway network on the economy.

support in built in an electoral democracy, as opposed to earlier work focusing on autocratic governance. Furthermore, we demonstrate how expressway projects can be used as a tool of persuasion rather than oppression in order to build up support for a political party over time. The results show that the AKP gained support across the country, and their main rivals, the CHP and MHP, lost support in areas where they were previously stronger.

Our work is also related to the literature on the relative electoral benefits of public infrastructure projects and individually-targeted welfare programs (Adiguzel et al., 2020; Bardhan et al., 2020; Berman et al., 2011; Levitt & Snyder Jr, 1997; Manacorda et al., 2011). The evidence on the political advantages of either type of government spending is mixed, but there is growing evidence that they can raise political support at the level of the individual. Our contribution here is to show that broad-based infrastructure projects can raise political support at an aggregate level in a way that is not found with other types of welfare programs.<sup>8</sup> We also show that the electoral benefits of such projects go beyond economic benefits, hence the focus on material beneficiaries might not properly capture the true political benefits of public service provision.

A large literature has developed on the economic impacts of infrastructure projects in developing and developed countries. These range from the economic effects of railways and expressways in China (Banerjee et al., 2012; Baum-Snow et al., 2017; Faber, 2014); roads and railways in India (Asher & Novosad, 2020; Donaldson, 2018); portage sites, railways, and roads, in the United States (Bleakley & Lin, 2012; Donaldson & Hornbeck, 2016; Duranton & Turner, 2012; Michaels, 2008). Further, Fourie & Herranz-Loncan (2015); Jedwab et al. (2017); Jedwab & Moradi (2016); Okoye et al. (2019); Storeygard (2016) study the impacts of roads and rail networks in Africa, and Coşar & Demir (2016) examine the impacts of expressways on exports in Turkey. The general finding here is that investments in transportation infrastructure have positive economic effects, although their impacts on specific locations might differ due to increased outmigration or capital mobility to more populous or prosperous areas. The impacts of transportation infrastructure on increased outmigration from relatively less urbanized areas that we find are seen in India (Asher & Novosad, 2020) and China (Faber, 2014).

This paper differs from the large literature on the impacts of infrastructure projects in a number of ways. First, we study one of the largest expansions in expressways over the past twenty years (Raiser & Wes, 2014). Even more important is our focus on the political implications of infrastructure projects in an electoral democracy. To the best of our knowledge, only Voigtlaender & Voth (2014) and Burgess et al. (2015) empirically examine the political implications of transportation infrastructure projects. Burgess et al. (2015) examine how political incentives shape the allocation of transportation infrastructure. Our work differs from Burgess et al. (2015) by studying the political benefits of a nationwide expressway expansion project that was not explicitly differentially targeted for electoral gains. As in Voigtlaender & Voth (2014), we examine

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<sup>8</sup>For example, in Appendix Table A6, we do not find any electoral benefits to the AKP for the AKP's family physician program that has been shown to help lower mortality rates (Cesur et al., 2017).

how successful project implementation can enhance political support, but study impacts across multiple election cycles. The different context also suggests that voters prefer parties who are able to get things done and not necessarily autocratic regimes.

Last, but not least, our paper is related to studies of the impacts of several projects implemented by the AKP over the past two decades. These include the family physician program (Adiguzel et al., 2020; Cesur et al., 2017), expansion of the natural gas network (Cesur et al., 2017), and linking cities to export ports (Coşar & Demir, 2016). With the exception of Adiguzel et al. (2020) who examine political benefits in local elections in Istanbul, our paper differs from these in focusing on how the visible expressway expansion project has contributed to extending political support for the AKP across the country. We further show that other less visible programs, while delivering economic and social benefits, do not have the same electoral benefits. This contribution is important in explaining how the AKP, often viewed as conservative and pro-Islamic, has managed to expand its political base through social programs. In this case, our findings also tie in to Meyersson (2014) who shows that Islamic parties in Turkey do deliver on social goods, especially for the poor. Our study further demonstrates that such spending on public goods, when delivered at a large and visible scale, can further increase political support beyond the party's core constituencies.

### 3 Background

Civilian rule was in flux between 1980 and 2002 in Turkey, driven by political instabilities, military interventions in 1980 and 1997, and economic shocks (Çarkoğlu, 2012). These instabilities led to the AKP's first victory in the national elections of 2002, and they subsequently made infrastructural investments a cornerstone of their economic stabilization program (AKP, 2015). The party has remained in power ever since. The AKP is generally seen as a conservative party, and pro-Islamic in some cases, and has faced significant opposition in Turkey especially in more liberal areas of the country (West II, 2005). We utilize the large-scale investment in expressways undertaken by the AKP-led Turkish government over the last two decades to causally identify the effects of transportation infrastructure on voting preferences, and specifically how it led to increased support for the AKP at the expense of its rivals.

Figure 1 shows the growth of expressways in all Turkish provinces between 2000 and 2018. The overall length of expressways has substantially increased since the ruling party, the AKP, won their first elections in 2002. Between 2002 and 2018, the average expressway length per province increased from about 53.5km to 275km, with most of the rise taking place during the first two terms of the AKP (2003 to 2011). The total expressway network was extended from about 4,300km to 22,275km across the country from 2002 to 2018 (see TURKSTAT (2020) and Table 2). The five-fold increase in the expressway network meant that, as shown in Figure 2, 75 provinces are now connected through this expressway network compared to less than 20 in 2002.

[Figure 1 about here.]

[Figure 2 about here.]

The expressway expansion was centrally planned and executed, and formed a key part of the AKP’s infrastructure projects and Emergency Road Action Plan (KGM, 2014).<sup>9</sup> The province-by-year variation in the building of expressways provides a unique opportunity to study the effects of this massive infrastructure project on voting preferences, because decisions were not provincially driven. Even though all provinces in Turkey benefited from such a significant investment, there was time variation in the diffusion of expressways and it is this time variation that we primarily exploit.

The expansion of the expressway network began in areas close to the main metropolitan areas and then extended to the peripheries. The expansion was largely driven by economic reasons, the need to increase access in and out of large metropolitan areas, and not political considerations (see for example the discussion in Coşar & Demir (2016)). According to the policy documents, expansion of the expressway network was not preferentially targeted to provinces for political reasons, rather the public investment program was aimed at “upgrading into expressways all the roads connecting the country to international markets and those connecting provincial centres” (KGM, 2020). Hence, it is unlikely that these planned expressways were systematically disrupted and targeted to places where voting preferences were expected to change in the short-term, given substantial fixed costs associated with expressway construction.

Table 1 illustrates the evolution of the expressway, within provinces, by proximity to the largest urban center and province in Turkey, Istanbul. We regress the total length of the expressway network within a province on distance to the center of Istanbul, and interact distance by year. The regression also includes year and province fixed effects. We find that while provinces closer to Istanbul had significantly more expressways, the length of the expressway network increased relatively faster in provinces farther away from Istanbul. This finding is robust to including general province fixed effects in column 2, and excluding Istanbul itself in columns 3 and 4.

[Table 1 about here.]

We further plot the predicted (log) length of total expressway network by distance to Istanbul and general election years in Figure 3. The top plot shows that while areas closer to Istanbul, and Istanbul itself, had more expressways, this gap was effectively closed within 2 terms of the AKP-led government, between 2002 and 2011. Between 2002 and 2007, the expressway network in provinces closer to Istanbul significantly increased (between 2 to 6 log-points), and by 2011 the expressway network in every province has increased. Overall, the results from Table 1 and

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<sup>9</sup>Other major projects included the expansion of the natural gas network, studied in Cesur et al. (2017), and an expansion of the family physical program studied in Cesur et al. (2017). We account for expansions in these other major projects in the analyses.

Figure 3 support the claim in planning documents that the purpose of the expressway expansion project was to extend the expressway network to peripheral provinces beginning in provinces closer to core provinces.

[Figure 3 about here.]

This background allows us to implement a generalized two-way fixed effects model in our analyses, accounting for differences in initial characteristics and country-wide changes over time, given that areas close to major metropolitan areas might have been systematically different from areas in the periphery and general country-wide shocks might influence the pace of construction and voting preferences for different parties. In addition, we provide further evidence to assess the plausibility of this assumption by performing a falsification test where we repeat the analysis by studying the effect of yet unbuilt expressways on voting preferences (using 3-year leads). Results summarized in Table 6 support the parallel trend assumption, and lends credence to the identifying assumption.

## 4 Data Sources and Descriptive Statistics

### Expressway Data

Data on transportation infrastructure for 2000-2018 were provided by the General Directorate of Highway (KGM, 2020, GDH in short). These statistics provide a wide range of information on transportation infrastructure in each Turkish province. From the data, we extract information on the length of total expressway in each province. We use expressways as the measure of transportation infrastructure, because of the standardized definition of expressways, and the centralized nature of expressway planning reduces any impacts of time-varying provincial factors on the progress of construction. Expressways, unlike many other public investments, are also visible and clearly seen. More importantly, our major interest is on the construction of expressways on electoral outcomes, and not on the economic effects due to increased market access. We also collect data on the provincial-level expenditure on roads in order to further account for any fluctuations in provincial-level road expenditure. The GDH also provided paper maps of the expressway network in 2000, 2005, and 2015, which we digitize for analyses.

The evolution of expressways is shown in Figure 2, and illustrates the rapid expansion of expressways connecting all provinces of the country. From Table 2, we see that the average expressway length within a province increased from 54km in the years before the AKP was elected to about 192.5km today (population weighted). The *growth rate* was significantly higher in places with very little expressways, average of 13km in the year 2000, where expressways increased by a factor of 8.3 compared to a 3-fold increase in provinces with initially more expressways. Our empirical strategy accounts for potential differences in initial conditions that might simultaneously influence the growth of expressways and vote shares.

[Table 2 about here.]

## Electoral Data

We obtain province-level voting results from multiple local and general elections in Turkey between 2002 and 2015. The data consist of elections in 1994, 2002 (baseline), and subsequent elections in 2004, 2007, 2009, 2011, 2014, and 2015, of which the elections of 2004, 2009, and 2014, were local elections. The data are collected from the web portal of the Supreme Electoral Council (YSK, 2020), which has archived elections data from 2002 to 2015. We collect data of vote shares for the ruling party, the AKP, and its main rivals, the CHP and MHP. The data for the CHP include its alliance with the Democratic Left Party (DSP). Electoral data for one other major party, the Peoples' Democratic Party (HDP), is also collected because of their connections to the Kurdish regions. The AKP, CHP, and MHP, consistently obtain more than 10% of all votes. The HDP was included because of its regional importance.<sup>10</sup> Lastly, the archive also contains voter turnout rates for all 81 provinces.

Summary statistics in Table 2 show that the AKP and the CHP obtain about 62% of the votes across all elections, which is a substantial share in a country with more than 20 major parties. The four parties we include account for well over 85% of all votes, leaving 15% of votes spread across other parties. AKP vote shares have increased between 2002 and 2015, from 32 to 45% of all votes across provinces, and current vote levels are very similar between initially high and low expressway provinces. Only the AKP has seen significant increases in vote shares since 2002, and the central goal of this paper is to shed light on how they have been able to increase vote shares since 2002. Figure 4 shows that most of these gains took place during the first 2 term of the AKP, between 2002 and 2010, with the largest absolute increase in provinces with initially medium populations and expressway stocks. This is a point we return to when discussing the identification strategy.

[Figure 4 about here.]

## Economic Outcomes and Time-Varying Controls

From the Turkish Statistical Institute (TURKSTAT, 2020), we also collect detailed provincial-level information on the unemployment rate, electricity usage (industrial and total), and outmigration,

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<sup>10</sup>A major party is defined as one that had obtained more than 10% of votes in a recent election and/or represented in parliament. The HDP is included because of its importance in the Kurdish region. Kurdish-connected parties have been barred from several elections, and a substitute party was formed with each ban. People's Labour Party (HEP) in 1990, Freedom and Democracy Party (OZDEP) in 1993, Democracy Party (DEP) in 1994, People's Democracy Party (HADEP) in 1994, Democratic People's Party (DEHAP) in 2002, Democratic Society Party (DTP) in 2005, Peace and Democracy Party (BDP) in 2008, Peoples' Democratic Party (HDP) in 2012. For pro-Kurdish parties in other elections, we use data for HADEP in 1994, DTP in 1999, and HDP for the 2014 and 2015 elections. In other elections they participated as independent candidates and are therefore not included in the analyses.

between 2000 and 2018. These data are used to test for further impacts of rising expressways on economic outcomes, and also provide controls for time-varying provincial characteristics. This information is supplemented with province-level data on various measures of economic development and performance taken from [TURKSTAT \(2020\)](#). These include data on total population, physicians, hospitals, and hospital beds, per capita, student-teacher ratios and number of total motor vehicles. We collect data on presence of the family physician program from [Cesur et al. \(2017\)](#), and the presence of a natural gas line within the province from [Cesur et al. \(2017\)](#). Lastly, we collect province-level data on average nightlight intensity, as a proxy for general economic activity, from [Düşündere \(2019\)](#).

