Political Institutions, Public Goods, and Migration*

Veda Narasimhan†

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Abstract

Institutions play a crucial role in shaping economic growth, not only through governance and policy but also by influencing migration patterns, which serve as a key mechanism for economic mobility and structural transformation. The role of institutions in shaping economic growth has been well-documented, but their effect on migration remains relatively under-explored. This paper looks at the role that proximity to local political institutions plays in generating changes in rural-rural and rural-urban migration, focusing on the causes and consequences of this phenomenon. Using a 1992 reform in India that decentralized power to local village councils, I look at how the introduction of these councils, and the degree of independence of these villages, impacted migration patterns both within rural areas, and towards urban areas. I find that villages with an independent political unit have higher population growth, and using a novel aggregate RDD methodology, I show that districts with a higher share of independent village councils also have higher degrees of urban migration and lower rates of long-term rural migration. Finally, I provide evidence that this is likely driven by independent villages having marginally differential economic activity and a greater provision of infrastructure-related public goods.

Keywords: migration, local economic development, political institutions
JEL codes: R11, R12, R23, O43

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†Department of Economics, New York University - Abu Dhabi, veda.narasimhan@nyu.edu

1 Introduction

Migration has traditionally been seen as a key driver of economic transformation (Lewis et al., 1954; Harris and Todaro, 1970), and while most work has focused on the impacts of rural-to-urban migration, rural-rural migration—movements between villages or other non-urban settlements— is also a significant phenomenon. These migration flows play an important role in the allocation of labor and resources, connecting rural economies and fostering localized economic growth. Political institutions play a pivotal role in shaping these migration patterns and the spatial distribution of economic activity, acting as drivers in the process of development. Locations with high-density populations often form around political institutions, and this is often an important consideration in the location choice decision for migrants. We know surprisingly little though about how local institutions interact with migration and the ways in which they may impact structural transformations at the local-level and beyond. This paper investigates how decentralizing political institutions impacts both rural-rural and rural-urban migration, affects local development, and generates disparities in growth across regions.

I take advantage of a federal reform in India that decentralized power to village-level units to measure the effect of differing degrees of decentralization on both local and aggregate outcomes. I focus on the effect of political decentralization on population movements, specifically the effect that it has on moving individuals between rural and urban areas, given that urbanization is considered one of the key drivers of growth. In 1992 the government passed the 73^{rd} Amendment to the Indian constitution, which established the legal and political existence of village-level councils (also known as Gram Panchayats, or GPs), and brought them into the democratic process whilst increasing their financial, administrative, and political independence. This federal reform from the nineties devolved power to local political institutions and created a three-tier political system with the village council as its smallest elected unit. From introducing elections at the local government level, to devolving responsibility of multiple aspects of governance, such as taxation, education, and local economic development, this system resulted in a significant shift in the potential of these local government units.

The state of Uttar Pradesh used population thresholds to determine which villages would receive their own GP. Villages below the threshold ended up sharing a government unit with other villages, whilst villages above the threshold were more likely to receive their own local council. This threshold gives me a clean identification strategy, hence I focus only on this state. Using this identification allows me to measure the effect of different intensities of decentralization, and more importantly, it allows me to aggregate my empirical strategy to the district-level in order to analyze large-scale impacts. I implement a fuzzy RDD at the village-level, and use the population threshold as an instrument to predict the likelihood that a village receives its own council. I then build on that empirical strategy by aggregating the RDD up to the district-level and using it to identify some of the causal impacts on the aggregate level.

I generate a measure of the share of treated villages within the RDD population bandwidth, and by using the RDD structure I control for some endogeneity concerns when analyzing the district-level consequences of the rural development program. I test my population variable to ensure there are no discontinuous jumps at the thresholds, and that the cutoff is a strong predictor for treatment status.

The exact effect of decentralization on local outcomes is an empirical question, but understanding village-level changes gives us important insights into how populations move. Models of location choice as seen in Bryan and Morten (2019), based on Eaton and Kortum (2002) and Allen and Arkolakis (2014) tell us that individuals value amenities and income opportunities. In order to capture some of these effects, I focus on developmental outcomes associated with these indicators - public goods, durable consumption, and economic activity. Given improvements in these categories, these location choice models give us predictions on how we would expect individual's to move. Higher levels of development make these locations more attractive locations for individuals to move to, and given sufficient improvements, we may expect individuals to substitute away from urban migration if the benefits of remaining in rural areas is sufficiently high.

Using this setting, my treatment captures the degree to which villages have access to political institutions, measured by having an independent village council. There is already evidence that polity size matters for public good outcomes (Narasimhan and Weaver, 2024), and we also know that proximity to political centers matters for outcomes (Dahis and Szerman, 2020), and this treatment captures the joint effect of both of these types of treatment.

I find that independent villages have higher rates of population growth, but these changes in rural population are driven by a reshuffling between rural areas, rather than substitution away from urban migration. I show these effects are emphasized at the district-level, and result in a positive impact on district GDP. These changes are correlated with improvements in public good provision, and changes in economic activity at the local level. The results suggest that decentralization not only fosters economic development at the village level, but also has positive effects on urbanization and growth.

The changes in the rural population at the village-level could be driven by two potential channels. First, that individuals may be substituting away from rural-urban migration, which could have negative consequences on aggregate growth. Alternatively, it could be driven by a re-optimization of rural populations from control villages to treated ones. I test both these channels with district-level migration data using my aggregated RDD strategy, and find no evidence of substitution away from urban migration. This result, taken with the findings in a previous paper (Narasimhan and Weaver (2024)) of increased educational provision as a public good and increased durable consumption in treated villages, is consistent with the idea that rural development may help to reduce migration frictions associated with urban migration. Combined with the findings of a positive effect on district-level GDP, these results suggest that rural development has indirect benefits to aggregate growth and migration that may not be captured when directly measuring development outcomes.

This paper bridges two strands of literature that have not been traditionally studied together. First, I contribute empirically to the research that has been conducted on the impact of decentralization (e.g. Faguet, 1999; Galasso and Ravallion, 2005; Zhang and Gong, 2005; Dahis and Szerman, 2020, Narasimhan and Weaver, 2024).[1] Additionally, work by Bardhan and Mookherjee (2006) provides an extensive review of advantages and disadvantages of decentralization, suggesting that there may be negative consequences, such as elite capture, that policymakers do not take into account.[2] I contribute to this literature by showing empirical evidence at the village-level of the positive impacts of a comprehensive decentralization reform covering multiple aspects of decentralization.[3] More generally, my findings also provide micro-level support to the literature on democratization and growth (see e.g. Barro, 1996; Glaeser et al., 2004; Acemoglu et al., 2019). In particular, this paper extends the work done by Foster and Rosenzweig (2004), providing support to their findings on public good provision, and adding to the evidence on the link between democratization and growth by showing more generally the aggregate effects of decentralization. My contribution also extends to the literature on the link between political institutions and aggregate growth. Much of the work on how institutions and democracy interact have been conducted at the macro-level (see Barro, 1996; Glaeser et al., 2004; Acemoglu et al., 2019), and my contribution is to micro-found these findings using detailed micro-level data to show the links between decentralization at the village-level and aggregate changes.

The second main strand I contribute to is the literature on the dynamics of rural and urban development, including rural-urban migration. Seminal papers in development economics (Lewis et al., 1954; Harris and Todaro, 1970) highlight the importance of rural-urban migration and the transition from agriculture to manufacturing and services. Lagakos (2020) presents a recent overview of the determinants of rural-urban migration, but does not discuss political institutions, which is the focus of my paper. Additionally, work by Gollin et al. (2014) and argue that despite the large proportion of individuals in the agricultural sector in rural areas, this is often the least productive sector. I build on this finding by arguing that changing economic activity in villages helps to mitigate some of this effect.[4] I additionally contribute to a growing body of empirical work that has delved into the barriers and impact of rural-urban migration (Bryan et al., 2014; Munshi and Rosenzweig, 2016; Bryan and Morten,

[1] Decentralization has also been the subject of extensive theoretical work beginning with Oates et al. (1972), for more recent reviews on the literature, see Gadenne and Singhal (2014) and Mookherjee (2015).

[2] For a detailed discussion on corruption and accountability in decentralization, see Mookherjee et al. (2005).

[3] Several prominent papers have looked into the reservation quota aspect of the same reform I study: Besley et al. (2004), Chattopadhyay and Duflo (2004a), Chattopadhyay and Duflo (2004b), and Besley et al. (2007). These papers do not exploit the variation in decentralization intensity that I use in this paper.

[4] More generally, there is a large literature looks at the spatial misallocation of labor as a barrier to growth. See Munshi and Rosenzweig (2016),Hsieh and Moretti (2019), and Donovan and Schoellman (2021).

2019; Morten, 2019). My results that decentralization may increase rural-urban migration by improving education and relaxing financial constraints in rural areas are consistent with the findings of this literature, and I add to this literature by showing that investments in local areas may help to drive urban migration and contribute to economic growth.

This paper is structured as follows: section 2 gives a background of the reform, and discuss the conceptual framework, while section 3 describes the data sources used in this paper. Section 4 then lays out the empirical strategy in detail followed by section 5 which presents the village-level analysis on rural development. Finally, section 6 looks at the district-level impacts on migration and growth, and section 7 concludes.

2 Decentralization in India

2.1 Background of the Reform

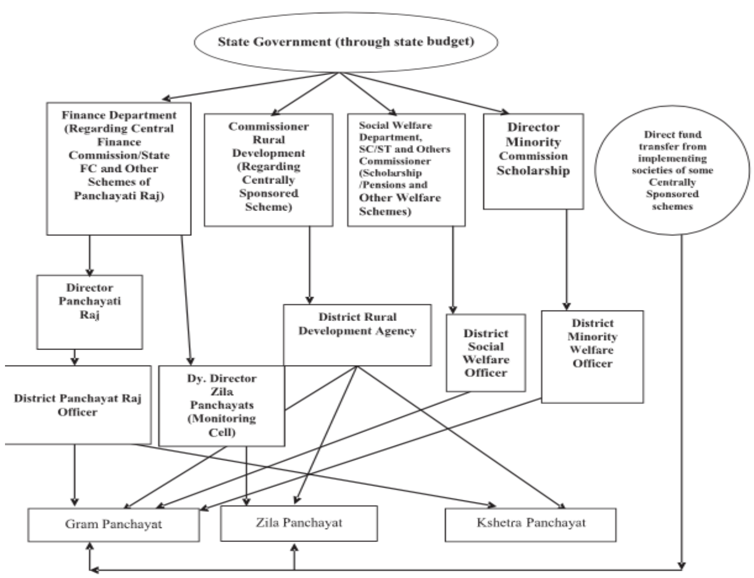
Starting in the early nineties, the Indian government engaged in a series of political and economics reforms intended to bring about aggregate growth and reduce poverty. The focus of these programs was to encourage economic development throughout the country, where the majority of the population resided in rural areas. One of the major reforms was the devolution of power to village-level units as a means to better meet the needs of this large rural population. Many developing countries were engaging in decentralization programs at this time, with countries such as Indonesia and China conducting their own decentralization within this time period. The Indian decentralization differed from other programs in a few key dimensions however. First, the reform was at a much more granular level than the majority of other reforms happening around this period, and second, it was a comprehensive program that covered a large range of different responsibilities.

Throughout India's post-independence period GPs had a limited existence, with the purpose of these councils being relatively limited. They were given very few responsibilities, with generally no political oversight or elections, and were heavily based on traditional systems of village governance such as being led by the elders of the village. During the 1980s, there was a movement to make use of these village councils to reach the large rural population that existed in the country. The key goal behind the potential reformation of these councils was that they would help the central government to encourage targeted growth and poverty reduction in an effective manner.

In 1992 the central government passed the 73^{rd} Amendment to the Indian Constitution. This was a comprehensive decentralization reform covering a multitude of different policies and purposes. The reform resulted in the formation of a three-tier system of governance at the state-level - district, sub-district, and village with a devolution of power and responsibility to the village-level across a set of different areas. This areas that could potentially be covered by the reform were highlight as a part of the 11^{th} schedule which is discussed in detail below. A key component of the reform was the introduction of political elections at the village-level for seats on the villages councils, with certain seats reserved for members of minority communities.

Areas of Decentralization The 11^{th} Schedule was a list of 29 different focus areas that the state-level governments could choose to decentralize to these newly formed village councils. Table 12.1 shows the list of potential activities that could be devolved to village councils, such as agriculture, irrigation, technical training, cottage industries, welfare programs, and public distribution systems. In addition to these key subjects, the GPs were also used to distribute federal funding and programs in order to increase efficiency and targeting. Some of the programs that fell under the purview of the local governments included the National Rural Employment Guarantee Scheme (NREGS) and public distribution systems (for example deciding who qualified for below the poverty line benefits).

Figure 1: Political Structure of the Panchayat System



Source: NITI Aayog.

Uttar Pradesh chose to devolve significant sections of the schedule to the GPs, and chose to include a fairly high degree of financial decentralization to compliment this. The GPs became the central point of contact for determining eligibility to special social support programs such as subsidies for food and rations. In addition, GPs were used to implement state and federal-level policies, such as education. By utilizing the knowledge of local councils, the state and federal governments hoped to increase efficiency and accuracy of social support targeting.

In addition to being used as distribution points, the GPs are also given responsibility of management of certain segments of education, public amenities, and development of local industry.

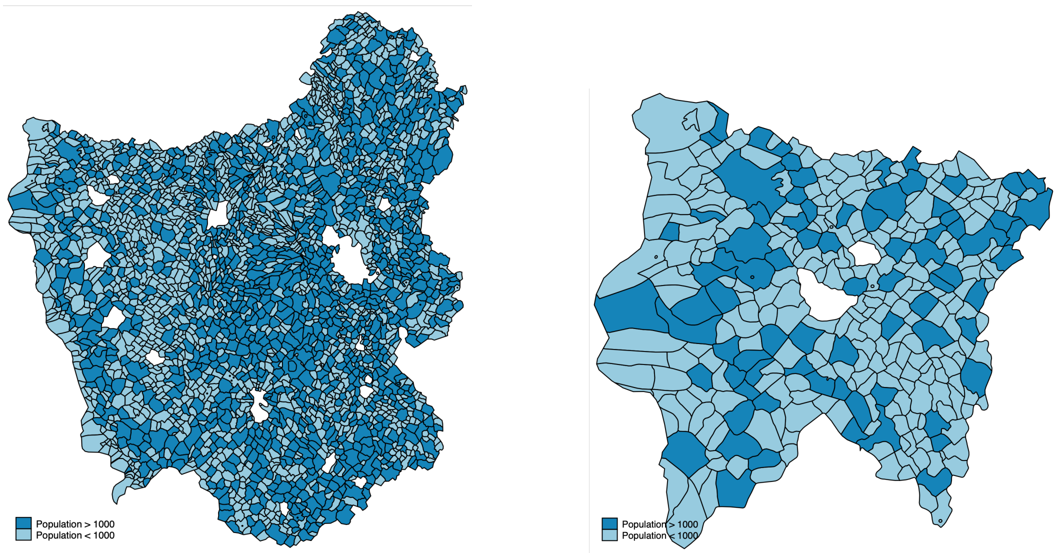
2.2 Implementation of the reform in Uttar Pradesh

Uttar Pradesh is the most populous state in India, however it often ranks low on the development scale relative to other states. Uttar Pradesh ranks near the bottom in terms of literacy, and 79% of the population (according to the 2001 census) still live in rural areas, with the majority of the population are in the agrarian sector.

In 1994 Uttar Pradesh brought into effect the Uttar Pradesh Panchayat Raj Act of 1994, building on their previous act from 1947. They included the new list of devolved functions as well as adjusting the village-council structure and many of the laws regarding the election and responsibilities of the panchayat. The state on paper gave the village councils control over work related to education, drinking water, welfare and child development, medicine and health, agriculture, and village development.

The aspect of this reform that matters for this paper however, is the population thresholds that were used to determine village-level eligibility for political units. Uttar Pradesh not only highlighted these thresholds in their Act, but they were also very effective in implementing it throughout the state. Figure 2 shows the distribution of villages above and below the threshold of 1000 people. As can be seen in the figure, the distribution of the treated versus untreated villages seems relatively random, which is important for the aggregation that I will be doing later in this paper.

Figure 2



(a) District **(b)** Sub-district

Notes: This figure shows the distribution of villages above and below the 1000 threshold in (1) a single district (2) a single subdistrict. The boundaries are determined using the official census maps from 1991. For more information on the underlying spatial data, please see Meiyappan et al. (2018).

3 Data

I use multiple data sources to collect information on both village-level, and district-level outcomes. The base dataset that I use comes from the Indian census data, but I complement this with Migration Census data, and data from ICRISAT. Furthermore, I collect spatial data from SEDAC, and combine all these datasets using both census codes and the SHRUG identifiers. All datasets are explained in detail below.

Census I use three rounds of the census in this project (1991, 2001, 2011). My population estimates for the RDD come from the 1991 census, as well as the majority of my baseline information. The remainder of the census information is used for outcomes and population data. The Indian census takes place every 10 years, and is meant to cover every individual in the country. It contains detailed information at the village-level on amenities, public goods, and population indicators.

SHRUG I use the Asher et al. (2019) SHRUG database to join multiple rounds of the population census and economic census. I can then link this to my district-level data, and ensure consistent merges across all datasets. The consistency over time also ensures that I can link all my datasets through multiple years in a consistent manner.

Migration Census - 2011 The migration census from 2011 gives me a detailed breakdown of rural-rural versus rural-urban migration within-district for the full state of Uttar Pradesh. This migration data is an additional part of the 2011 Indian census, and is available at the district-level. I match the codes using the 2011 census codes, to include this information in my main data.

ICRISAT ICRISAT is the International Crops Research Institute for the Semi-Arid Tropics, and they collect detailed agricultural and socioeconomic information on Indian districts. From the ICRISAT dataset I get detailed information on district-level GDP, broken down by GDP per capita, and different sectors. This dataset also has extensive information on crop productivity for a multitude of different agricultural products.

SEDAC India Shapefiles For all the spatial analysis I conduct in this paper, I use the Columbia SEDAC database and their underlying shapefiles. This gives me the universe of all villages from 1991-2011, with all relevant census identifiers so I can link the files to the rest of my databases. More information on this database is available in Meiyappan et al. (2018).

4 Empirical Methodology

At the village-level I use a fuzzy RDD (Regression Discontinuity Design) to causally identify the impacts of the decentralization reform on village-level outcomes. My treatment effect is determined on whether a village is able to have a solo GP. As Uttar Pradesh used population thresholds to determine which villages would end up independent, there is a clear discontinuity at a 1000 people where the likelihood of having an independent GP jumps. A similar methodology has been used in a previous paper Narasimhan and Weaver (2024) which focuses on the bundle of treatments induced by the reform. This paper focuses more directly on the impact of being an independent local institution. The underlying assumption here is that there are no significant underlying differences between the villages just above and below the cut-off prior to the implementation of the reform. I conduct a series of extensive robustness checks to ensure that my regression discontinuity is valid.

In order to generate an aggregate measure of the intensity of decentralization at the district-level, I build an aggregated RD instrument to identify the impacts of the intensity of decentralization on aggregate growth and migration. The aggregated instrument takes advantage of the randomization induced around the threshold to instrument for the distribution of GPs at the district-level.