The estimates from Table 2 show that provinces with an initially higher stock of expressways are generally more prosperous, as measured by nightlight intensity, electricity usage, and a significantly lower rate of outmigration. These provinces are also more populous, have more physicians, slightly higher hospital beds, motor vehicles, and natural gas pipelines. However, there is no evidence that support for the AKP systematically varies between initially high and low expressway provinces today. We account for fixed provincial characteristics and their potential dynamic effects in our identification strategy, which we discuss next.

## 5 Identification Strategy and Empirical Framework

### Estimates from Province-by-Year Variation

Our primary identification strategy relies on province-by-year variation in the length of expressways within a province to estimate the effects of the construction of expressways on voting preferences. Specifically, we estimate a difference-in-differences model using the two-way fixed effects regression below:

$$Y_{prt} = \beta \log(\text{exp}_{prt}) + \delta_p + \gamma_t + \Pi' X_{prt} + \tau_{rt} + \tau_{rt}^2 + \epsilon_{pt} \quad (1)$$

The equation estimates the effect of the (log) of total expressways, measured in *km*, in province, *p*, region *r*, and time *t*, on outcome  $Y_{prt}$ . The model controls for province and time fixed effects,  $\delta_p$ ,  $\gamma_t$ , time-varying province characteristics,  $X_{prt}$ , and region-specific time trends,  $\tau_{rt} + \tau_{rt}^2$ .<sup>11</sup> The primary outcomes of interest are vote shares of the ruling AKP, and those of rival parties, the CHP, MHP, HDP, and effects on voter turnout rates. The treatment,  $\log(\text{exp}_{prt})$ , captures the dynamic evolution of the stock of expressway within provinces over time.<sup>12</sup> All models control for a 1-year lag of total expressway length to capture conditions in the previous election cycle, and an indicator for whether the election is a local election. All standard errors

<sup>11</sup>In some specifications we allow more flexible region time trends by including region-year fixed effects.

<sup>12</sup>We use the growth of the expressway stock, as opposed to levels, when describing the treatment given that it enters the equation in logs.

are clustered at the province level.

One concern with simply regressing vote shares on the log of expressways is that construction might have focused on, or increased more rapidly, in places where vote shares for the AKP were expected to rise. For instance, in Figures 3 and 5, we find that the growth in expressways (relative to initial stock) was inversely proportional to distance to Istanbul, initial populations, and expressway stocks, as expected from the plan to expand the network into areas that did not initially have expressways.<sup>13</sup> Therefore, it is possible that these places could have also had higher vote shares for the AKP, although the evidence in Figure 4 indicates that the largest vote share gains were concentrated in the medium population and initial expressway group stock. Nevertheless, we include province fixed effects,  $\delta_p$ , in order to flexibly deal with systematic differences in initial conditions that might be related to both expressway stock growth and the change in vote shares.<sup>14</sup> Furthermore, it is possible that fluctuations in the economy, for example, can influence the pace of expressway construction and voting preferences. We include time fixed effects,  $\gamma_t$ , in order to flexibly deal with any time variation in voting preferences general to all provinces.

[Figure 5 about here.]

From the above discussion, it is clear to see that the effects of the growth in the expressway network on voting preferences,  $\beta$ , can only be identified from province-by-time variation in the growth of the stock of expressways. This would be the case if voting trends in provinces with and without growth in the stock of expressways would have been the same (the parallel trends assumption). However, the parallel trends assumption might fail when province-by-time variation in the stock of expressways is related to other province-specific changes that are related to voting preferences.<sup>15</sup>

In Table 3 we examine the relationship between other time-varying province characteristics and the growth in the stock of expressways. In column 1 we find that, in any given year, only hospital beds per capita and the log of motor vehicles per capita are significantly related to changes in the expressway. These are also jointly significant as measured by the F-test. When we include province fixed effects in column 2, we find that most of the relationship disappears and all time-varying factors are jointly insignificant predictors of the growth in the length of expressways, although the number of motor vehicles continues to be individually significant. This indicates that the growth of expressways is largely driven by fixed province characteristics captured by

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<sup>13</sup>Figure 5 was constructed using the top 3, middle 3, and bottom 3, provinces in each category as at the year 2002 (initial period of AKP government).

<sup>14</sup>Province fixed effects also control for time-invariant differences in provinces that had initially different expressways stocks as seen in Columns 4 and 5 of Table 2.

<sup>15</sup>Note that expressway construction is planned and executed at the national level, and independent of province-level economic or budget priorities (see [Cesur et al. \(2017\)](#) for a full discussion on the role of the central government in infrastructure planning). However, we do control for province-level total expenditure on roads in  $X_{prt}$  in order to account for any changes in province-level spending.

the province fixed effects. We further relax the parallel trends assumption and allow provincial trends to differ by statistical region and include quadratic region-time trends in column 3, and region-year fixed effects in column 4. The results continue to show that these time-varying characteristics do not predict the growth in the stock of expressways, the joint significance p-values are .365 and .619 respectively, and motor vehicles do not significantly predict the stock of expressways once we allow for region-year fixed effects. These findings are robust to excluding the much more developed Istanbul province in column 5.

Therefore, assuming that the effect of expressway construction on voting preferences ( $\beta$ ) is homogenous, the identification assumption in Equation (1) is that conditional on province and year fixed effects, and time trends that may vary at the regional level, voting preferences would have evolved similarly in areas with and without growth in the length of the expressway network. We also account for the time-varying province characteristics in Table 3 to capture any residual differential trends across provinces. This is a conditional parallel trends assumptions and is substantially less restrictive than the standard parallel trends assumption.<sup>16</sup> Note that allowing time trends to vary by region also captures spillovers across provinces within a region, which would be the case if expressways go through neighbouring provinces.

[Table 3 about here.]

We briefly discuss the homogenous effect assumption mentioned above here, and leave the full discussion for the robustness section. [de Chaisemartin & D’Haultfoeuille \(2019\)](#) show that, even with parallel trends, the two-way fixed effects model in Equation (1) can be biased and of the wrong sign, if there are heterogeneous effects across provinces or time. This is primarily because  $\beta$  is a weighted average of various causal responses over time and different groups, and some of the weights could be negative. We show that our estimates are robust to biases driven by heterogeneous effects. First, we do not find substantial evidence for heterogeneity by initial characteristics and in different samples. Secondly, we estimate the weights derived by [de Chaisemartin & D’Haultfoeuille \(2019\)](#) and show that they are not systematically related to factors that could increase the effects of the expressway construction, specifically year of expansion, the intensity of expressway expansion itself, and whether the province was initially of medium population and urbanization (as these areas experienced the strongest increases in AKP vote shares and growth in expressways, as in Figures 4 and 5).

## Cross-Sectional Estimates

We further show that the estimated relationship between the log of expressways and voting preferences also holds in the cross-section of provinces, using data from the 2014 Presidential

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<sup>16</sup>In the baseline results, we model region time trends as linear and quadratic time trends, given that the large number of region-year fixed effects might lead to imprecise estimates. We do show, however, that the main findings are robust to region-year fixed effects. We provide further evidence that expressways did not grow faster in places where vote shares would have systematically evolved differently in Table 6.

elections.<sup>17</sup> In order to deal with the possibility that expressways might be targeted to party supporters, we control for initial support for the AKP in the 2002 elections, hence the estimates only capture additional increases in AKP vote shares as a result of the expansion of expressways, or other factors that drive the evolution of expressways and the AKP vote share. We further control for other programs implemented by the AKP government, such as the expansion of the natural gas network and establishment of the family physical program, and other province-level characteristics that changed between 2002 and 2014 shown in Table 3. In addition, we utilize the methodology developed in Oster (2017) to show that results are robust to omitted unobservable province characteristics, assuming that unobserved province-level characteristics are as important as the observed characteristics that we include in the regressions.

Further, we follow Faber (2014) to construct a hypothetical expressway network, using the least cost path connecting the 22 most populous cities in the year 2000. As shown in Figure 6, we connect all the major cities from West to East in a Northeasterly direction, and then from East to West in a Southwesterly direction. The fully connected network is then reduced to a least-cost path, taking into account the cost of slopes and avoiding built-up areas, and this least-cost network is shown in Figure 7. The least cost path is clearly exogenously constructed and will only coincide with the true expressway network under the assumption that the expressway was intended to connect the biggest cities in the cheapest way possible. We use the length of the least cost path, a hypothetical expressway network, as an instrument for the actual length of the expressway network within each province.

[Figure 6 about here.]

[Figure 7 about here.]

## 6 Results

### 6.1 Estimates from Province-by-Year Variation

#### Expressways and Votes

We begin with results on how changes in the length of expressways have contributed to differential voting patterns between 2002 and 2015 in Table 4. Results are ordered by vote shares for the four major parties we study, the ruling AKP, the CHP, MHP, and HDP. The fifth panel considers the question of whether expressway construction increased voter turnout rates. In column 1, we find that vote shares for the ruling AKP increased in areas where there was a greater expansion in the expressway network. Specifically, a 10% increase in the length of expressways within a

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<sup>17</sup>A major caveat with the cross-sectional evidence is the small size provinces at 81.

province increased vote shares for the AKP by .3 percentage points within the same province.<sup>18</sup> To put this into perspective, for the average province in which the expressway network increased from 51km to 193km, as in Table 2, the estimates imply that the growth in the expressway network increased the AKP’s vote share by 4.2 percentage-points. This is about one-third of the total increase in the AKP’s vote share since 2002. The bump in votes for the AKP came at the expense of the CHP, the AKP’s main rival, who lose about half a percentage point in its vote share for a 10% increase in expressways constructed by the AKP. The results also show declines of smaller magnitudes, and statistically insignificant, in vote shares for the MHP and the HDP as a result of expressway construction. The fifth panel shows that these changes in voting patterns are not due to changes in turnout rates.

The causal interpretation of the above findings is complicated by the credibility of the parallel trends assumption. We evaluate robustness to violations of parallel trends in columns 2 to 4 of Table 4. In column 2, we relax the parallel trends assumption and allow trends to vary across regions by including region-specific quadratic trends.<sup>19</sup> The results in column 2 show that the key results are robust to the inclusion of region-specific quadratic trends—growth in expressways is significantly associated with an increase in vote shares for the AKP and a decline in votes for the CHP. Column 3 allows for possible differential trends driven by provinces, assuming some of these differences over time are captured by observable time-varying characteristics.<sup>20</sup> The point estimates remain unchanged across the board indicating that the results are unlikely to be driven by differential province-specific trends, at least as represented by the time-varying control variables. Column 5 allows for more flexible region-specific time trends, by including region-by-year fixed effects. The point estimates are slightly noisier but the broad conclusions remain, qualitatively and quantitatively—a 10% increase in expressways constructed by the AKP within a province increased its vote share by about .27 percentage points and decreased votes to the CHP by about .4 percentage points.

To sum up, the baseline findings in Table 4 demonstrate that the AKP vote share increased significantly in provinces where there were more expressways constructed, and this came at the expense of the rival CHP. There was a decrease in the vote shares of the MHP and the HDP, but these are quantitatively small and statistically insignificant. These changes in voting preferences were not driven by an increase in voter turnout, which are already remarkably high in Turkey at

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<sup>18</sup>This is computed as the estimate of  $\beta$ , 3.1507, multiplied by  $\log(1.1) = .0953 \approx .1$ .

<sup>19</sup>Put another way, we allow differential trends for provinces in different regions. For example, it is possible that construction in a province within a specific region might lead to increased vote shares throughout the region, and then future construction in other provinces within the same region. Region-specific time trends allow us to account for these effects.

<sup>20</sup>These include total provincial expenditure on roads, the log of total population, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line. We do not include some outcomes like GDP per capita and the unemployment rate in the control variables because they could be considered outcomes of the expressway expansion process. Effects of the expressway on GDP and employment are discussed in Section 7.

greater than 80% as in Table 2. We further demonstrate that the results are robust to controlling for a number of time-varying characteristics at the province level, and allowing differential time trends for provinces in different regions. Next, we present further evidence that the results are not driven by differential time trends and reverse causality, and that the estimates can be interpreted as causal.

[Table 4 about here.]

## Robustness Checks

### Province-Specific Trends

Here we further investigate whether the estimated effects of expressways on voting preferences and turnout can be explained by time trends that are not specific to all provinces within a region. We expect our estimated effects to remain the same if province-specific time trends are completely captured by the time-varying controls included in the estimation, with the caveat that province-specific time trends can confound dynamic effects of expressways (Wolfers, 2006).