4.1 Identification - RDD

I use the population threshold of 1000 people as an instrument for my main treatment - having a solo GP - and the first-stage looks at the likelihood that a village above the cut-off is selected into being treated. This gives me the following two estimable equations:

First-stage:

$$D_{v,g} = \alpha_0 + \alpha_1 C[pop_{v,g} \geq 0] + u_{v,g} \text{ if } pop_{v,g} \in [\underline{pop}, \overline{pop}] \tag{1}$$

Second-stage:

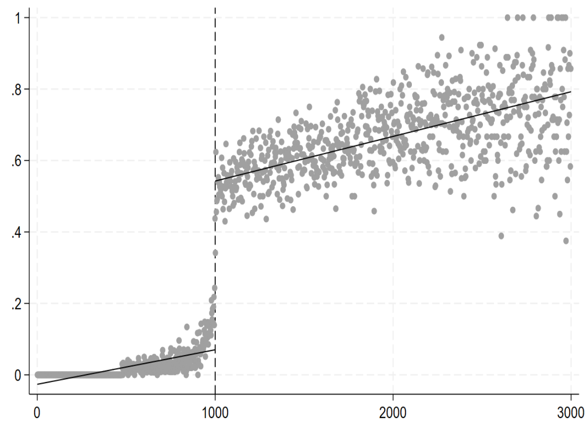
$$Y_{v,g} = \beta_0 + \beta_1 pop_{v,g} + \delta \hat{D}_{v,g} + \beta_2 pop_{v,g} * \hat{D}_{v,g} + \epsilon_{v,g} \text{ if } pop_{v,g} \in [\underline{pop}, \overline{pop}] \tag{2}$$

Where $D_{v,g}$ is the status of being "treated" (which here is defined as a village with a solo panchayat) for village v in GP g, Y_v is the outcome of interest, $C[pop_v \geq 0]$ is a dummy indicator taking a value of one when the population is above 1000, and $pop_{v,g}$ is the population of the village. In the appendix I allow for more flexible formulations of the $pop_{v,g}$. Following the empirical methodology put forward by Calonico et al. (2014), I use an optimal bandwidth selection method, and utilize a linear function for my independent variables. There are two main advantages to this methodology. First, this allows me to develop robust point estimations based on data-driven optimal bandwidth selections, and second, it generates more robust standard error predictions which I can compare across different types of estimation methods to ensure my results are robust. Throughout the paper I present the results based on the optimal bandwidth, however in Appendix 13 I present the results across different bandwidths to ensure that my findings are robust. In specifications where I include controls or fixed effects, I follow Calonico et al. (2014) and do not interact them with my treatment or cutoff dummy.

My main coefficient of interest is δ_1, which is identified under the condition that my running variable (in this case population) is smooth across the threshold. I check this along with other robustness checks in the next section to ensure that my first-stage is valid.

First-stage In Figure 3 I plot the effective first-stage of my fuzzy RDD. The figure shows that there is a strong first-stage suggesting that there is a 36% increase in the likelihood of a village having an independent GP, relative to villages just below the threshold. In the appendix I include the results of the F-test from this regression, and show that the instrument satisfies the conditions for a strong instrument.

Figure 3: First-Stage check



Notes: The figure shows the test for the jump at the cutoff of the treatment variable. The running variable has been restricted to below 2000 once again to be able to view the cutoff clearly. The y-axis is the treatment variable, and I use 100 bins on either side of the cutoff.

5 Rural Population Growth

Most models of location choice such as Bryan and Morten (2019) tell us that improvements in development outcomes at the village and individual-level in specific locations may make these areas more attractive for people to move to. Improvements in things like economic activity and public goods are likely the driving forces behind the movement in population in treated villages.

I first show the effect of the reform on population movement, then test whether this change is coming through migration or changes in fertility, and finally breakdown the population movements by gender. This allows me to better understand what proportion of the population is driving these changes, as population movements can act as revealed preferences.

5.1 Total Population Change

Table 1 shows the RDD results of population change over the period 1991-2011. The effects on population change happen in the second decade covered in this analysis, and show that treated villages have 9.4 p.p. higher population growth compared to control villages.

Table 1: Population Change

VARIABLES	(1) Pop Ch (2011-2001)	(2) Pop Ch (2011-1991)	(3) Pop Ch (2001-1991)
RD_Estimate	0.0368***	0.0413	-0.0139
	(0.0130)	(0.0300)	(0.0188)
Observations	90,938	90,700	90,715
Bandwidth	277.7	196.8	216.8
Control Mean	0.201	0.527	0.270

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table shows the coefficient on the RDD treatment variable on population change in percentage. Column (1) shows the change over the entire period of interest, 1991-2011, column (2) shows the change between 2001-2011, and column (3) shows the population change between 1991-2001. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. All the regressions are run with district-level fixed effects, district-level clustered standard errors, and optimal bandwidth selection. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

One concern is that the change in population may be driven my changes in fertility between treated versus untreated village. In order to ensure that the population changes are generated by population movements rather than differential fertility rates, I also check for changes in population aged 0-6 both in levels and in changes, and find no significant differences between the treated and untreated villages (Table 15.1 presents the results of the changes). The standard errors on the coefficient estimates are relatively large, however the point estimates are still less than the changes we observe for the total population, suggesting that the change can't be driven purely by fertility changes. Given the estimates on changes in fertility rates however, it is possible that in the future we may observe changes in the fertility rate as the effect of the population change between 2001-2011 starts to kick in.

5.2 Population Change by Gender

Given the population growth in treated villages, I also check whether this growth is different by gender. To do this, I check the population growth over the same period, restricted to males versus females. The results are presented in Table 2 and Table 3.

I find that the population change is reflected in the individual gender breakdowns (Table 2 & Table 3)). For males, it can be seen from Table 2 that the majority of the population growth happened between 2001-2011, like the total changes. Furthermore, the magnitude of the effect is quite similar to the total effect.

Table 2: Population Change - Male

	(1)	(2)	(3)
VARIABLES	Pop Ch (m) (2011-2001)	Pop Ch (m) (2011-1991)	Pop Ch (m) (2001-1991)
RD_Estimate	0.0401***	0.0203	-0.0278
	(0.0145)	(0.0305)	(0.0185)
Observations	90,699	90,705	90,697
Bandwidth	248.4	192.3	226.1
Control Mean	0.192	0.498	0.253

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table shows the impact of own village council status on population change in percentage for males. Column (1) shows the change over the entire period of interest, 1991-2011, column (2) shows the change between 2001-2011, and column (3) shows the population change between 1991-2001. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. All the regressions are run with district-level fixed effects, and district-level clustered standard errors. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

A somewhat more interesting finding is that women show significantly higher population growth across both period that I look at. The magnitude of this effect is also much higher. This effect may be compounded by the fact that a significant proportion of rural migration is driven by women moving for marriage (see Rosenzweig and Stark (1989)).

Table 3: Population Change - Female

VARIABLES	(1) Pop Ch (f) (2011-2001)	(2) Pop Ch (f) (2011-1991)	(3) Pop Ch (f) (2001-1991)
RD_Estimate	0.0363***	0.0663**	0.00336
	(0.0129)	(0.0316)	(0.0200)
Observations	90,643	90,608	90,592
Bandwidth	279.9	202.1	215
Control Mean	0.207	0.566	0.291

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table shows the impact of own village council status on population change in percentage for females. Column (1) shows the change over the entire period of interest, 1991-2011, column (2) shows the change between 2001-2011, and column (3) shows the population change between 1991-2001. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. All the regressions are run with panchayat-level clustered standard errors. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Taken together, these results suggest that the total effects we observe are not driven purely by movement of a single gender, although females grow at a much higher rate. This implies that the population movements I observe are not just driven by young males migrating for economic reasons but rather could potentially be families. To check this, I look at the demographics of the populations in these villages.

5.3 Village Demographics

Understanding the types of people moving to these solo GPs will help to determine some of the mechanisms driving these effects. Using data from the SECC 2011, I can check demographic breakdowns at the village-level, both in levels and in shares. Since the data comes from 2011, this measures the post-migration population in these villages. Table **??** shows the breakdowns in shares of different age categories.

Table 4: Village Demographics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0-5yrs	6-15yrs	16-25yrs	26-35yrs	36-45yrs	46-55yrs	56-65yrs
Panel A: Demographics (Shares) (2011)							
RD_Estimate	-0.146	-0.246	0.669**	0.0968	-0.0452	-0.0998	-0.159
	(-0.58)	(-0.76)	(3.18)	(0.69)	(-0.30)	(-0.80)	(-1.38)
Mean	9.515	25.99	20.96	14.43	11.54	7.299	5.504
N	87758	87758	87758	87758	87758	87758	87758

Notes: This table shows the impact of own village council status on share of the population in 2011 that falls within a specific age bin. The data is taken from the SECC 2011, and is calculated as a share of the total population. All the regressions are run with panchayat-level clustered standard errors. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The only group that shows significant changes, is the "young" population aged between 16-25 years old. There are a few potential possibilities here - first, that these individuals are moving for schooling, second, that they are moving for work, third, they are moving for marriage/family or fourth, there are fewer young people migrating to urban areas. In the case of education, For this age group, less than 3% of villages have a senior secondary school, and even fewer have any educational institutions at a higher level. However there are more middle schools available in these treated villages, but we see no corresponding increase in the parental age group. While students are likely to commute/walk to school, anecdotally, it is rare for students to permanently move alone to another village. Employment and marriage are both highly likely drivers of these effects, and previous work by Rosenzweig and Stark (1989) shows that rural migration is high especially for women moving for marriage. To test the employment channels, I later look at the effect of the reform on different sectors of employment. The final explanation on urban migration I test in the next section.

Summary These findings suggest that the population growth in treated villages does not seem to be driven by higher fertility levels, but rather by a movement of individuals to these treated villages. Given that both the male and female population of these more decentralized villages seem to grow at similar magnitudes, one possible explanation, is that the population growth is driven by individuals moving into these villages as families, potentially for work. Surprisingly we don't see a disproportionate number of males moving to these villages, which suggests that it is unlikely that people are moving only for economic reasons. We may therefore observe changes in the fertility rates in future censuses. One alternative explanation is that more individuals remain in these more decentralized villages compared to control villages, or for example, that more individuals migrate to urban areas in control villages, whereas fewer migrate from treated villages. In order to check whether there is substitution away from rural-urban migration, and the effect on rural migration, I move to the district-level to look at aggregate patterns of population movement.

6 Rural-Urban Population Movements

Given the population movement we observe at the village-level, it is important to understand what the spillover effects for this on rural-urban migration. Urban migration is one of the key drivers of economic growth, and a reform of this size may conceivably have an effect on the rate of migration if population movement at the village-level is disrupted.

To understand the impact on urban migration, I look at population changes in neighboring towns. As mentioned in the empirical strategy section, my independent variable measures the share of treated villages around a town that have their own village council. I calculate the villages around each town by pairing each village to its closest town distance-wise, as measured by the census.

Table 5: Rural-Urban Spillovers

	(1)	(2)
Town Population Change	Full Sample (2001-2011)	Restricted Sample (2001-2011)
Proportion of Villages Treated	0.312***	0.297***
	(0.0305)	(0.0584)
Observations	1,737	773

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table shows the town-level regression of population growth in the town between 2001-2011 on the share of treated villages nearby. I match villages to towns on the basis of which town is geographically closest to each town and create a matched pair. The share of treataed villages is then calculated first on the full sample (column (1)), and then within a restricted sample based on villages that fall within a 300 person bandwidth of the cutoff (column(2)). Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5 shows the results from calculating both the share of all villages treated around a town, and the results from a restricted sample where the share is calculated based only on those villages that fall within a specific population bandwidth. The results show that as the share of treated villages in the area increases, so does the population in the nearest town. This result suggests that areas with more treated villages also have towns which are growing at a faster rate. The easiest interpretation of this result is that a 1 standard deviation increase in the share of treated villages within 300 people of the cutoff results in a 3% increase in the population of the town.

Coupled with the findings on the movements of populations between villages, this finding suggests that while there is an increase in inflows of people into treated villages, there is also an increased outflow towards urban areas. Narasimhan and Weaver (2024) found that there were larger village-level improvements in education and other public goods in villages that were smaller. These improvements may also have helped to increase the likelihood of individuals within treated villages moving to urban areas. Improvements in education and higher levels of housing quality both suggest a reduction in education frictions, and a decline in potential income constraints that may have previously prevented individuals from engaging in urban migration.

7 District Migration

The reform that I focus on provides me with a unique setting to be able to observe empirically the effects at the local-level, but also to use my empirical strategy to identify some of the aggregate effects on district-level outcomes. Given that we observe rural population changes at the village-level, there are two potential channels which could be driving these effects. First, the population growth could come from people substituting away from urban migration. This is the main concern with the effects that we find, as we have evidence that higher urbanization rates are positively correlated with growth. The second potential channel is that the rural population changes are driven by a reshuffling of the rural population, as treated villages become rural centers, attracting people from untreated villages. To test both these channels, I use migration data at the district-level that allows me to break down within-district migration by rural-rural and rural-urban. Unfortunately data limitations and the use of district-level data, means that I only have at most 54 potential observations available for analysis, so this limitation should be kept in mind when interpreting the results that follow.

7.1 Empirical Strategy - District-level

In order to observe the effects of the reform on the district-level outcomes, I aggregate my RDD to the district-level. To do this I use the fuzzy RDD and generate a share of treated villages within a specific population bandwidth, and then instrument for this using the proportion of the villages above the population cutoff within the same bandwidth.

Identification The core concern when looking at the district-level is that we may not be able to identify impacts of micro-level changes in a meaningful way. The major reason for this is that we often don't have exogenous variation at the district-level that allows us to perceive more than correlational patterns. However one unique aspect of my setting is that I have a method for generating some degree of exogenous variation, based on my RDD at the village-level.[5]

I define my "treatment" (independent variable) as the following:

$$TreatedShare_d = \frac{\sum \text{Number of Treated Villages}}{\sum \text{Total Number of Villages}} \tag{3}$$

Where, v represents the village, and d the district. Here I use the full sample of available GPs. The major concern is that the share of solo GPs is correlated with other key indicators that are also important determinants of migration and growth, for example, population density. To correct for potential endogeneity and to take advantage of the random variation induced by my RDD, I further instrument for the treatment share using an aggregated version of the instrument used for the fuzzy RDD:

$$Instrument_d = \frac{\sum \text{Number of Villages above the Cutoff}}{\sum \text{Total Number of Villages}} \text{ if } Pop_{vd} \in [\underline{X}, \overline{X}]$$

This empirical strategy allows me to take advantage of the exogenous variation induced by the reform at the local-level, and bring that variation into a district-level regression. The key benefit of this strategy is that my aggregated analysis focused on large-scale consequences of the reform can now be interpreted causally rather than as correlations.

First-stage My independent variable defined as the share of villages within a district who have their own village council for the entire district, while the instrument is defined within a population bandwidth, and calculates the share of villages above the cutoff within a district with a population restriction. All results presented in the main text use a population bandwidth of 400 as this is the bandwidth for which the instrument is strongest. For robustness, I check the results hold under alternative bandwidths.

I check the validity of my aggregate instrument to ensure that it is meaningful. The full results are available in Table 6. The first stage is strong: the coefficient on the instrument is positive and significant, and the F-statistic is above 10. This instrument is highly correlated because I restrict the observations to ensure that the sample that is used for the RDD is what is underlying the variation in the aggregated independent variable, hence the strong first-stage. This empirical strategy allows me to take advantage of the exogenous variation induced by my RDD and aggregate it to the district-level to generate meaningful estimates of the effect of the reform on aggregate outcomes. An upcoming paper, Narasimhan, Norris, and Wang (2024) provides the econometric theory to support that the methodology provides us with suitable causal estimates.

[5]See Campante and Yanagizawa-Drott (2018) for a similar use of the RDD as an instrument.

Table 6: First-Stage: District Instrument

	(1)
	Treatment Share
Cutoff Share	1.223***
	(0.316)
Observations	42
R-squared	0.316
F-Stat	14.54

Notes: This table displays the first-stage for the aggregated-version of the RDD instrument. I regress the share of treated villages within a district on the share of villages above the cutoff within the district, restricting the villages used in my calculation to 300 above and below the population cutoff. The instrument and the independent variable are calculated on a restricted bandwidth to increase the strength of the instrument.

To increase the robustness of the results, I run all the outcomes of interest with multiple bandwidth calculations to ensure that the results aren't being driven by a specific bandwidth (see Appendix 17). I use this aggregated instrument to capture differential migration flows at the district-level.

RDD Aggregation I can use the aggregated version of my RDD to generate empirical estimates at the district-level. Using my aggregated independent variable - share of treated villages - and instrumenting for it with the share of villages above the cutoff, allows me to use the exogenous variation inherent in the RDD.

I run the following regression at the district-level:

$$\frac{\text{Migrants}_d}{\text{Total population}_d} = \alpha_0 + \alpha_1 Treat_d + \alpha_2 Pop_d^{91} + \epsilon$$

I calculate the proportion of migrants as a share of the rural population in order to account for differences in population distribution across districts, and run the regression at the district level. I also run a robustness check for my results by changing the output variable to the share of migrants out of the total migration population, and include these results in the following tables.

7.2 Rural-Urban Migration

Table 17.7 shows that there is a positive effect of treatment share at the district-level on rural-urban migration. A one standard deviation increase in the share of treated villages within a district leads to a 1.7% increase in the share of total migration. The effect is also positive and significant when broken down by gender (see Appendix 17.5). This effect also holds when we check whether migrants moved for employment (Panel B), and whether they moved with their families. These effects however are more concentrated in the short-term migrants, suggesting that this type of move is a more recent phenomenon.

Table 7: Total Migration: Within District (Rural-Urban)

	(1)	(2)	(3)	(4)	(5)
	Duration: ALL	Duration: Less than 1 yr	1-4 yrs	5-9 yrs	More than 10yrs
Panel A: Rural-Urban Migration (ALL) (2011)					
Sh. of Independent Villages	9.37***	0.41***	1.60***	1.58***	4.51***
	(1.84)	(0.08)	(0.31)	(0.30)	(0.88)
Mean	2.22	0.08	0.31	0.34	1.25
N	71.00	71.00	71.00	71.00	71.00
r2	0.15	0.07	0.11	0.15	0.22
Panel B: Moving for Employment					
Sh. of Independent Villages	1.86***	0.08***	0.30***	0.32***	1.00***
	(0.36)	(0.02)	(0.06)	(0.06)	(0.20)
Mean	0.37	0.01	0.05	0.06	0.22
N	71.00	71.00	71.00	71.00	71.00
r2	0.21	0.05	0.10	0.17	0.27
Panel C: Moving with the HH					
Sh. of Independent Villages	3.30***	0.18***	0.69***	0.68***	1.36***
	(0.63)	(0.03)	(0.13)	(0.12)	(0.26)
Mean	0.59	0.03	0.11	0.12	0.27
N	71.00	71.00	71.00	71.00	71.00
r2	0.18	0.09	0.13	0.16	0.24

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to three hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

A potential concern was that decentralization would trigger local-level improvements in development that may encourage individuals to remain in rural areas. I find quite the opposite. The increase in rural-urban migration is quite surprising, but could potentially be explained by two potential channels. First, the improvements in availability of education starting from 2001, suggests that individuals in treated villages may have higher levels of education. This is in line with findings from other studies such as Schultz (1960) and others who find that education reduces barriers to migration. Greater availability of educational institutions at the primary and secondary level in 2001 in treated villages (and carried into 2011) may provide a higher proportion of individuals with access to basic education. This may improve their access to jobs in urban areas and increase their expected wage.

These findings suggest that improvements in rural development may actually contribute to reducing migration frictions, which could have a positive effect on aggregate growth. Given that the reform measures the intensity of decentralization rather than a direct comparison of decentralization versus none, the magnitude of the effects seem quite plausible. Given the relatively small sample size these results are based on, I can rule out a negative effect on rural-urban migration, however I can't say much about how large the positive gains may be, nor who the main participants are.

7.3 Rural-Rural Migration

The finding that there is no negative effect on urbanization rates suggests that the population changes is coming instead from rural reshuffling. To test this, I look at within-district rural-rural migration. Table 17.9 shows that overall rural-rural migration declines as there is more treated units in a district, however this masks a lot of heterogeneity. The overall finding fits with the hypothesis that the population growth at the village-level is driven by a reshuffling of the rural population from control villages to treated villages. However when we break it down by duration, we find that short-term migration is positively impacted by having more solo GPs, but long-term migration is negatively impacted. This difference is likely driven by the causes of migration - across the board, migration for employment is positively affected by the share of solo GPs, which suggests that these solo GPs are proving more attractive for working age individuals - this is reflected in the demographic findings in the previous section. There are also positive effects on moving with a household, which also suggests that these are not just workers migrating, but entire families moving.