Estimates are shown in Table 5. The top panel of Table 5 shows that the estimated effects are robust to trends specific to provinces with similar initial vote shares for the ruling AKP in 2002. This is the case for linear time trends, quadratic time trends, and quadratic time trends with time-varying controls included. In all cases, we find that the results are not being driven by the fact that the AKP rewarded (or enticed) provinces with initially high (or low) AKP-vote shares, where vote shares would have increased regardless. In the bottom panel of Table 5 we fully allow for province-specific linear and quadratic time trend, and also include time-varying controls.

Overall, we find that while the estimates are noisier, we continue to see that a 10% increase in expressways built by the AKP within a province increased their vote share by about .3 percentage points and decreased the vote share of the CHP by about .4 percentage points. These changes in voting preferences are not driven by increased voter turnout. The point estimates are quantitatively and qualitatively similar to the baseline results in Table 4. Taken together, these results demonstrate that the estimated effects of expressway construction on the vote shares of the AKP and CHP are likely not driven by differential time trends across provinces. Next, we provide even further evidence to demonstrate that expressway caused increased vote shares and not the other way around.

[Table 5 about here.]

### Pre-Existing Trends or Anticipatory Effects

The question we wish to address here is whether there were already trends in AKP or CHP vote shares in provinces where expressways were later increased. Put another way, did the AKP

build expressways in places where vote shares were already on the increase? The preceding results indicate otherwise, but we investigate further by running a placebo analysis. We regress 3-year leads of expressway growth on vote shares, controlling for time and province fixed effects, time-varying controls and region-specific time trends.

The results in Table 6 demonstrate that there were no anticipatory effects or pre-existing trends in AKP and CHP vote shares related to the construction of expressways. Point estimates are insignificant across the board, and the signs are reversed in the case of AKP-vote shares. Hence, we conclude that there is no evidence expressways were built in provinces where vote shares for the AKP (CHP) were expected to increase (decrease) or already increasing (decreasing).

[Table 6 about here.]

## Heterogeneity and Causal Interpretation of Point Estimates

Recent studies have emphasized that two-way fixed effects models might not produce an estimate with a causal interpretation in the presence of effect heterogeneity. As explained in [de Chaisemartin & D'Haultfoeuille \(2019\)](#), this is because the estimate is a weighted sum of multiple treatment effects on groups where the treatment effects might be heterogeneous. This becomes a problem when some of the weights are negative, because it implies that the weighted sum might be much smaller than the true treatment effect or of the opposite sign if groups with the largest effects receive negative weights. Therefore, we briefly investigate the implications for our estimates of the effects of expressway expansion on AKP vote shares from Equation 1.

First, we note that there is no evidence of strong heterogeneity in the effects of expressway expansion on AKP vote shares related to economic or province characteristics that indicate more intense treatment (see Tables 12 and 13). Second, we use the methodology and code from [de Chaisemartin et al. \(2019\)](#) to estimate the weights from Equation 1 and its relationship with different indicators for intensity of treatment. Their results suggest that systematic variation in weights is likely to lead to biased estimates from two-way fixed effects models, if, for example, areas where the effects are larger receive negative weights then it implies that the weighted sum of all effects is likely to be negative.

Results are shown in Table 7.<sup>21</sup> We examine the relationship between the computed weights and a number of variables that could be related to intensity of treatment. One might expect that effects will be greater in more intensively treated areas or in areas that were treated earlier, but we find that the estimated weights are neither related to the log of expressway nor year of treatment. Results from Table 13, and the history of expressway expansion in Turkey imply that provinces in the middle urbanization or population tertiles will be more intensively treated (see Figure 5). There is no evidence that the weights are significantly correlated with being in the

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<sup>21</sup>Results from running the code provided by [de Chaisemartin et al. \(2019\)](#) reveal that Equation (1) is estimated using a mix of positive (282) and negative (282) weights to add up 564 causal responses using instances where the log of expressway changed between elections.

middle urbanization or population tertiles. Lastly, there is also no evidence that weights are systematically related to output per capita, as measured by night lights.

Overall, we do not find evidence that the magnitude and sign of the estimated effects of expressways on AKP vote shares will be biased by systematically negative regression weights on provinces with higher effect sizes.<sup>22</sup>

[Table 7 about here.]

## 6.2 Cross-Sectional Estimates

Here, we provide more evidence against systematic bias due to the way two-way fixed effects regressions compute point estimates using evidence from cross-sectional regressions in Table 8. The results demonstrate that the positive effects on AKP vote shares, primarily at the expense of the CHP, also holds in the cross-section hence this finding is not unique to the two-way fixed effects regression. The second panel of Table 8 further illustrates that the results continue to hold even after we control for initial vote shares. While vote shares have remained persistent between 2002 and 2014, we continue to find that provinces with greater expressway networks are more likely to vote for the AKP in 2014. In the third panel, we provide an answer to the question, by how much will the estimated effects change if we included additional controls that are just as important as the control variables we include and increased the  $R^2$  by an additional 30%? The results from computation of Oster (2017) bounds show that our main results are robust to concerns about omitted variables. Even if we added more relevant control variables, we would still conclude that a 10% increase in the expressway network would have increased vote shares for the AKP by .18 percentage-points and decrease CHP vote shares by .84 percentage-points.

[Table 8 about here.]

### Instrumental Variable Estimates

In Table 9, we show results using the least-cost path described in Section 5 as an instrument for the actual expressway network. Results continue to show that the expansion of the expressway network is associated with increased vote shares for the AKP at the expense of its main rival, the CHP, although the estimates are now noisier. The first-stage estimate of the relationship between the length of the hypothetical least cost path (minimum spanning path) and the length of the actual expressway network is positive and significant, suggesting that the hypothetical least cost path is a good predictor of the actual expressway network. However, the F-stat for the excluded instrument is 9.1 indicating that the instrument might be weak (Angrist & Pischke, 2008), driving the larger point estimates. The bottom panel of Table 9 shows results from Anderson et al.

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<sup>22</sup>The same results hold for vote shares for the CHP, but these are omitted to save space.

(1949) and [Stock & Wright \(2000\)](#) tests of significance for the effects of the expressway that are robust to weak instruments. Both tests demonstrate that the positive impact of the expressway on increased vote shares for the AKP is robust to concerns about weak instruments.<sup>23</sup>

[Table 9 about here.]

## 7 Mechanisms

The previous section demonstrated that AKP-constructed expressways within a province led to electoral gains for the AKP across the country, electoral losses for the CHP, and to a lesser extent losses for the MHP. Why did the construction of expressways lead to political gains for the AKP? We address this question by looking at the direct economic effects of expressway construction on output per capita, as measured by night lights, electricity usage, unemployment, and migration. We then examine other explanations, especially the idea that delivering on the visible expressway project demonstrated capability, competence, and efficacy, following the political and economic turbulence of the preceding period ([Çarkoğlu, 2012](#); [Rodrik, 2009](#)).<sup>24</sup>

### 7.1 Expressways and Direct Economic Benefits

The 2002 elections in Turkey followed the economic crises of 2001 that was partly precipitated by a political crises ([Rodrik, 2009](#)). Thus, we ask whether the economic benefits of the major expressway projects within a province can explain the AKP's political successes since 2002. The expressway project was perhaps the most visible of all megaprojects quadrupling the expressway network from 4,300km to 22,275km in less than 20 years.

Table 10 presents estimates of the economic effects of the province-by-year variation in total expressway length within a province, from Equation (1).<sup>25</sup> The top panel shows effects on output per capita, as measured by night lights per capita. Results indicate that the growth in expressways within a province is not positively associated with relatively faster growth in output per capita, and the difference-in-difference estimates are in fact negative. There is a strong positive effect on industrialization, as proxied by industrial electric usage, and no effects on total electricity usage. We do not find any positive effects on the province-level unemployment rate, but find evidence that outmigration increased in provinces where the expressway grew more rapidly. These results

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<sup>23</sup>We also implement the instrumental variable regression using the weak instrument robust Limited Information Maximum Likelihood (LIML) estimator. The estimates are quantitatively similar hence we omit these estimates in order to save space.

<sup>24</sup>A World Bank report notes that “The quality of the road network in Turkey is justifiably a matter of pride for Turkish citizens who have ventured across their country’s borders” ([Raiser & Wes, 2014](#)).

<sup>25</sup>Note that the estimates only capture differential benefits in any given province, and do not capture any general equilibrium or spillover effects. Hence, they do not speak to the general effects of the expressway project on the Turkish economy as a whole. Furthermore, we are looking at all expressways in contrast to [Coşar & Demir \(2016\)](#) who study roads connecting provinces to international gateways.

are robust to the inclusion of region-specific quadratic trends in column 2, the inclusion of time-varying control variables in column 3, and region-by-year fixed effects in column 4. These results are also supported by Akbulut-Yuksel et al. (2020) who show that expressway project did not have any statistically significant effect on individual development outcomes.

Furthermore, in Appendix Table A1, we use 3-year leads to show that the estimates do not reflect pre-existing trends. Results in Appendix Tables A2 and A3 further reveal that, with the exception of migration, the above results are not driven by heterogeneity. Outmigration rose significantly in the least initially urbanized provinces with medium populations. Overall, the evidence on direct economic benefits is mixed. We find an increase in labour mobility, as measured by outmigration from initially least urbanized regions, and increased industrialization. However, we do not find positive effects for total output per capita, total electricity usage, and unemployment.

[Table 10 about here.]

In Tables A4 and A5 of the Appendix, we evaluate how much of the political benefits of the expressway expansion can be explained by economic effects (focusing on output, industrialization, and migration). In Table A4 we find that controlling for these economic outcomes do not change our core conclusions, which is that the growth of the expressway network within a province increased vote shares for the AKP, at the expense of the CHP, and less significantly for the MHP. In fact, only growth in output, as measured by night lights, has a significant impact on vote shares and it is negative for the AKP and positive for the more conservative MHP. Additionally, Table A5 demonstrates that the effects of the expressway network on vote shares do not increase significantly with increases in output, industrialization, and outmigration.<sup>26</sup> Therefore, we next pursue explanations that emphasize perceptions of competence and efficacy as possible mechanisms for the political benefits of the expressway expansion project.

## 7.2 Expressways and Perceptions of Competence

Next, we examine the hypothesis that the construction of expressways was a public display of competence and efficacy by the AKP regime, which further strengthened their political position. Voigtlaender & Voth (2014) demonstrate that the construction of the *Autobahn* in Germany contributed to the political rise of the Nazi party. The expressway network in Turkey is very visible and stands out when compared to other countries in the region. A 2014 World Bank report notes that “The quality of the road network in Turkey is justifiably a matter of pride for Turkish citizens who have ventured across their country’s borders” (Raiser & Wes, 2014). The visibility of

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<sup>26</sup>All interaction terms are insignificant and point estimates remain unchanged when interacted with night lights per capita and net outmigration, but are substantially reduced and insignificant when we interact with industrialization.

the expressway network was also utilized extensively by the AKP in its election campaigns, represented by the slogan *Durmak yok, yola devam*, which is roughly translated as “No stopping, keep going” or more literally “No stopping, keep going on the road”. It has been argued elsewhere that the perception of the AKP as competent with respect to the economy has been important for its electoral victories between 2002 and 2011 (Çarkoğlu, 2012). Here we further ask whether the visible expressway network was partly responsible for the change in perception.

### **Evidence from Differences in Earlier Vote Shares for the Welfare Party**

In this section we investigate whether the political benefits of the expressway construction project were greatest in places where competence and stability were most desired. The AKP came to power as a new party in 2002 driven by dissatisfaction with older parties in Turkey, as a result of political and economic instabilities that followed the military intervention in 1997. Since political support for the established parties was weakened by the political turmoil of the 1990’s, we hypothesize that the show of competence provided by the expressway would have been more beneficial in places where political dissatisfaction was greater. We test this hypothesis using information on vote shares for the Islamist Welfare Party (RP in Turkish) in the 1994 elections. We split provinces into three groups according to initial vote shares for the RP in the local elections of 1994, and use support for the RP as indicator of discontent with established parties and a desire for effectiveness and stability. This is because dissatisfaction with governance led to the rise of the Islamist Welfare Party (RP in Turkish), with victories in local elections in 1994, the first ever for an Islamist party in Turkey, and a subsequent victory in the general elections of 1996. The party was, however, banned following the military intervention of 1997 (Rabasa & Larabee, 2008; Meyersson, 2014). Therefore, we ask whether the expressway had a greater effect on voting preferences in provinces that voted for the RP in 1994, where there was greater political discontent and demand for more effective politics. Results are in Table 11.

The estimates in column 1 indicate that support for the AKP increased the most in provinces that supported the RP in 1994. More importantly, in column 2, we find that losses for the oldest and well-established CHP were greatest in provinces with the most support for the RP. The point estimates for provinces with high and medium support for the RP in 1994 are more than 3 times as large as in provinces with the least support for the RP. We do not find significant differences for votes for the MHP and HDP, and no significant differences in voter turnout. Overall, the evidence in Table 11 indicates that the expressway had the greatest effects in provinces where there was substantial political discontent in the 1990’s. We interpret this finding to mean that the expressway expansion project had the greatest benefits for the AKP, and losses for the more established CHP, in provinces where change was more desired. This interpretation is also consistent with results from Panel 3 of Table 12, where we find that the estimated effects of the expressway are smaller when Istanbul and Ankara are excluded from the sample—these are also major provinces won by the RP in 1994.

[Table 11 about here.]

## Evidence from Heterogeneous Effects

In this section we investigate the extent to which results are being driven by a few provinces or regions, and by heterogeneity driven by initial conditions. Analyzing heterogeneity is itself interesting and important given the increasingly regional nature of Turkish politics and perceptions of the AKP (West II, 2005). The AKP is viewed as a regional phenomenon, conservative, and largely pro-Europe, in contrast to the CHP which is more secularist and nationalist in outlook (Tezcür, 2012; Rabasa & Larabee, 2008). Therefore, it will be informative to investigate whether expressway construction by the AKP had weaker effects in more nationalist or less conservative provinces.

**Heterogeneity Across Provinces and Regions** We show results of heterogeneous effects across different provinces in Table 12. The top panel shows that results are robust to excluding the more economically prosperous Istanbul province. The results show that the positive effects of expressways on the AKP remain quantitatively and qualitatively similar to baseline estimates. The major difference is that, excluding Istanbul, expressway construction further decreased support for the ultra-conservative and nationalist MHP but the negative effects on the CHP is about half of the baseline estimates. The relatively larger estimated impacts on MHP vote shares outside Istanbul is primarily driven by their larger initial vote shares outside Istanbul and other major urban areas (YSK, 2020).<sup>27</sup>

The second panel shows that this results also generalizes to excluding the Marmara region, which contains Istanbul, and also excluding the three most populous provinces of Istanbul, Ankara, and Izmir, in Panel 3. In sum, these results indicate that the positive effects of expressways on AKP vote shares are present even excluding the economically prosperous provinces that were already connected to the expressway network. The negative effects on votes for the CHP are smaller as the MHP also lose votes as a result of expressways outside of Istanbul, Ankara, and Izmir, areas that were previously their stronghold.

One might have expected larger estimated effects on AKP vote shares when the three most prosperous provinces are excluded, given that the three provinces are less conservative, already connected to the expressway network, and the AKP is widely seen as a conservative party. As we alluded to earlier, these more prosperous provinces were also the areas where shows of competence and stability were most desired given that the RP won these areas in 1994. Put another way, the persuasion factor was most effective in provinces that are less conservative but desired competence in public service delivery.

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<sup>27</sup>In the 2002 elections, the CHP and affiliated parties (especially the DSP) won relatively larger vote shares in the more developed West, Marmara, Aegean, and Mediterranean, regions, while the more nationalist MHP won relatively larger vote shares in other parts of the country (YSK, 2020).

In the fourth panel of Table 12, we exclude Central Anatolia which contains the capital province Ankara and other more rural provinces. We find that the results excluding Central Anatolia are similar to baseline estimates with a slightly larger positive effect for the AKP. The fifth panel excludes the “West”, referring to the Marmara and Aegean regions, generally seen as more pro-Europe, prosperous, and more secular (West II, 2005). Again, as with the results of excluding Istanbul, we find that the positive effects on AKP vote shares are similar to the baseline, but the vote loss by the CHP is much less and the MHP loses substantial votes. Furthermore, results in panel 6, which restricts the sample to the West and Mediterranean regions, the more prosperous but less conservative regions of the country, demonstrate that the vote gain by the AKP is slightly larger in this sample. The estimated effect on vote loss by the CHP is about 80% larger compared to the full sample in their former strongholds. These findings are consistent with the persuasive power of expressways in these more prosperous but less conservative areas.

In summary, the results in Table 12 demonstrate that the effects of expressways on vote shares for the AKP is found across the country and largely of the same magnitude, although slightly larger in the most populous, more economically advanced, and less conservative, provinces. However, the effects on vote shares for the two other rival parties, the CHP and MHP, vary by province and regions although all qualitatively similar. The point estimate for the loss in vote shares for the CHP is 100% higher in their former strongholds in the more populous and prosperous provinces, while the loss for the MHP is found in other regions. Simply put, the construction of expressways led to a loss in vote shares for the relatively more dominant party prior to the emergence of the AKP within each province—the CHP in the West, Marmara, and Mediterranean regions, and the MHP in the rest of the country (YSK, 2020).

[Table 12 about here.]

**Heterogeneity by Initial Urbanization and Population** Here, we examine the heterogeneous effects of expressways by initial urbanization and development. Faber (2014) shows that the economic effects of the expressway in China varied between urbanized and periphery areas, and in the context of Turkey it is possible that core areas benefited more than less urbanized provinces and we might expect stronger vote increases for the AKP. Figure 5 reveals that the change in expressways was earlier and greater in initially medium population provinces that were first connected to surrounding urban areas, so we might also expect greater effects in these areas. We test for these patterns of heterogeneity by dividing provinces into initial urbanization and population tertiles (in the years 2000 and 2002), and interacting the estimated effects with each tertile. Results are presented in Table 13, and we focus on estimated effects on vote shares of the AKP, CHP, and MHP.

The top panel presents heterogeneity by initial urbanization. We find positive effects of the growth in expressways on the vote shares for the AKP across all three tertiles, but effect sizes are greatest for the middle group, and almost double the effect in the most urbanized provinces,

with the bottom tertile in between. The negative effects on the vote shares of the CHP is found across the board, but with a slightly smaller estimated loss in the bottom tertile where there was a greater, but insignificant, loss in vote shares for the MHP. This pattern is consistent with the earlier finding that the loss in vote shares for the CHP was greater in more prosperous provinces. The bottom panel of Table 13 presents results of estimated effect sizes by population tertiles. The positive effects on AKP vote shares are found across all three tertiles. As we found in the previous tertiles, the negative effects on vote shares for the CHP is substantially larger in the most populous provinces when compared to provinces in the bottom population tertile. There are no significant effects on MHP vote shares in any of the population tertiles.

Overall, we continue to find relatively stable estimates of the positive effects of expressway expansions on AKP vote shares at the expense of the CHP, and in some cases the MHP, but there are no definite patterns to these differences that can be readily tied to economic benefits or effects as defined by a core-periphery model of transportation infrastructure (Faber, 2014). These results also show that the larger increases in vote shares for the AKP in Istanbul, Ankara, and Izmir (and in the West, Marmara, and Mediterranean regions), is not driven solely by the fact that they are more urbanized or populous.

[Table 13 about here.]

### **Evidence From an Effective but “Invisible” Project: Natural Gas Expansion**

Key to the competence and efficacy explanation is that the project was visible to all and a “thing of pride.” Hence, we contrast the effects of expressways on vote shares to the effect of the natural gas expansion project that occurred over the same time period. Cesur et al. (2017) show that the natural gas expansion project substantially lowered air pollution and infant mortality, but natural gas pipelines are largely invisible and do not quite capture the public imagination like brand new expressways do (Flyvbjerg et al., 2003).

Do “invisible” but effective infrastructure projects like natural gas pipelines also increase political support? Results from Table 14 demonstrate that in spite of the real benefits of the natural gas expansion project from 2002 to 2015, it is not related to changes in vote shares for any party. Neither the AKP, the CHP, the MHP, nor the HDP, gain or lose differentially as a result of the natural gas expansion project. The results in Table 14 provide evidence that the visibility of the expressway expansion project was partly responsible for its political benefits for the AKP. Further evidence in Table A6 of the Appendix, from the family physician project studied in Cesur et al. (2017), demonstrate that the program had no significant electoral benefit to the AKP even though it was shown to have lowered mortality rates.

[Table 14 about here.]

## 8 Conclusions

In this paper, we investigate how the unprecedented expansion of transportation infrastructure influenced the consolidation of political power by the AKP in Turkey. Specifically, we use the nationwide investment in transportation infrastructure undertaken by the Turkish government over the last two decades to causally identify the political effects of the improvement in transportation infrastructure on the political support. We use province-by-year variation in the construction of the expressway network, and voting results in 7 elections between 2002 and 2015, to show that vote shares for the AKP increased in provinces where there was an increase in expressways. Gains by the AKP primarily came at the expense of its main rivals the Republican People's Party (CHP), and the Nationalist Movement Party (MHP). In the average province, expansion of the expressway network account for about a third of the increase in AKP vote shares. Several robustness checks demonstrate that the estimates are causal and are robust to province and region specific time trends. We also verify that leads of the expressway are not related to vote shares ruling out reverse causality and pre-existing trends.

Exploring different causal channels, we do not find evidence that the economic benefits of the expressway within a province explain the political benefits to the AKP. There is no positive impact on economic growth and unemployment, but we do find some evidence of increased outmigration from less urbanized provinces. We provide evidence that the visibility and scale of the project signalled competence and had a persuasive factor for a number of reasons. Estimated effects are larger in provinces that experienced more discontent with the status quo in the 1990's, proxied by vote shares for the Islamist RP in 1994, and larger in provinces that are less conservative but needed stability after the instabilities of the 1990's. Electoral losses by the AKP's more established rivals were also larger in provinces they had previously controlled, and other economically successful but less visible projects had no significant impacts on vote shares. Overall, our results demonstrate that displays of competence matter. While previous works have focused on how autocracies consolidate power, our results reveal that visible displays of competence can help a political party solidify its political position and persuade new voters even in an electoral democracy.

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Figure 1: Growth of Expressways in Turkey (Provincial Average)