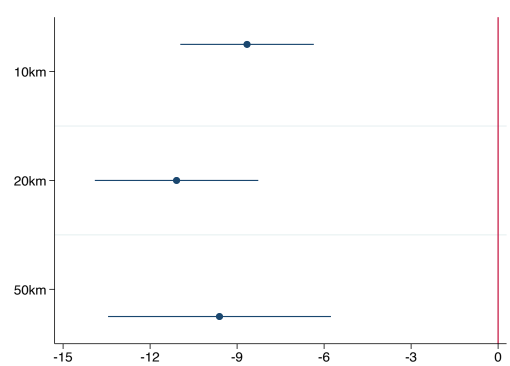
Table 8: Total Migration: Within District (Rural-Rural)

	(1)	(2)	(3)	(4)	(5)
	Duration: ALL	Duration: Less than 1 yr	1-4 yrs	5-9 yrs	More than 10yrs
Panel A: Rural-Rural Migration (ALL) (2011)					
Sh. of Independent Villages	-9.64***	0.28***	-0.42	-0.92***	-7.56***
	(2.94)	(0.07)	(0.30)	(0.35)	(2.09)
Mean	13.26	0.24	1.38	1.56	8.99
N	71.00	71.00	71.00	71.00	71.00
r2	0.20	0.20	0.09	0.18	0.21
Panel B: Moving for Employment					
Sh. of Independent Villages	0.20**	0.12***	0.05***	0.04**	0.00
	(0.09)	(0.03)	(0.01)	(0.02)	(0.05)
Mean	0.24	0.02	0.03	0.03	0.13
N	71.00	71.00	71.00	71.00	71.00
r2	0.01	0.31	-0.03	-0.06	-0.00
Panel C: Moving with the HH					
Sh. of Independent Villages	0.21	0.13***	0.09***	0.06	-0.10
	(0.17)	(0.03)	(0.03)	(0.04)	(0.08)
Mean	0.46	0.04	0.07	0.08	0.22
N	71.00	71.00	71.00	71.00	71.00
r2	-0.02	0.30	-0.05	-0.04	0.04

Notes: This table shows the district-level regressions on within-district rural-rural migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to four hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

To test whether this rural reshuffling hypothesis holds at the village-level, I regress village-level population change between 2001 and 2011 on the share of villages in the surrounding area that has a population above the cutoff.

Figure 4: Spillover: Effect of treated villages in the surrounding area on population change (2001-2011)



Notes: This figure shows the coefficient on the independent variable measuring share of villages in the surrounding area whose population is above the cutoff. The outcome is the population change between 2001-2011.

Figure 4 shows the coefficients on the share of villages above the cutoff for three distance ranges - 10km, 20km, 50km. The interpretation of this coefficient is that as the share of villages above the cutoff in the surrounding areas grows, the population change in the villages itself is lower. This aligns with the idea that individuals are moving to treated villages from control villages. As the number of surrounding villages that are "treated" (since this is a reduced form variable) increases, the villages grow more slowly.

Coupled with the findings on the growth of population in treated villages, this finding suggests that while there is an increase in inflows of people into treated villages, there is also an increased outflow towards urban areas. Narasimhan and Weaver (2024) highlighted that there were larger village-level developments in education and economic activity in villages that received their own village council, and that this was likely a driving force behind the decision for individuals to migrate from control villages to treated villages. Similarly however, these improvements may also have helped to increase the likelihood of individuals within treated villages moving to urban areas. Improvements in education and higher levels of housing quality both suggest a reduction in education frictions, and a decline in potential income constraints that may have previously prevented individuals from engaging in urban migration.

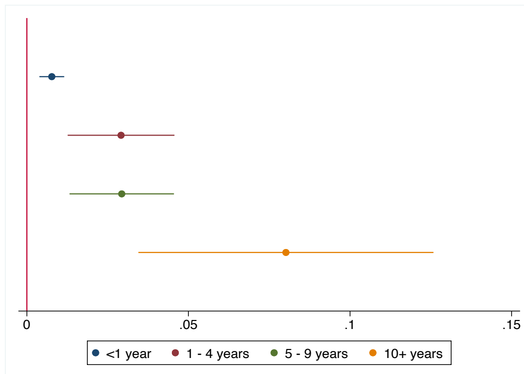
Summary Taken with the findings on rural-urban migration, there are two key takeaways from this section. First is that village-level developments seem to have no negative consequences on urban migration rates, as they may help to reduce migration frictions. Second, the population changes we observe at the village-level are likely driven by reshuffling of the rural population, as I find evidence of a negative correlation between the share of treated villages in a district and the rural migration share at the aggregate level. This masks a lot of hidden heterogeneity however, as more recent migrants move at a higher rate to these treated villages to potentially access work and employment. In addition, there is also evidence at the village-level, that having a lot of treated villages in the surrounding area may reduce the rate at which a village grows, however overall treated villages still grow more, even when controlling for the share of treated villages in the area. Given these changes in the spatial distribution of population, especially the increase in rural-urban migration, I now look at the types of migrants we observe in the data, and the effect that the decentralization has on growth more broadly, focusing on district-level GDP.

8 Duration of Migration

Using the same aggregated RDD, I use data from the Indian Migration Census (2011) to understand what type of migrants are moving. Specifically, I look at the duration of the migration episodes, to see how the reform affects temporary versus long-term migrants.

Figure 5 shows plots the coefficient on the share of treated villages for four durational migrations: less than one year, one to four years, five to nine years, and more than 10 years. As can be seen by the figure, the share of treated villages seems to have the largest effect on long-term migrants, with migrants moving for ten plus years being the most impacted. This suggests that the migration we see from rural areas to urban areas are not driven by temporary migration decisions, and are rather individuals moving for long-term gains.

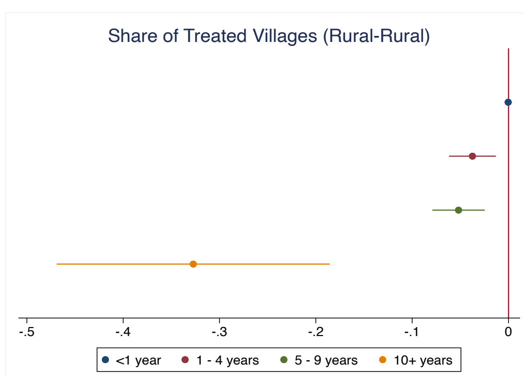
Figure 5: Migration Duration: Rural-Urban



Notes: This figure shows the coefficient on the independent variable measuring share of villages in the district that were treated, instrumented with the share of villages whose population is above the cutoff. The outcome is the share of rural-urban migrants falling within each of the assigned durational categories.

Like the rural-urban migration findings, the rural-rural migration durations of migration follow a similar pattern (see Figure 6). The largest decline in migration between rural areas is observed for long-term migrations. Given that the majority of population effects are only observed starting from 2001, it is possible that this effect could be compounded over time. More long-term analysis would be required to observe what happens to these migration patterns over a longer time horizon.

Figure 6: Migration Duration: Rural-Rural



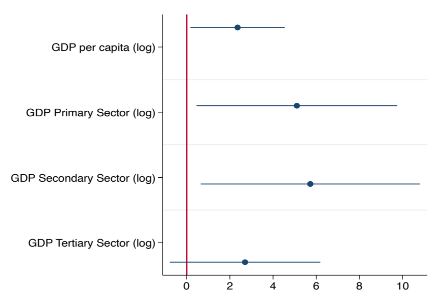
Notes: This figure shows the coefficient on the independent variable measuring share of villages in the district that were treated, instrumented with the share of villages whose population is above the cutoff. The outcome is the share of rural-rural migrants falling within each of the assigned durational categories

Summary Using data from the Indian census I find that for both rural-urban migration and rural-rural migration, long-term migration seems to be the most affected by the share of decentralized villages in a district. Longer duration migrations (e.g. 10+ years) seem to be have the largest effect, and these results suggest that decentralization plays a potentially important role in driving persistent economic changes. These individuals are moving semi-permanently to these new locations, suggesting that the changes they bring with them may be permanent.

9 District GDP

The combination of the improvements in development combined with the changes in the spatial distribution of population, are likely to drive changes in aggregate growth. We know from work by Gadenne and Singhal (2014) that rural-urban migration contributes to economic growth, and the developments at the village-level, especially the shift away from agriculture, may itself increase aggregate growth. Additionally, there is evidence that large-scale infrastructure developments in places drive improvements in aggregate growth (Shenoy, 2018). To test this, I proxy for growth using district-level GDP per capita data, as well as sectoral data, all taken from the ICRISAT dataset. I run the same regression as the migration outcomes, replacing the migration share with GDP per capita and GDP in the primary, secondary, and tertiary sector.

Figure 7: Decentralization Intensity and GDP at the District-level



Notes: This figure shows the district-level regressions on four key outcomes - GDP per capita, Primary Sector GDP, Secondary Sector GDP, Tertiary sector GDP, all measured in current prices. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

The results are presented in Figure 17.2. I find that despite a lack of precision in the estimates, the results are fairly sizable and positive, with the GDP per capita increasing by at most 29%, and at least 0.3% for a one standard deviation increase in treated share of villages within a district. Based on these results, we can rule out a negative impact on GDP, and this effect holds across all three sectors as well. [6] Unfortunately I am unable to disentangle the exact channel driving this increase in GDP, however given the fairly large standard errors and the small sample size, it is more meaningful to treat this result as a non-negative rather than a firm positive outcome.

Summary The main concern in the research question was that a sufficiently high level of rural development may negatively impact urban migration, which in turn would have negative consequences for aggregate growth. In contrast, I find that not only does rural development have positive effects on rural-urban migration, but it also seems to have a positive effect on GDP per capita, or at the very least a non-negative effect. This is an important finding, because I am able to link micro-level changes to aggregate changes in an empirical framework.

10 Economic Development

The first important channel I focus on is how local political institutions impact local infrastructure and economic activity. I look at the effect of the reform on road provision, specifically provision of "'good" versus "'bad" roads. Roads are a key measure of market access, and contribute significantly to the prevalence of economic activity in these areas and therefore provide a key measure of how effective these local institutions are. Based on the road results, I then study how economic activity in these villages is affected, focusing on the agricultural sector versus manufacturing and services.

10.0.1 Roads

The first infrastructure investment I look into is the impact of having an own village council on road provision. Road quality is divided into two types - good quality versus bad quality. A good approach is a road that has some kind of gravel/tar structure, and is easily accessible by car. Bad roads are usually simple mud roads, or roads that do not have defined structure or building. For 2011, unfortunately only information on blacktop roads was available, so there is no "bad" comparison. These variables measure the availability of these roads, but I can't do a more detailed breakdown of the quality of these roads apart from blacktop versus mud due to data limitations.

Table 9 shows that there is evidence to suggest that treated villages initially did have higher quality provision of roads. Treated villages having a 16 percentage point higher likelihood of having a good road, significant at the 1% level. In addition, villages with their own GP were 12 percentage points less likely to have a bad road. However, there was a federal road program introduced post-2001. This program has been studied extensively previously by Asher and

[6] I also breakdown the results by year and category in Appendix 16

Novosad (2020), which may explain the lack of observable effect by 2011. Uttar Pradesh was one of the few states to not follow specific population rules in implementing the road building road program, hence it is unlikely that my analysis would be able to capture any significant results after the introduction of the program with my RDD. These results are also consistent with the findings in Narasimhan and Weaver (2024), although the coefficients differ due to the different instrument being used.

Table 9: Roads

	(1) Good Road Quality (2001)	(2) Bad Road Quality (2001)	(3) Good Road Quality (2011)
Own Village Council	0.162***	-0.122**	-0.0567
	(0.0577)	(0.0538)	(0.0486)
Observations	87,883	87,883	87,706
Effective Observations	23,643	17,951	20,952
Bandwidth	459.3	367.5	417.6
Control Mean	0.58	0.68	0.69

Notes: This table shows the coefficient on the RDD treatment variable on the provision of roads. The dependent variable is measured as a dummy variable with 0 if that type of road is not available, and 1 if it is available. The census measures two types of roads, *pucca* (which is good quality) and *kuccha* (which is bad quality). A good quality road is usually one that is permanent, usually made up or tar or gravel. Bad quality roads are ones that are just mud. As always, the specification is run with district-level FE, the standard errors are clustered at the district-level, and the results are presented using an optimal bandwidth selection process. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Road-building has significant impacts on a multitude of factors. Work by Donaldson (2020) and Asturias et al. (2018) highlight how important transport infrastructure is for reducing spatial misallocations, improving productivity, and welfare improvements. Improving access to markets for these villages could have significant positive effects, especially on economic activity, and the evidence suggests that in 2001, there were significant benefits to being in a decentralized village which may have made treated villages more attractive locations. These effects mostly disappear by 2011, however any effects on population could be driven by the initial differences in 2001.

Overall, there is some evidence to suggest that market access, as measured by roads, was directly affected by having an independent GP headquarters, however in some cases federal programs superseded the local governments in managing these amenities. The federal governments seem to have been more effective in some of these cases in reducing the village-level differences between control and treated villages.

10.1 Economic Activity

Given the improvements we see in roads at the village-level, it would stand to reason that these changes may have effects on the economic activity in these areas, as better access through roads improve market access and reduce mobility frictions. To look into this in more detail, I look at changes in economic activity in these villages.

I look at the number of commercial enterprises available in villages, as well as the share of firms engaged in agricultural activities. Table 10 shows that treated villages show a growth in the number of commercial enterprises in 2011 relative to control villages, although the magnitude are relatively small. Treated villages in 2013 have 5 more commercial establishments. This is measured by the proportion of buildings within a village that is utilized for commercial business purposes. Furthermore, treated villages show a 4.7 percentage point decline in the share of agricultural enterprises compared to control villages. This evidence is suggestive of changes in the type of economic activity in treated villages, however the magnitudes are relatively small, and the changes marginal.

Table 10: Economic Activity

	(1) No. of Commercial Properties (1990)	(2) No. of Commercial Properties (2013)	(3) Agricultural Activity (%) (1990)	(4) Agricultural Activity (%) (2013)
Own Village Council	1.505	7.040**	0.510	-4.797***
	(2.199)	(2.960)	(1.852)	(1.479)
Observations	88,100	88,100	88,100	88,100
Effective Observations	21,364	20,808	22,869	18,940
Bandwidth	423.3	414.3	447.4	383.9
Control Mean	7.81	10.98	4.40	3.70

Notes: This table shows the coefficient on the RDD treatment variable on a set of economic characteristics. Column (1) measured the effect on the use of commercial properties in the baseline year 1990. This is measured in terms of number of properties. Commercial properties are defined as buildings used for commercial purposes such as retail. Column (2) measures the same variable in 2013. Column (3) measures the effect on agricultural activity as a share of total activity in 1990, and (4) measures the same variable in 2013. Agricultural activity is defined as firms or businesses engaged in agricultural practices as defined by the economic census. As always, the specification is run with district-level FE, the standard errors are clustered at the district-level, and the results are presented using an optimal bandwidth selection process. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

One potential explanation for the effects, is that these villages are undergoing some degree of structural change at a micro-level, and the evidence seems to imply that decentralization is driving improvements in public goods that help to change the type of economic activity that is taking place in these villages. The treated villages start acting like rural centers for economic activity, but the mechanisms are still relatively unclear.

11 Conclusion

In this paper I provide causal evidence on the impact of a decentralization reform on migration and growth. I focus on the impact this reform had on population movements, and then analyze district-level outcomes, using an aggregated version of my RDD strategy. I start with the interesting result that local developments generated by political decentralization encourage the movement of individuals to more decentralized villages. This finding does not appear to be driven by changes in fertility rates, which remain constant between treated and untreated villages. Taken with the finding that the population growth of both men and women is relatively balanced, it suggests that the population growth I observe is likely driven by individuals migrating to these treated villages, or more individuals remaining in these villages rather than migrating away.

To test this concern that local-level improvements may result in population growth in treated villages that is driven by substitution away from rural-urban migration I check the causal impact of the reform on district-level patterns of migration. Given that rural-urban migration is a key driver of growth, this would be a serious concern to policy-makers. I use an aggregated version of my RDD based on population thresholds to generate a measure of the share of treated villages at the district-level. I find that there are surprisingly no negative consequences on rural-urban migration, or on GDP.

My findings are consistent with the result that decentralization-led development helps to relax some of the educational and financial frictions associated with rural-urban migration. Additionally, the population changes are driven by a reallocation of the population within rural areas, and the combined effect of development at the village-level and increased rural-urban migration is consistent with the findings on increased GDP per capita at the district-level. Additionally, the largest effects on migration are associated with long-term migrants, which suggests that decentralization has created long-term population relocation.

Finally, the results of this paper suggest that there are indirect consequences to decentralization and development, that are not necessarily captured if we focus on just the village-level outcomes. Rural development, rural-urban migration and growth are closely linked, and this paper shows that micro-level changes need to be studied alongside aggregate outcomes in order to meaningfully measure the impact of policy such as the decentralization reform. This paper highlights two important findings for policy-makers: first, it suggests that decentralized political systems can have a positive impact on growth at the aggregate-level, and second, and most importantly, it highlights that rural-led development need not come at the expense of aggregate development, rather it may work as a positive factor for increasing economic development. The last finding opens up a potential source of future research, that focuses on looking at the types of rural development that can interact positively with aggregate growth.

Given the results in this paper, there are still some open questions that need to be answered with further research. First, the exact channels through which rural development impacts aggregate outcomes, for example, what are the drivers of the district-level GDP effects, and can we disentangle the contribution of rural-urban migration versus village-level development? In addition, understanding the flows of migration, most importantly what the compositional effects are, is left to future work.

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Appendix

12 Areas of Decentralization

Table 12.1: The 29 subjects under the 11^{th} Schedule

11^{th} **Schedule**		
• Agriculture, including agricultural extension • Land improvement, implementation of land reforms, land consolidation and soil conservation • Minor irrigation, water management and watershed development • Animal husbandry, dairying and poultry • Fisheries • Social forestry and farm forestry • Minor forest produce • Small scale industries, including food processing industries • Khadi, village and cottage industries • Rural housing	• Drinking water • Fuel and fodder • Roads, culverts, bridges, ferries, waterways and other means of communication • Rural electrification, including distribution of electricity • Non-conventional energy sources • Poverty alleviation program • Education, including primary and secondary schools • Technical training and vocational education • Adult and non-formal education • Libraries	• Cultural activities • Market and fairs • Health and sanitation, including hospitals, primary health centers and dispensaries • Family welfare • Women and child development • Social, welfare, including welfare of the handicapped and mentally retarded • Welfare of the weaker sections, and in particular, of the Scheduled Castes and the Scheduled Tribes • Public Distribution system • Maintenance of community asset

13 Robustness Check

This section presents the results of the fuzzy RDD allowing for different bandwidths.