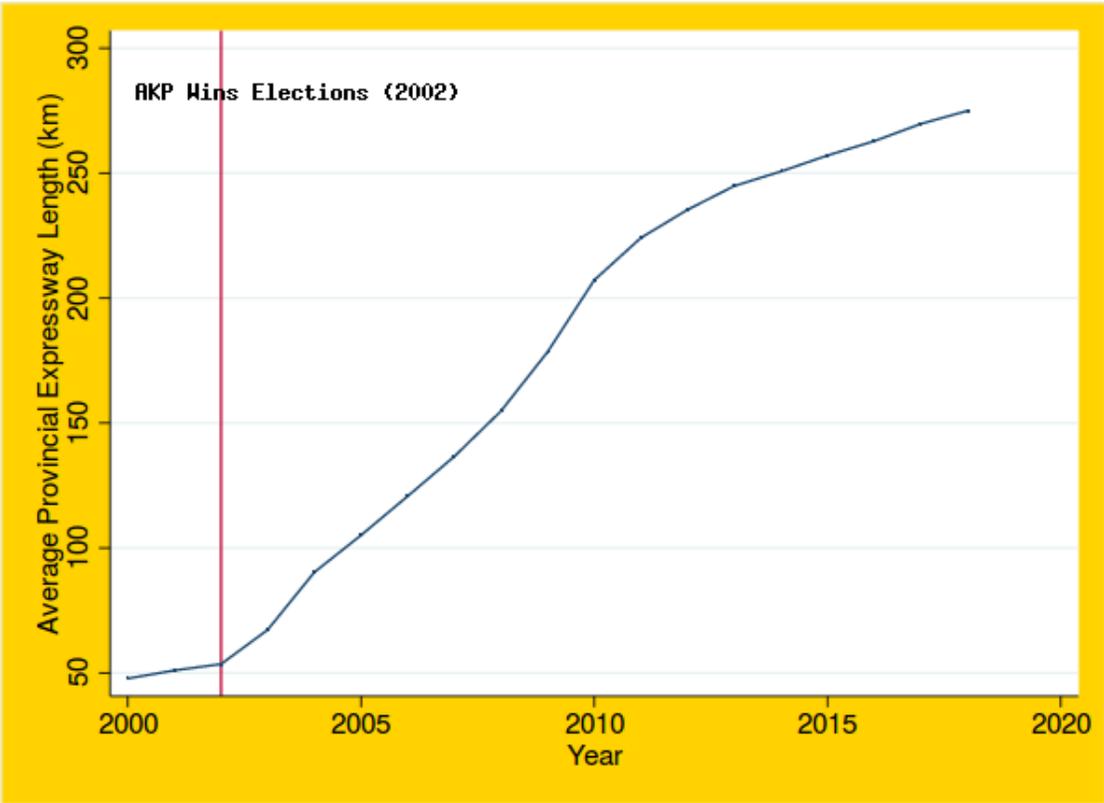
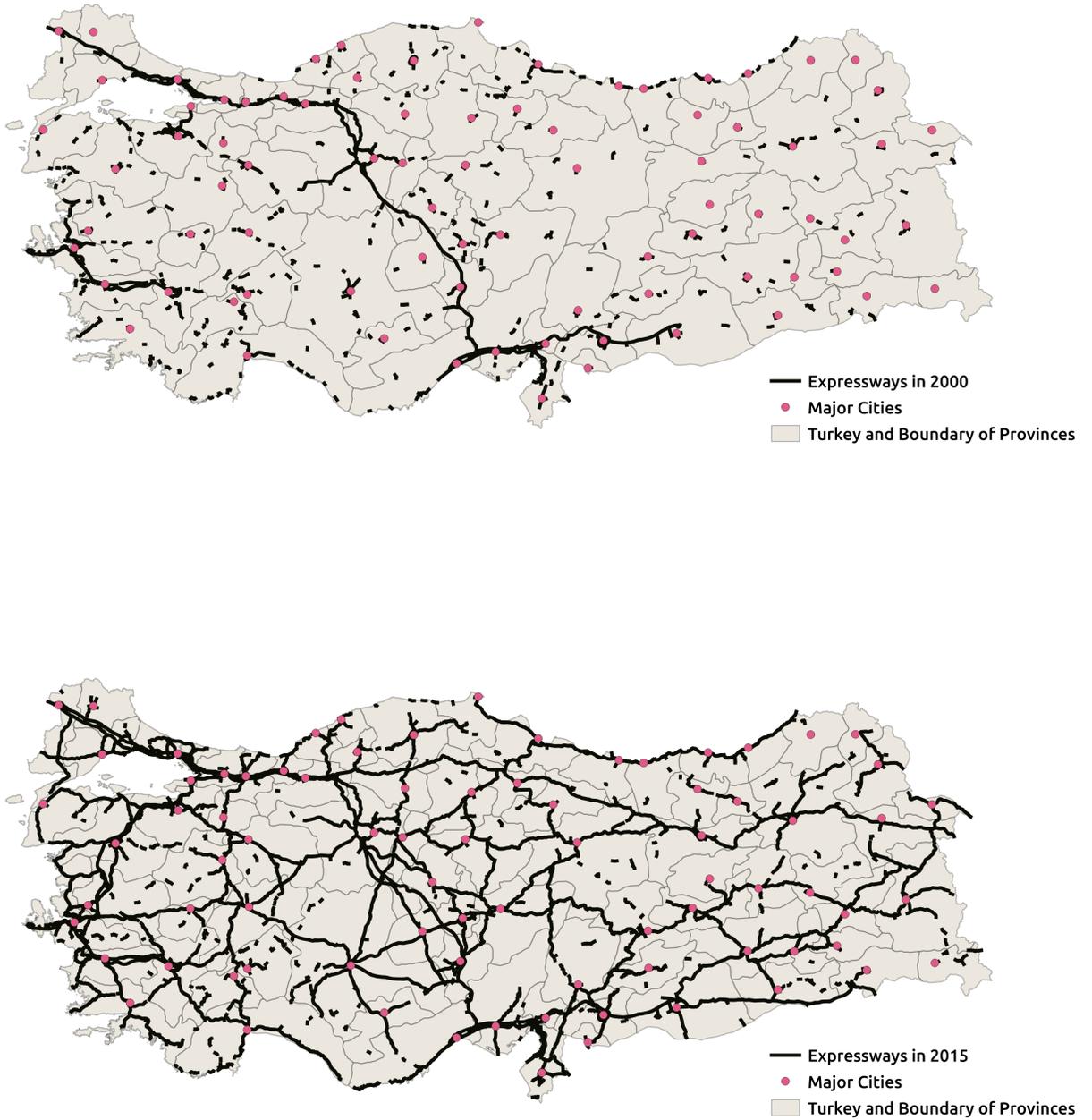
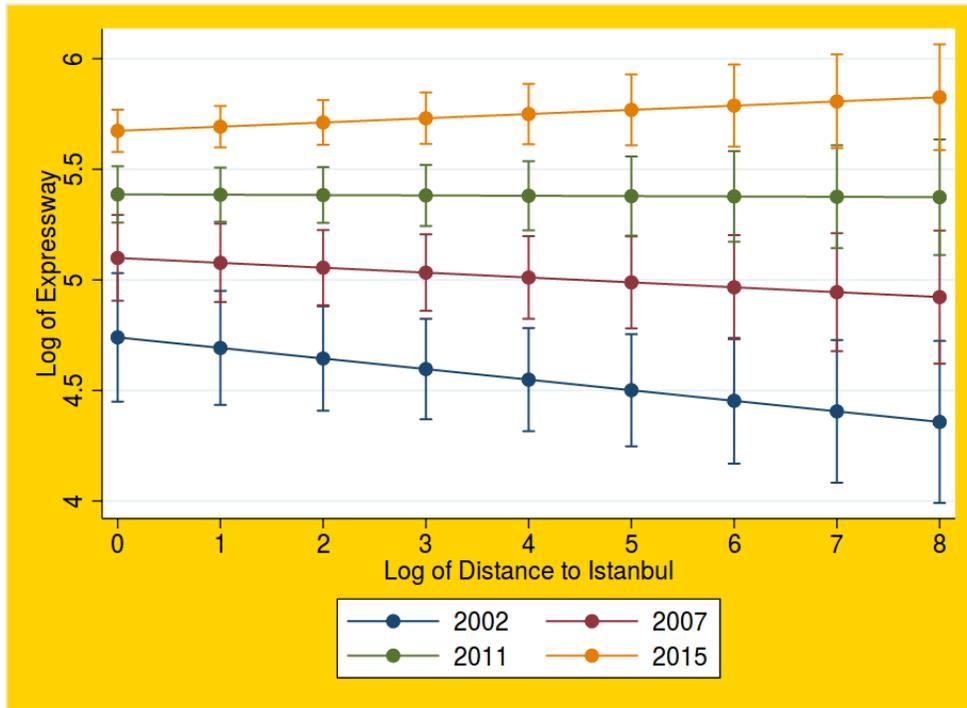


Figure 2: Growth of Expressways in Turkey Between 2000-2015



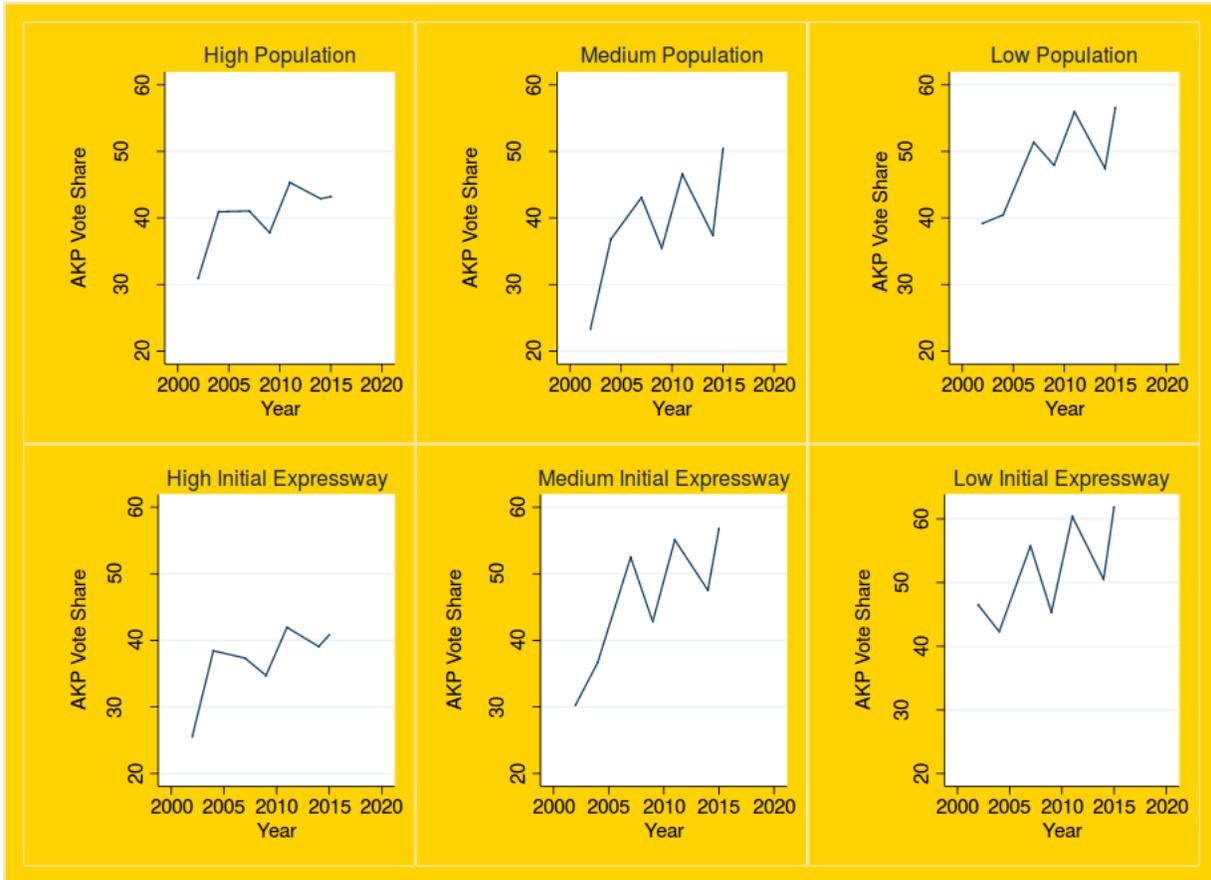
Note: Maps are digitized from paper maps obtained from the General Directorate of Highways (KGM, 2020). Maps include expressways that were partially under construction, represented by "dashed" lines.

**Figure 3:** Growth of Expressways by Distance to Istanbul and Year



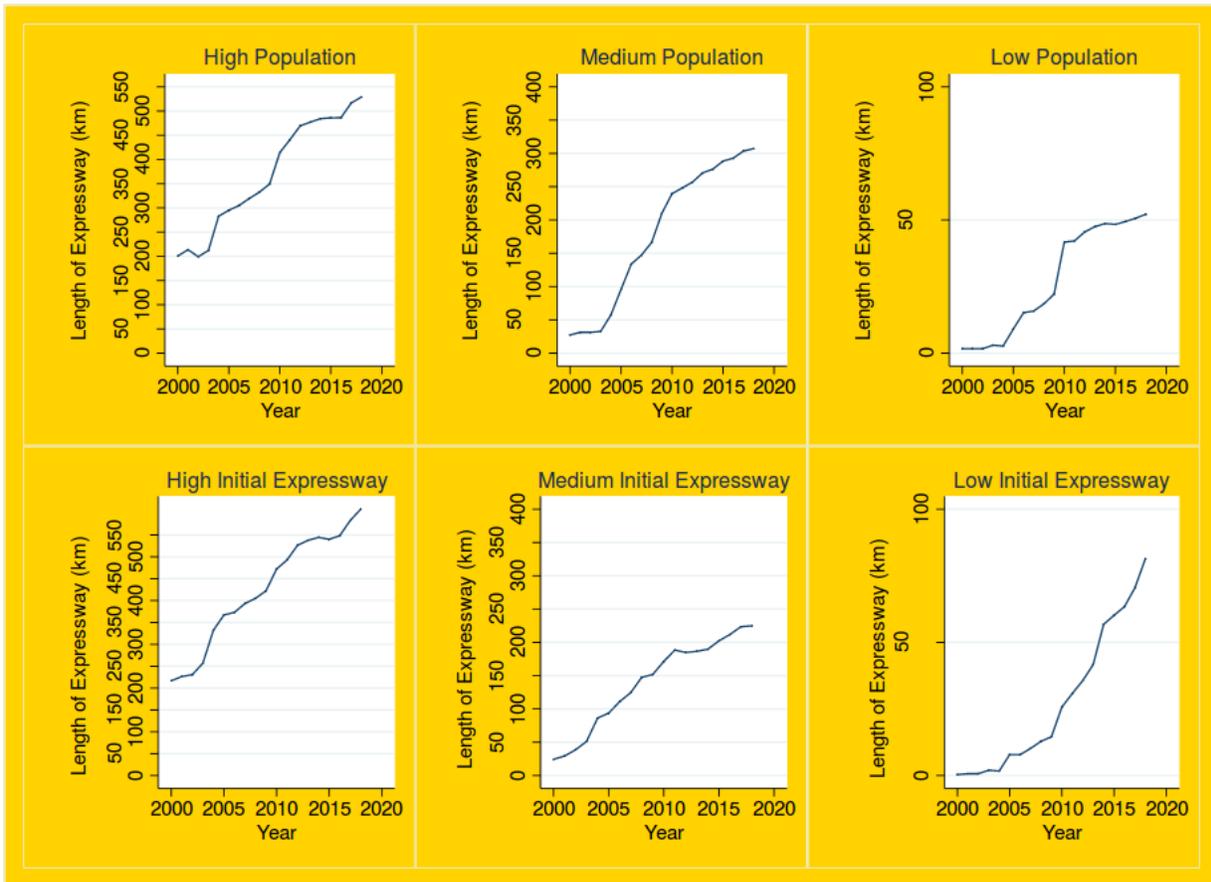
Note: Figure shows predicted (log) length of expressway by distance to Istanbul. Results come from a regression of the length of expressway on distance to Istanbul, year, and an interaction of distance to Istanbul and year. Bars represent 95% confidence intervals clustered at the province level (81 provinces).

**Figure 4:** Evolution of the AKP Vote Share by Initial Population and Expressway Length



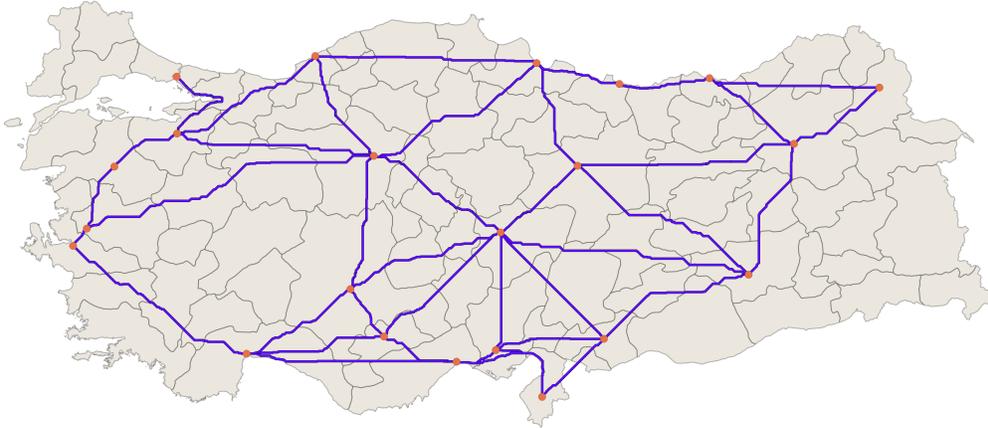
**Notes:** Figure shows the evolution of vote shares for the AKP according to initial population and expressway length in 2002. The 3 initially high population provinces are Istanbul, Ankara, Izmir; medium population provinces are Yozgat, Kutahya, Tekirdag; low population provinces are Tunceli, Bayburt, Kilis. The 3 initially high expressway provinces are Antalya, Izmir, Ankara; medium expressway provinces are Kocaeli, Malatya, Giresun; low expressway provinces are Ardahan, Gumushane, Kilis.

**Figure 5:** Evolution of Expressway by Initial Population and Expressway Length



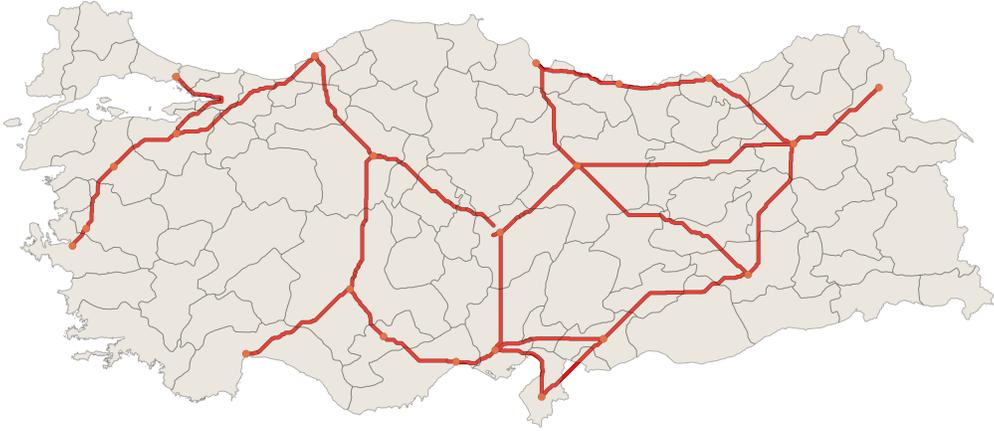
**Notes:** Figure shows the evolution of the expressway according to initial population and expressway length in 2002. The 3 initially high population provinces are Istanbul, Ankara, Izmir; medium population provinces are Yozgat, Kutahya, Tekirdag; low population provinces are Tunceli, Bayburt, Kilis. The 3 initially high expressway provinces are Antalya, Izmir, Ankara; medium expressway provinces are Kocaeli, Malatya, Giresun; low expressway provinces are Ardahan, Gumushane, Kilis.

**Figure 6:** Hypothetical Connection of Major 2000 Cities



**Notes:** Figure shows the least cost path connecting all 22 most populous cities in Turkey in the year 2000, using slopes and land use as measures of cost.

**Figure 7:** Minimum Spanning Tree Connecting Major 2000 Cities



**Notes:** Figure shows the minimum spanning tree of the least cost path connecting all 22 most populous cities in Turkey in the year 2000, using slopes and land use as measures of cost.

**Table 1: Evolution of Expressway by Distance to Istanbul and Year**

Dependent Variable is (Log) Length of Expressways				
	(1)	(2)	(3)	(4)
	Including Istanbul	Excluding Istanbul	Excluding Istanbul	
Log Distance to Istanbul	-6.3963** (2.4539)		-40.9782*** (12.4881)	
X Year	0.0032** (0.0012)	0.0029** (0.0012)	0.0203*** (0.0062)	0.0188*** (0.0063)
Observations	1458	1458	1440	1440
Year FE	Yes	Yes	Yes	Yes
Province FE	No	Yes	No	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results from a regression of the log of the length of expressway on year and province fixed effects, as indicated, log of the province's distance to Istanbul, and an interaction of the distance to Istanbul and year.

**Table 2:** Descriptive Statistics for Province-Level Data

	All	Before AKP (2002)	After AKP	High Expressway (2000) 82 km Mean	Low Expressway (2000) 13 km Mean
	(1)	(2)	(3)	(4)	(5)
Expressway (Length, Km)	170.121 (152.183)	50.737 (54.360)	192.505 (154.199)	233.65 (162.7)	108.14 (110.3)
Road Expenditure (Currency?)	208,000,000 (202,000,000)		208,000,000 (202,000,000)	250000000 (232395569.2)	170000000 (160216412.5)
<b>Political Outcomes</b>					
AKP Vote Share	43.867 (13.906)	32.805 (13.457)	45.711 (13.113)	45.146 (12.46)	42.62 (15.11)
CHP Vote Share	18.092 (13.000)	15.946 (7.394)	18.450 (13.686)	19.876 (12.15)	16.352 (13.57)
HDP Vote Share	8.265 (16.830)	8.923 (13.911)	8.046 (17.717)	16.006 (9.527)	12.791 (11.25)
MHP Vote Share	14.378 (10.55)	9.335 (4.355)	15.219 (11.038)	5.37 (11.82)	11.093 (20.22)
Voter Turnout	83.892 (6.072)	79.059 (5.503)	84.582 (5.835)	84.573 (5.882)	83.226 (6.189)
<b>Economic Outcomes</b>					
GDP Night Lights	6.114 (3.495)	2.643 (1.398)	6.765 (3.385)	6.88 (3.946)	5.34 (2.803)
Industrial Electricity Usage	978,925.4 (1,799,033)	612,813.7 (1,216,356)	1,047,571.0 (1,880,820)	1500000 (2291510.6)	430000 (808647)
Total Electricity Usage	2,069,608.0 (4,043,747)	1,217,151.0 (2,390,727)	2,229,444.0 (4,265,001)	3400000 (5342402.5)	760000 (997981.1)
Unemployment	9.785 (3.980)		9.785 (3.980)	10.068 (3.638)	9.51 (4.274)
Net Out Migration	0.195 (1.435)		0.195 (1.435)	0.09 (0.957)	0.298 (1.777)
<b>Time-Varying Controls</b>					
Population	904,592 (1,550,063)	821,196 (1,186,264)	919,714 (1,607,151)	1400000 (2099257)	390000 (220798.5)
Physicians Per-100 K Population	129.462 (51.083)	99.265 (46.298)	133.488 (50.354)	149.126 (53.29)	110.277 (40.52)
Hospitals Per-100 K Population	2.224 (0.979)	1.956 (0.991)	2.260 (0.972)	2.051 (0.832)	2.393 (1.078)
Hospital Beds Per-100 K Population	232.668 (91.780)	180.564 (83.805)	239.615 (90.585)	256.088 (91.76)	209.819 (85.91)
Students Per-Teacher	15.357 (4.247)	18.148 (4.003)	15.183 (4.202)	14.907 (3.510)	15.796 (4.821)
Number of Motor Vehicles	181.168 (97.843)	108.561 (57.033)	190.244 (98.105)	214.641 (96.88)	148.511 (87.22)
Family Physician Program	0.560 (0.497)	0.000	0.630 (0.483)	0.569 (0.495)	0.551 (0.498)
Any Natural Gas	0.331 (0.471)	0.062 (0.241)	0.391 (0.488)	0.441 (0.497)	0.224 (0.417)
Observations (Max)	1539	243	1296	760	779

**Notes:** Table shows the means and standard deviations (clustered at the province level (81) in parantheses) of variables used in the analyses. The sample consists of the 81 Provinces of Turkey with data from 2000 to 2018, hence a maximum of 1539 province-year observations. Some variables are only available after 2002, hence summary statistics are missing prior to the AKP party coming to power. Variable descriptions and sources are described in the text. Median expressway length in the year 2000 was 44 with a mean of 24, "High Expressway" refers to provinces with above-median expressway length and "Low Expressway" refers to provinces with below-median expressway length.

**Table 3: Balance Test for Construction of Expressways**

	Dependent Variable is (Log) Length of Expressways				
	(1)	(2)	(3)	(4)	(5) Excluding Istanbul
Log of Population	-0.02 (0.0506)	0.2173 (0.6460)	0.5977 (0.7145)	-0.5348 (0.5754)	-0.4821 (0.5838)
Physicians Per-100 K Population	0.0058*** (0.0013)	0.0003 (0.0009)	0.0002 (0.0006)	0.0012 (0.0009)	0.0013 (0.0009)
Hospitals Per-100 K Population	-0.1975* (0.0995)	0.0203 (0.0510)	0.0374 (0.0496)	0.0155 (0.0484)	0.017 (0.0485)
Hospital Beds Per-100 K Population	-0.0022** (0.0011)	-0.0008 (0.0008)	-0.001 (0.0006)	-0.0009 (0.0006)	-0.0009 (0.0006)
Students Per-Teacher	-0.03 (0.0180)	-0.0091 (0.0074)	-0.0024 (0.0077)	0.0019 (0.0108)	-0.002 (0.0128)
Log of Motor Vehicles	0.3792** (0.1479)	0.9981** (0.4828)	0.9296** (0.4331)	0.1626 (0.2467)	0.1393 (0.2487)
Province Has Family Physician Program	-0.10 (0.1374)	-0.0369 (0.0648)	-0.0536 (0.0682)	-0.0102 (0.0590)	0.0139 (0.0582)
Any Natural Gas	0.02 (0.1260)	-0.014 (0.0938)	-0.0006 (0.0606)	-0.0175 (0.0470)	-0.0307 (0.0458)
Joint Significance F-Test	8.45	1.32	1.11	.783	.697
Joint Significance P-Value	0.00	.246	.365	.619	.693
Observations	1457	1457	1457	1457	1439
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Region-Linear Time Trends	No	No	Yes	No	No
Region-Quadratic Time Trends	No	No	Yes	No	No
Region-Year FE	No	No	No	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows how changes in various measures of economic development and performance are related to year-to-year changes in the construction of expressways for the 81 provinces of Turkey. Estimates account for a variety of province (81) and region (12) time (18) trends. The last column shows that results are robust to excluding the economically and politically important Istanbul.