	(1)	(2)	(3)	(4)
Population Change (1991-2011)	BW: 100	BW: 200	BW: 300	BW: 400
Own Village Council	13.07	4.619	7.070	4.018
	(12.68)	(6.425)	(5.233)	(4.517)
Observations	7,928	16,167	24,707	33,660
Control Mean	49.45	50.16	50.38	50.71

	(1)	(2)	(3)	(4)
Population Change (2001-2011)	BW: 100	BW: 200	BW: 300	BW: 400
Own Village Council	14.45**	6.141*	8.324***	9.350***
	(6.758)	(3.134)	(2.761)	(2.443)
Observations	7,928	16,167	24,707	33,660
Control Mean	20.47	20.80	20.80	21.02

	(1)	(2)	(3)	(4)
Population Change (1991-2001)	BW: 100	BW: 200	BW: 300	BW: 400
Own Village Council	0.784	-1.761	-0.569	-3.814
	(7.845)	(3.854)	(3.305)	(2.622)
Observations	7,928	16,167	24,707	33,660
Control Mean	25.40	25.79	26.04	26.22

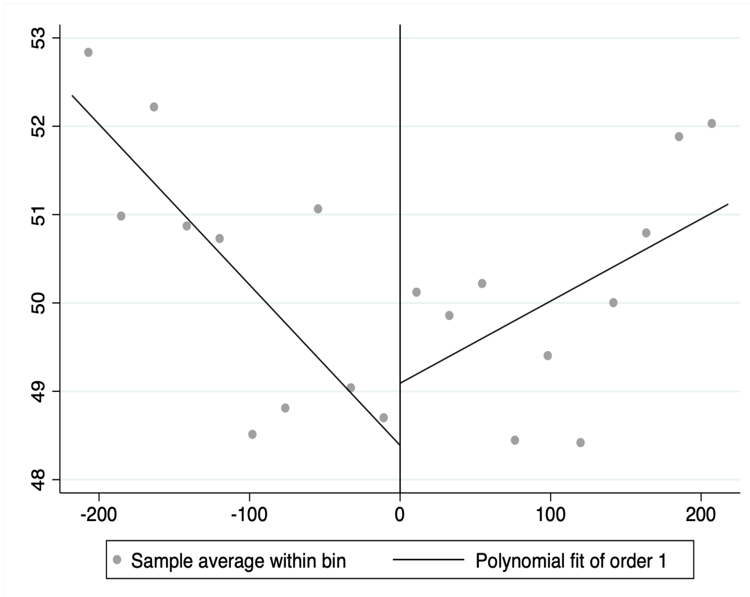
The results presented here, do not significantly differ from the optimal bandwidth results presented in the text.

14 RDD Plots - Reduced Form

14.1 Population Change

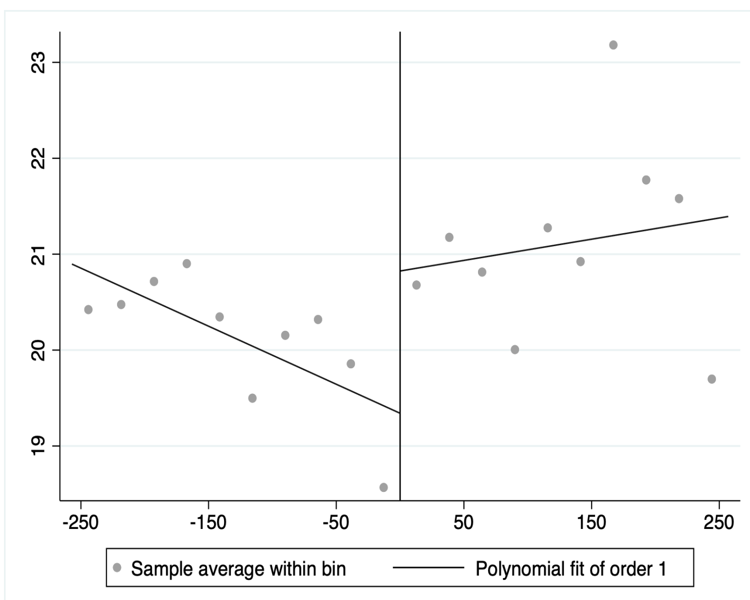
As seen in the paper, the significant jump in population change is between 2001-2011.

Figure 14.1: Population Change (1991-2011)



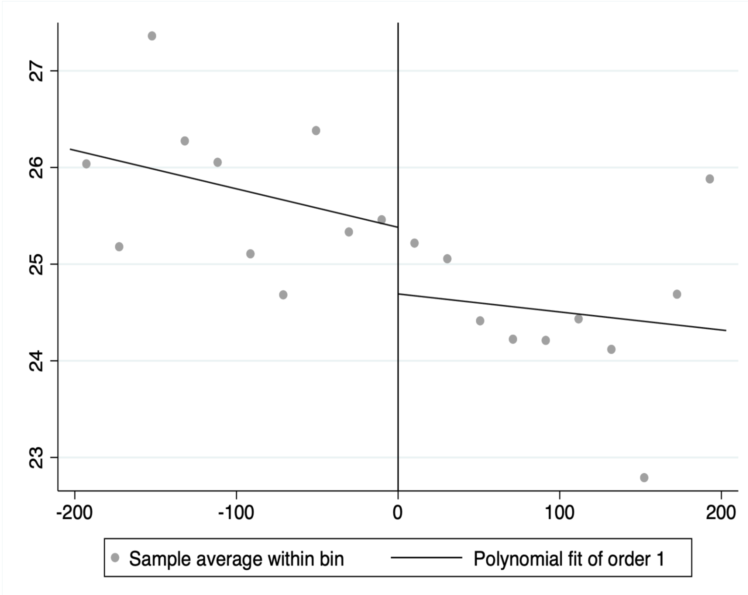
Notes: This figure shows the RDD plot for population change in percentage between 1991-2011. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. The plot is generated through running the sharp RDD (reduced form), using a linear approximation on either side. The optimal bandwidth here is 204.

Figure 14.2: Population Change (2001-2011)



Notes: This figure shows the RDD plot for population change in percentage between 2001-2011. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. The plot is generated through running the sharp RDD (reduced form), using a linear approximation on either side. The optimal bandwidth here is 258.

Figure 14.3: Population Change (1991-2001)



Notes: This figure shows the RDD plot for population change in percentage between 1991-2001. I wincorize all the population data to ensure that there are no errors affecting the results. To wincorize I take the bottom and top 1% value and replace any observations outside those with the 1% value. The plot is generated through running the sharp RDD (reduced form), using a linear approximation on either side. The optimal bandwidth here is 219.

15 Fertility Levels

As a check to make sure that the population changes are not driven by changes in fertility, I also present below the results on population of children aged between 0-6, and show both the changes and the levels. Table 15.1 shows that there is no significant difference between treated and control villages in the growth of children aged 0-6, whilst Table 15.2 shows that the same holds true for the levels regression.

Table 15.1: Fertility

Population Change (Age 0-6)	(1) 1991-2011	(2) 2001-2011	(3) 1991-2001
Own Village Council	6.656	5.496	3.855
	(6.916)	(4.823)	(6.059)
Effective Obs	8345	9036	8345
Bandwidth	186.8	200.9	186.9
FE	Y	Y	Y
Clusters	Y	Y	Y

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: This table shows the impact of having an own GP on changes in fertility rates over the same periods as the previous table. As before, I include district FE and district-level clustered standard errors. I also run the same specification on the levels, and find no significant effects.

Table 15.2: Fertility

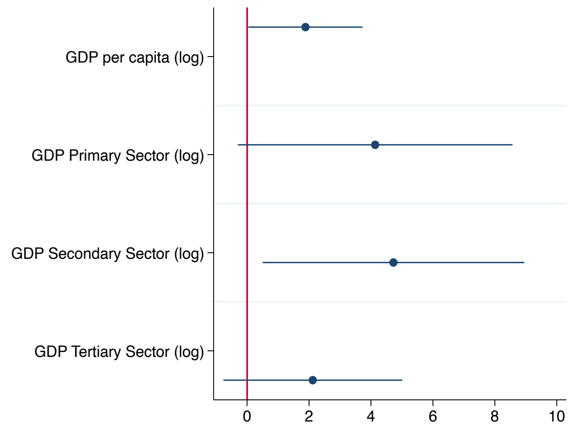
Population Aged 0-6 (levels)	(1) 1991	(2) 2001	(3) 2011
Robust	1.539	-5.464	13.28
	(4.573)	(10.07)	(12.46)
Observations	95,754	94,960	94,857
Effective Observations	12,579	16,038	13,101
Bandwidth	265.3	325.2	275.9
Control Mean	193.9	225.7	220.6
FE	Y	Y	Y
Clusters	Y	Y	Y

Notes: This table shows the impact of having an own GP on fertility rates in levels over different periods. As before, I include district FE and district-level clustered standard errors.

16 GDP

This section shows the full set of GDP results, and presents some of the robustness checks. Figure 16.1 reproduces the GDP per capita results, controlling for total consumption in 1991 at the district-level.

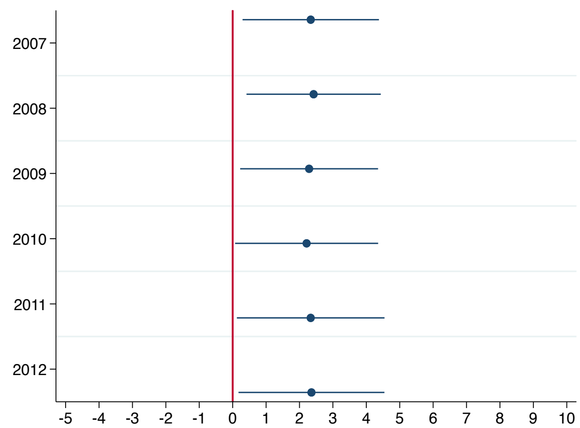
Figure 16.1: GDP per Capita - Controlling for Total Consumption (1991)



Notes: This figure shows the district-level regressions on GDP per capita, controlling for total consumption at the district-level in 1991. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

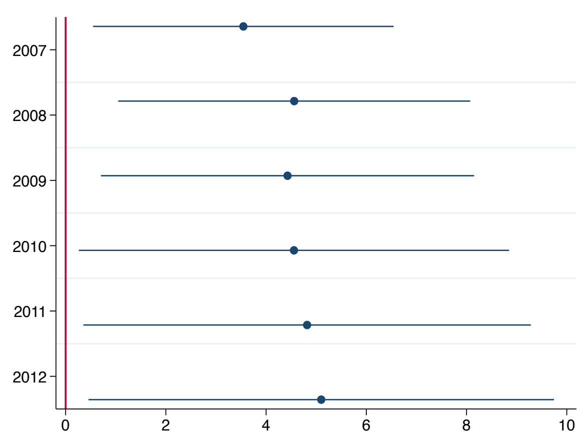
The following figures show the results of the four key GDP outcomes (GDP per capita and Primary, Secondary and Tertiary Sector GDP (in current prices)) for all available years.