**Table 4: Effects of Expressway Expansions on Voting Preferences**

	(1)	(2)	(3)	(4)
Dependent Variable is Vote Share of the AKP				
Log of Expressway	3.1507*** (1.0351)	3.4383*** (1.1224)	3.4377*** (1.1716)	2.6692** (1.2682)
Local Elections	-21.5969*** (8.0751)	16.0538* (8.7310)	16.8478 (10.9605)	-19.4635 (13.4766)
Observations	567	567	567	567
Dependent Variable is Vote Share of the CHP				
Log of Expressway	-4.9888*** (0.9651)	-3.6593*** (0.8148)	-3.1716*** (0.9625)	-3.7685*** (0.9895)
Local Elections	-5.2137 (13.0795)	16.7939 (14.7593)	21.0967 (16.0443)	19.0126 (18.2617)
Observations	567	567	567	567
Dependent Variable is Vote Share of the MHP				
Log of Expressway	-1.3313 (1.0599)	-0.6062 (1.0871)	-1.0213 (1.1044)	-0.9629 (1.0354)
Local Elections	-5.2815 (9.1656)	-7.8066 (16.6216)	-7.6663 (15.9981)	17.6012 (18.8335)
Observations	567	567	567	567
Dependent Variable is Vote Share of the HDP				
Log of Expressway	-1.4188 (0.8646)	-0.7711 (1.0497)	-0.2188 (1.1524)	-0.7172 (1.0293)
Local Elections	-10.1278*** (2.5736)	-8.1857*** (1.3780)	-7.4464 (5.1673)	0 (.)
Observations	324	324	324	324
Dependent Variable is Rate of Voter Turnout				
Log of Expressway	0.3456 (0.4926)	-0.9188 (0.5570)	-0.5474 (0.5610)	-0.4953 (0.6200)
Local Elections	7.4652 (5.0210)	-4.5588 (4.2526)	-2.0347 (4.2118)	-9.0017** (3.9436)
Observations	567	567	567	567
Time-Varying Controls	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Region-Linear Time Trends	No	Yes	Yes	No
Region-Quadratic Time Trends	No	Yes	Yes	No
Region-Year FE	No	No	No	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on voting preferences, using data from 81 Turkish provinces, national, and local elections, in the years 2002, 2004, 2007, 2009, 2011, 2014, and 2015. The HDP was restricted from two election cycles, hence the smaller number of observations. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for a combination of province, (81), region (12), and time (18) trends, as indicated in the Table. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include log of total population, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line.

**Table 5: Effects of Expressways on Voting Preferences: Robustness to Differential Trends**

Initial AKP Vote Share-Specific Time Trends					
	Vote Share				Voter Turnout
	AKP (1)	CHP (2)	MHP (3)	HDP (4)	(5)
Linear Time Trends					
Log of Expressway	3.7912* (1.9632)	-4.5533*** (1.5027)	-0.4869 (1.6716)	1.2674 (1.9570)	0.0762 (1.1803)
Quadratic Time Trends					
Log of Expressway	3.3002* (1.8699)	-4.6371*** (1.5415)	-0.4684 (1.6725)	1.6137 (1.9943)	0.1646 (1.1733)
Quadratic Time Trends and Time-Varying Controls					
Log of Expressway	2.9713* (1.7319)	-4.7317*** (1.5656)	0.2119 (1.6354)	1.9692 (2.6337)	-0.4459 (0.7005)
Province-Specific Time Trends					
	Vote Share				Voter Turnout
	AKP (1)	CHP (2)	MHP (3)	HDP (4)	(5)
Linear Time Trends					
Log of Expressway	3.3259* (1.9344)	-3.2303*** (0.9822)	-1.1266 (1.5881)	0.0495 (3.4647)	0.3665 (0.5839)
Quadratic Time Trends					
Log of Expressway	3.3387* (1.9328)	-3.2363*** (0.9822)	-1.1353 (1.5900)	0.0418 (3.4593)	0.3625 (0.5832)
Time Trends and Time-Varying Controls					
Log of Expressway	3.1888 (2.2054)	-3.0768** (1.3288)	-0.7174 (1.6602)	-2.9345 (4.6735)	0.1328 (0.6703)
Observations	567	567	567	324	567
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows estimated effects of changes in the length of expressway on voting preferences, using data from 81 Turkish provinces from 2000 to 2018, and accounting for differential time trends across provinces by initial vote for the AKP and province-specific time trends. All estimates control for province and time fixed effects. All models control for a 1-year lag of total expressway length and an indicator for whether the election is a local election. Time varying controls include total expenditure on all types of roads, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

**Table 6:** Placebo Test: Effects of Expressways on Voting Preferences (3-year Treatment Leads)

	AKP (1)	Vote Share CHP (2) MHP (3)		HDP (4)	Voter Turnout (5)
Log of Expressway (3-year Lead)	-4.1463 (3.2190)	-0.6385 (1.3541)	1.3688 (1.6976)	2.3129 (1.9532)	0.587 (0.9971)
Observations	405	405	405	162	405
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results of a placebo test of future changes in the length of expressway on voting preferences, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

**Table 7: Implicit Regression Weights and Indicators of Larger Effect sizes**

	Coefficient	SE	T-stat	Correlation
Log of Expressway	0.005	0.004	1.306	0.077
Year	-0.030	0.027	-1.136	-0.096
Middle Initial Population	-0.001	0.001	-1.091	-0.021
Middle Initial Urbanization	0.0005	0.001	-0.738	-0.015
Night Lights per Capita	-0.266	0.240	-1.111	-0.125
Observations	567	567	567	567
Time-Varying Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows computed implicit weights in computing the point estimate for the effect of expressways on AKP vote shares in Equation (1), using the methodology described in [de Chaisemartin et al. \(2019\)](#). The estimated weights are then compared to different variables that might determine the size of the effect—log of expressway, year, middle initial urbanization and population, and output per capita as measured by night lights. Regressions control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for a combination of region (12), and time (18) trends, as indicated in the Table. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include the log of population, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line.

**Table 8:** Effects of Expressways on Voting Preferences in 2014: Cross-Sectional Estimates

	(1)	(2)	(3)	(4)	(5)
	AKP	Vote Shares for CHP	MHP	HDP	Voter Turnout
2014 Log of Expressway	5.6490** (2.1390)	-8.4699*** (2.5437)	-0.9002 (2.8054)	-0.6173 (1.2077)	-0.0632 (0.3945)
Control Variables	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.143	0.438	.133	0.056	0.614
Estimates Controlling for Lag of Outcomes					
	AKP	Vote Shares for CHP	MHP	HDP	Voter Turnout
2014 Log of Expressway	2.5773* (1.4740)	-5.9474*** (1.9603)	1.0778 (2.5406)	-1.039 (1.1991)	(0.3841)
2002 AKP	0.6550*** (0.0692)				
2002 CHP		1.4357*** (0.1940)			
2002 MHP			1.6568*** (0.3722)		
2002 HDP				0.1440** (0.0697)	
2002 Turnout					0.1326** (0.0571)
Control Variables	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.618	0.681	.320	0.108	0.641
Computation of <a href="#">Oster (2017)</a> Bound					
Oster (2018) Estimate	1.835	-8.444	1.817	-1.299	-0.537
Max R <sup>2</sup>	0.803	0.885	0.416	0.141	0.833
Observations	81	81	81	81	

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of the length of expressway on voting preferences in 2014, using data from 81 Turkish provinces. All regressions also control for total expenditure on all types of roads. Control Variables refer to 2002 controls for various other measures of economic development and public investment. These include the log of population, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line. The bottom panel shows robustness to omitted unobservables following the methodology in [Oster \(2017\)](#).

**Table 9:** Effects of Expressways on Economic Performance and Voting Preferences in 2014: Cross-Sectional IV Estimates

	(1)	(2)	(3)	(4)	(5)
	AKP	Vote Shares for CHP	MHP	HDP	Voter Turnout
2014 Log of Expressways	21.6288*** (8.1114)	-11.3382 (7.3247)	-0.1037 (8.0130)	-3.2476 (3.5578)	1.2399 (1.2075)
Observations	81	81	81	81	81
Control Variables	Yes	Yes	Yes	Yes	Yes
First-Stage Estimates: Dependent Variable is Log of Expressways in 2014					
Length of Least Cost Path			0.0011*** (0.0003)		
Log of Population			0.0168** (0.0064)		
Hospitals Per-100 K Population			-0.0823 (0.1155)		
Hospital Beds Per-100 K Population			0.0006 (0.0012)		
Students Per-Teacher			-0.0071 (0.0208)		
Log of Motor Vehicles			0.0039*** (0.0014)		
Any Natural Gas			-0.4015 (0.3374)		
Observations			81		
Weak ID F-Stat			9.1		
Control Variables			Yes		
			Weak Instrument Robust Inference		
Anderson et al. (1949) F-stat	12.02	1.959	0	0.806	1.108
Anderson et al. (1949) P-value	0.001	0.166	0.99	0.372	0.296
Stock & Wright (2000) F-stat	11.452	2.116	0	0.884	1.212
Stock & Wright (2000) P-value	0.001	0.146	0.99	0.347	0.271

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results from instrumental variable estimates of the effects of the length of expressway on economic performance and voting preferences in 2014, using data from 81 Turkish provinces. The instrument is the length of the minimum spanning tree (MST) connecting all large cities as at 1990, as described in the text. All regressions also control for total expenditure on all types of roads. Control Variables refer to 2002 controls for various other measures of initial economic development and public investment. These include initial 2002 levels of physicians per capita, hospitals per capita, hospital beds per capita, students per teacher, the log of total motor vehicles, within the province, and presence of a natural gas line. The log of total population is also included as a control in estimates of electricity usage, migration, and voting preferences.

**Table 10: Effect of Expressway Expansions on Economic Performance**

	(1)	(2)	(3)	(4)
Dependent Variable is Log Night Lights per Capita				
Log of Expressway	-0.1109*	-0.1513*	-0.1673**	-0.1026
	(0.0660)	(0.0833)	(0.0777)	(0.0705)
Dependent Variable is Industrial Electricity Usage				
Log of Expressway	0.1732**	0.1759**	0.2018**	0.1917*
	(0.0718)	(0.0789)	(0.0820)	(0.0970)
Dependent Variable is Total Electricity Usage				
Log of Expressway	0.0132	0.0326	0.0423	0.0367
	(0.0330)	(0.0326)	(0.0305)	(0.0355)
Dependent Variable is the Unemployment Rate				
Log of Expressway	-0.0168	-0.5325*	0.0074	0.0459
	(0.2504)	(0.2984)	(0.3876)	(0.3174)
Dependent Variable is Net Emigration				
Log of Expressway	0.3495***	0.1689	0.1226	0.2155*
	(0.1152)	(0.1048)	(0.0959)	(0.1088)
Observations	1458	1458	1458	1458
Time-Varying Controls	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Region-Linear Time Trends	No	Yes	Yes	No
Region-Quadratic Time Trends	No	Yes	Yes	No
Region-Year FE	No	No	No	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on various measures of economic performance, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for a combination of province, (81), region (12), and time (18) trends, as indicated in the Table. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line. The log of total population is also included as a control in models for electricity usage, unemployment rates, and migration rates.

**Table 11:** Effects of Expressways on Voting Preferences: Differences by Welfare Party Vote in 1994

	Vote Share				Voter Turnout (5)
	AKP (1)	CHP (2)	MHP (3)	HDP (4)	
Log of Expressway X High	4.6272* (2.3796)	-4.8136*** (1.7654)	1.0609 (2.1290)	3.1906 (3.1606)	-1.5926** (0.7783)
Log of Expressway X Medium	2.8114 (2.7787)	-4.9039** (1.9948)	1.6671 (2.1994)	2.2714 (2.7940)	-1.9945** (0.8092)
Log of Expressway X Low	3.0255 (2.3272)	-1.2796 (1.9353)	1.9831 (2.2372)	2.5072 (3.2460)	-1.6823** (0.6799)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results of effects of expressway expansions on voting preferences, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

**Table 12:** Expressways and Voting Preferences: Excluding Key Provinces and Regions

	AKP (1)	Vote Share			Voter Turnout (5)
		CHP (2)	MHP (3)	HDP (4)	
Panel 1: Excluding Istanbul					
Log of Expressway	3.1106** (1.2020)	-2.4806** (0.9499)	-1.8191* (1.0813)	-0.8125 (1.1624)	-0.8246 (0.5748)
Observations	560	560	560	320	560
Panel 2: Excluding Marmara Region					
Log of Expressway	3.0206** (1.3008)	-2.1830** (0.9289)	-2.0642* (1.1765)	-1.0282 (1.3138)	-0.6269 (0.5830)
Observations	469	469	469	268	469
Panel 3: Excluding Istanbul, Ankara, Izmir					
Log of Expressway	2.6318** (1.0900)	-2.1058** (0.9472)	-1.8039* (0.9060)	-1.2791 (1.2609)	-0.5966 (0.5663)
Observations	546	546	546	312	546
Panel 4: Excluding Central Anatolia Region					
Log of Expressway	4.0643*** (1.2171)	-3.2481*** (1.0353)	-0.6944 (1.1402)	-0.6743 (1.2910)	-0.9099 (0.5530)
Observations	511	511	511	292	511
Panel 5: Excluding West Region					
Log of Expressway	3.4429** (1.4028)	-1.7799* (0.9591)	-2.5389** (1.2233)	-1.1876 (1.4455)	-0.4131 (0.6298)
Observations	413	413	413	236	413
Panel 6: Restricting to Marmara, Aegean, and Mediterranean, Regions					
Log of Expressway	4.3618** (1.6186)	-5.9139*** (1.8490)	1.3425 (1.8617)	-0.1334 (0.7855)	-0.314 (1.1591)
Observations	210	210	210	120	210
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on voting preferences, using data from 81 Turkish provinces from 2000 to 2018, excluding a number of economically and politically important provinces and regions. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, an indicator for local elections, and the log of total population.

**Table 13:** Expressways and Voting: Differences by Initial Urbanization and Population Tertiles

	Heterogenous Effects by Initial Urbanization (2000)				
	(1)	(2)	(3)	(4)	(5)
	AKP	Vote Shares for			Voter
		CHP	MHP	HDP	Turnout
Log of Expressway X Top	2.119 (1.5326)	-3.7726*** (1.0066)	-0.0158 (1.0666)	-0.2004 (1.5588)	0.2484 (0.6411)
Log of Expressway X Middle	4.1713*** (1.2194)	-3.6972*** (0.9929)	-0.8427 (1.2537)	0.0185 (1.3032)	-0.3901 (0.6837)
Log of Expressway X Bottom	2.9407** (1.2167)	-2.8135** (1.1725)	-1.0828 (1.1639)	-0.5833 (1.3656)	-0.9990** (0.4659)
Observations	567	567	567	324	567
	Heterogenous Effects by Initial Population (2002)				
	(1)	(2)	(3)	(4)	(5)
	AKP	Vote Shares for			Voter
		CHP	MHP	HDP	Turnout
Log of Expressway X Top	3.8028** (1.5246)	-4.9907*** (0.9730)	-0.8566 (1.4513)	-0.2964 (1.4004)	-0.5239 (0.8389)
Log of Expressway X Middle	3.6992** (1.5004)	-2.8039*** (0.9614)	-1.8485 (1.1459)	0.1317 (1.3889)	-0.7424 (0.7138)
Log of Expressway X Bottom	2.9887** (1.2511)	-2.2228* (1.1887)	-0.0773 (1.1456)	-0.4779 (1.0971)	-0.2974 (0.6530)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on voting preferences, according to initial province urbanization rate and population size (2002), using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for a combination of region (12), and time (18) trends, as indicated in the Table. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include the log of population, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line.

**Table 14:** Invisible Investment: Effects of Natural Gas on Voting Preferences

	AKP (1)	Vote Share CHP (2) MHP (3)		HDP (4)	Voter Turnout (5)
Any Natural Gas	-1.0375 (1.2651)	-0.7023 (0.9650)	-0.1082 (0.9138)	-0.4318 (2.5172)	0.0037 (0.4532)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results of changes in natural gas adoption on voting preferences, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

# Appendices

**Table A1:** Placebo Test: Effects of Expressways on Economic Performance (3-year Treatment Leads)

	Per-Capita Night Lights (1)	Electricity Usage Industrial (2)	Electricity Usage Total (3)	Unemployment (4)	Net Emigration (5)
Log of Expressway (3-year Lead)	0.0564 (0.0481)	-0.0337 (0.0729)	0.0411 (0.0347)	-0.033 (0.3920)	0.0528 (0.1246)
1296	1296	1296	1296	1215	
Observations	1296	1296	1296	1296	1215
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results of a placebo test of future changes in the length of expressway on various measures of economic performance, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line. The log of total population is also included as a control in models for electricity usage, unemployment rates, and migration rates.

**Table A2:** Effect of Expressway Expansions on Economic Outcomes: Differences by Initial Urbanization and Population Tertiles

	Heterogenous Effects by Initial Urbanization (2000)				
	(1)	(2)	(3)	(4)	(5)
	Per-Capita Night Lights	Electricity Usage Industrial	Total	Unemployment	Net Emigration
Log of Expressway X Top	-0.1586** (0.0627)	0.1540* (0.0902)	0.0165 (0.0431)	-0.1105 (0.6137)	-0.1245 (0.1272)
Log of Expressway X Middle	-0.1566** (0.0692)	0.1974*** (0.0677)	0.0362 (0.0294)	-0.1468 (0.3612)	0.1269 (0.0854)
Log of Expressway X Bottom	-0.1699 (0.1270)	0.1963* (0.1040)	0.0518 (0.0351)	-0.3978 (0.3642)	0.2480** (0.1025)
Observations	1458	1458	1458	1458	1458

	Heterogenous Effects by Initial Population (2002)				
	(1)	(2)	(3)	(4)	(5)
	Per-Capita Night Lights	Electricity Usage Industrial	Total	Unemployment	Net Emigration
Log of Expressway X Top	-0.1613** (0.0679)	0.1371* (0.0695)	0.027 (0.0354)	-0.1451 (0.5135)	0.1836 (0.1425)
Log of Expressway X Middle	-0.2192* (0.1227)	0.1516* (0.0839)	0.0381 (0.0368)	0.2165 (0.4604)	0.2321** (0.1113)
Log of Expressway X Bottom	-0.0951** (0.0454)	0.2918** (0.1167)	0.0566 (0.0405)	-0.1628 (0.3256)	-0.0742 (0.1041)
Observations	1458	1458	1458	1458	1458

Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on various measures of economic performance and performance, according to initial urbanization and population, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for a combination of region (12), and time (18) trends, as indicated in the Table. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, and presence of a natural gas line. The log of total population is also included as a control in models for electricity usage, unemployment, and migration rates.

**Table A3: Expressways and Economic Performance: Excluding Key Provinces and Regions**

	Per-Capita Night Lights (1)	Electricity Usage Industrial (2)	Electricity Usage Total (3)	Unemployment (4)	Net Emigration (5)
Excluding Istanbul					
Log of Expressway	-0.1181 (0.0870)	0.1910* (0.1029)	0.0377 (0.0375)	-0.2041 (0.4090)	0.1938** (0.0937)
Observations	1440	1440	1440	1440	1440
Excluding Marmara Region					
Log of Expressway	-0.1373 (0.0968)	0.1836 (0.1155)	0.0253 (0.0410)	-0.0805 (0.4384)	0.2032** (0.1017)
Observations	1206	1206	1206	1206	1206
Excluding Istanbul, Ankara, Izmir					
Log of Expressway	-0.1243 (0.0979)	0.2128** (0.1057)	0.032 (0.0381)	-0.3073 (0.3798)	0.1217 (0.0856)
Observations	1404	1404	1404	1404	1404
Excluding Central Anatolia Region					
Log of Expressway	-0.1112** (0.0452)	0.1957** (0.0902)	0.0361 (0.0333)	-0.0268 (0.4216)	0.1366 (0.1013)
Observations	1314	1314	1314	1314	1314
Excluding West Region					
Log of Expressway	-0.1485 (0.1076)	0.1632 (0.1238)	0.0081 (0.0429)	0.0386 (0.4367)	0.1549 (0.1100)
Observations	1062	1062	1062	1062	1062
Restricting to Marmara, Aegean, and Mediterranean, Regions					
Log of Expressway	-0.0974*** (0.0351)	0.2359*** (0.0665)	0.1210*** (0.0393)	-1.0346 (0.6803)	-0.0198 (0.1612)
Observations	540	540	540	540	540
Excluding East and Southeast Anatolia Region					
Log of Expressway	-0.1579 (0.1077)	0.2478*** (0.0830)	0.0975*** (0.0288)	0.2536 (0.7758)	-0.2496 (0.2012)
Observations	1026	1026	1026	1026	1026
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows the estimated effects of changes in the length of expressway on various measures of economic performance, using data from 81 Turkish provinces from 2000 to 2018, excluding a number of economically and politically important provinces and regions. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and the log of total population except for GDP and Night lights per-capita.

**Table A4:** Effects of Expressway on Voting Outcomes: Controlling for Key Economic Outcomes

	AKP (1)	Vote Share			Voter Turnout (5)
		CHP (2)	MHP (3)	HDP (4)	
Controlling for Night Lights per Capita					
Log of Expressway	2.5174** (1.2256)	-3.1791*** (1.0515)	-0.4923 (1.2446)	-1.5668 (1.2674)	-0.7655 (0.5857)
Log Night Lights per Capita	-11.6744*** (2.5119)	-0.0943 (2.8700)	6.7112** (3.0134)	-15.1089* (7.9101)	-2.7674** (1.2992)
Controlling for Industrial Electric Usage					
Log of Expressway	3.1689*** (1.1632)	-2.9364*** (0.9766)	-1.236 (1.0590)	0.4605 (1.1753)	-0.4933 (0.5573)
Industrial Electric	1.287 (0.9719)	-1.1264 (0.6943)	1.0281 (0.6188)	-2.4619* (1.2742)	-0.2592 (0.3782)
Controlling for Net Outmigration					
Log of Expressway	3.4464*** (1.1729)	-3.1652*** (0.9696)	-1.0141 (1.0928)	-0.3051 (1.1437)	-0.5438 (0.5612)
Net Outmigration	-0.3628 (0.5652)	-0.2693 (0.6863)	-0.3021 (0.6972)	1.1129 (1.4620)	-0.1508 (0.2521)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows how effects of the expressway on voting changes when we control for some economic outcomes. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

**Table A5: Effects of Expressway on Voting Outcomes: Interaction with Economic Outcomes**

	AKP (1)	Vote Share CHP (2) MHP (3)		HDP (4)	Voter Turnout (5)
Interaction with Night Lights per Capita					
Log of Expressway	3.1182** (1.4574)	-2.9209** (1.3442)	-1.3208 (1.3274)	-1.4492 (1.3842)	-1.114 (0.7488)
X Log Night Lights per Capita	-0.6153 (0.8528)	-0.2644 (0.6669)	0.8484 (0.6585)	-0.1604 (1.2123)	0.3568 (0.4042)
Log Night Lights per Capita	-8.7698* (4.5262)	1.154 (4.5036)	2.7057 (4.2873)	-14.4822** (6.8533)	-4.4519* (2.2517)
Interaction with Industrial Electric Usage					
Log of Expressway	1.4953 (3.5460)	-1.2048 (2.6871)	-1.1725 (2.3599)	-0.9221 (3.0342)	-1.7079 (1.1840)
X Industrial Electric	0.1484 (0.2891)	-0.1535 (0.2164)	-0.0056 (0.2013)	0.12 (0.2661)	0.1077 (0.1115)
Industrial Electric	0.6942 (1.3070)	-0.5132 (1.1130)	1.0506 (0.8793)	-2.9150** (1.2385)	-0.6894 (0.5117)
Interaction with Net Outmigration					
Log of Expressway	3.4592*** (1.1794)	-3.1909*** (0.9831)	-0.9966 (1.0918)	-0.1905 (1.0756)	-0.5348 (0.5512)
X Net Outmigration	-0.3694 (0.5980)	0.7424 (0.6280)	-0.5016 (0.7145)	-1.2555 (1.2929)	-0.2579 (0.2047)
Net Outmigration	1.6338 (3.2503)	-4.2819 (3.3963)	2.409 (3.5401)	7.641 (6.7068)	1.243 (1.0208)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows how effects of the expressway on voting changes by different economic outcomes. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.

**Table A6: Invisible Investments: Effects of Family Physician Program on Voting Preferences**

	AKP (1)	Vote Share CHP (2) MHP (3)		HDP (4)	Voter Turnout (5)
Family Physician Program	-1.6536 (1.0730)	0.8316 (1.8117)	2.1918 (1.8475)	-3.5433** (1.7435)	-0.5344 (0.4351)
Observations	567	567	567	324	567
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Region-Linear Time Trends	Yes	Yes	Yes	Yes	Yes
Region-Quadratic Time Trends	Yes	Yes	Yes	Yes	Yes

**Notes:** \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Standard errors clustered at the province level (81) in parentheses. Table shows results of changes in presence of the family physician program on voting preferences, using data from 81 Turkish provinces from 2000 to 2018. All estimates control for province and time fixed effects. All regressions also control for total expenditure on all types of roads and a 1-year lag of total expressway length. Estimates account for region-specific linear and quadratic time trends. Time-Varying Controls refer to annual controls for various other measures of economic development and public investment. These include an indicator for local elections, physicians per capita, hospitals per capita, students per teacher, the log of total motor vehicles, the presence of a family physician program within the province, presence of a natural gas line, and log of total population.