Figure 16.2: GDP per Capita (all years)



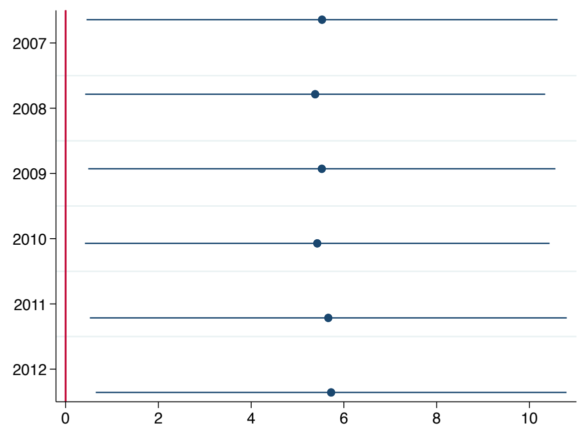
Notes: This figure shows the district-level regressions on GDP per capita, controlling for total consumption at the district-level in 1991. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

Figure 16.3: Primary Sector GDP (all years)



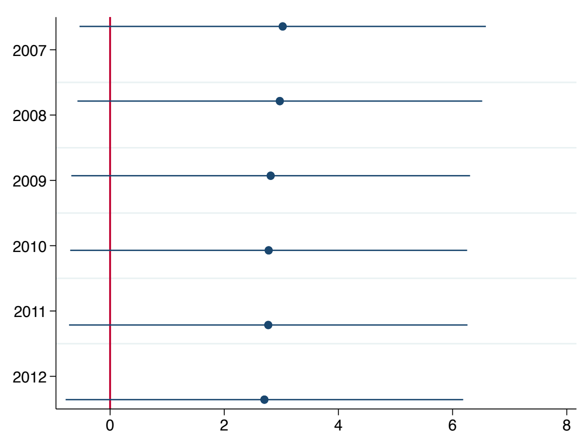
Notes: This figure shows the district-level regressions on Primary Sector GDP, controlling for total consumption at the district-level in 1991. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

Figure 16.4: Secondary Sector GDP (all years)



Notes: This figure shows the district-level regressions on Secondary Sector GDP, controlling for total consumption at the district-level in 1991. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

Figure 16.5: Tertiary Sector GDP (all years)



Notes: This figure shows the district-level regressions on Tertiary Sector GDP, controlling for total consumption at the district-level in 1991. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within three hundred of the cutoff.

17 Robustness Checks - Alternative Bandwidths

In this section I reproduce all the results from the main text of the paper but with alternative bandwidths as a robustness checks. I use two main bandwidths - 200 and 400.

17.1 Migration - Rural-Urban

Table 17.1: Total Migration: Within District (Rural-Urban) (BW:400)

	Share of Total Population			Share of Total Migration		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Male	Female	Total	Male	Female
Share of Treated Villages	0.198***	0.102***	0.0958**	0.156***	0.0792***	0.0764***
	(0.0660)	(0.0284)	(0.0397)	(0.0490)	(0.0251)	(0.0246)
Observations	54	54	54	54	54	54
Mean	5.853	2.146	3.707	2.995	1.165	1.830

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to 400 below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 17.2: Total Migration: Within District (Rural-Urban) (BW:200)

	Share of Total Population			Share of Total Migration		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Male	Female	Total	Male	Female
Share of Treated Villages	0.170**	0.109***	0.0611	0.194*	0.108*	0.0864*
	(0.0717)	(0.0344)	(0.0431)	(0.107)	(0.0570)	(0.0506)
Observations	54	54	54	54	54	54
Mean	5.821	2.141	3.680	2.893	1.124	1.769

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to 200 below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

17.2 Migration - Rural-Rural

Table 17.3: Total Migration: Within District (Rural-Rural) (BW:400)

	Share of Total Population			Share of Total Migration		
	Total	Male	Female	Total	Male	Female
Share of Treated Villages	-0.902***	-0.0469**	-0.855***	-0.421***	-0.0197**	-0.401***
	(0.245)	(0.0213)	(0.232)	(0.100)	(0.00971)	(0.0940)
Observations	54	54	54	54	54	54
Mean	42.49	3.046	39.45	17.92	1.352	16.56

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to 400 below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

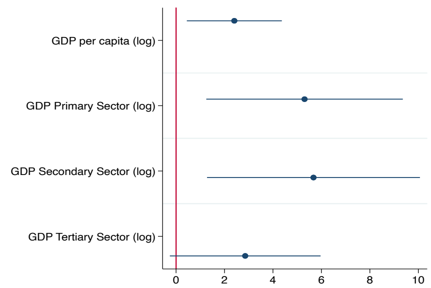
Table 17.4: Total Migration: Within District (Rural-Rural) (BW:200)

	Share of Total Population			Share of Total Migration		
	(1)	(2)	(3)	(4)	(5)	(6)
	Total	Male	Female	Total	Male	Female
Share of Treated Villages	-1.632***	-0.0893**	-1.543***	-0.598***	-0.0253*	-0.573***
	(0.567)	(0.0410)	(0.533)	(0.134)	(0.0132)	(0.126)
Observations	54	54	54	54	54	54
Mean	42.06	3.016	39.04	17.26	1.296	15.96

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to 200 below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

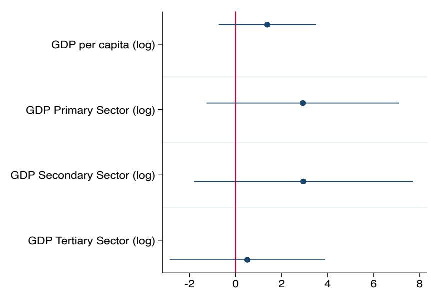
17.3 GDP

Figure 17.1: Decentralization Intensity and GDP at the District-level



Notes: This figure shows the district-level regressions on four key outcomes - GDP per capita, Primary Sector GDP, Secondary Sector GDP, Tertiary sector GDP, all measured in current prices. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within 400 of the cutoff.

Figure 17.2: Decentralization Intensity and GDP at the District-level



Notes: This figure shows the district-level regressions on four key outcomes - GDP per capita, Primary Sector GDP, Secondary Sector GDP, Tertiary sector GDP, all measured in current prices. The regressions instrument for treatment status with the cutoff dummy. This figure restricts the cutoff aggregations to using only villages with a population that is within 200 of the cutoff.

17.4 Village Demographics

Table 17.5: Village Demographics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0-5yrs	6-15yrs	16-25yrs	26-35yrs	36-45yrs	46-55yrs	56-65yrs
Panel A: Demographics (Levels) (2011)							
RD_Estimate	1.779	1.200	13.33*	4.285	1.750	0.527	-1.242
	(0.37)	(0.13)	(2.05)	(0.96)	(0.48)	(0.22)	(-0.69)
Mean	160.9	436.7	348.8	238.1	189.7	119.0	88.40
N	87773	87773	87773	87773	87773	87773	87773

Notes: This table shows the impact of own village council status on population totals in 2011 that falls within a specific age bin. The data is taken from the SECC 2011, and is calculated as a share of the total population. All the regressions are run with panchayat-level clustered standard errors. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

17.5 District-level Migration - Rural-Urban by Gender

Table 17.6: Total Migration: Within District (Rural-Urban)

	(1)	(2)	(3)	(4)	(5)
	Duration: ALL	Duration: Less than 1 yr	1-4 yrs	5-9 yrs	More than 10yrs
Panel A: Rural-Urban Migration (Female) (2011)					
sh_instr_all	4.94	0.20	0.87	0.84	2.43
	(0.99)***	(0.04)***	(0.17)***	(0.16)***	(0.50)***
Mean	1.37	0.04	0.19	0.20	0.81
N	71.00	71.00	71.00	71.00	71.00
r2	0.14	0.11	0.12	0.14	0.18
Panel B: Emp					
sh_instr_all	0.15	0.01	0.03	0.03	0.06
	(0.03)***	(0.00)***	(0.01)***	(0.01)***	(0.01)***
Mean	0.03	0.00	0.00	0.00	0.02
N	71.00	71.00	71.00	71.00	71.00
r2	0.12	-0.07	0.05	0.07	0.20
Panel C: HH					
sh_instr_all	1.74	0.10	0.38	0.37	0.70
	(0.33)***	(0.02)***	(0.07)***	(0.07)***	(0.13)***
Mean	0.32	0.02	0.06	0.06	0.14
N	71.00	71.00	71.00	71.00	71.00
r2	0.18	0.10	0.12	0.15	0.24

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to three hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 17.7: Total Migration: Within District (Rural-Urban)

	(1)	(2)	(3)	(4)	(5)
	Duration: ALL	Duration: Less than 1 yr	1-4 yrs	5-9 yrs	More than 10yrs
Panel A: Rural-Urban Migration (Male) (2011)					
sh_instr_all	4.43	0.21	0.73	0.74	2.08
	(0.88)***	(0.04)***	(0.14)***	(0.14)***	(0.41)***
Mean	0.85	0.04	0.12	0.13	0.44
N	71.00	71.00	71.00	71.00	71.00
r2	0.16	0.04	0.09	0.15	0.24
Panel B: Emp					
sh_instr_all	1.71	0.07	0.27	0.29	0.93
	(0.33)***	(0.02)***	(0.05)***	(0.06)***	(0.18)***
Mean	0.34	0.01	0.04	0.05	0.20
N	71.00	71.00	71.00	71.00	71.00
r2	0.22	0.07	0.10	0.17	0.27
Panel C: HH					
sh_instr_all	1.55	0.08	0.30	0.31	0.66
	(0.30)***	(0.02)***	(0.06)***	(0.06)***	(0.13)***
Mean	0.27	0.01	0.05	0.05	0.13
N	71.00	71.00	71.00	71.00	71.00
r2	0.18	0.08	0.14	0.18	0.24

Notes: This table shows the district-level regressions on within-district rural-urban migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to three hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

17.6 District-level Migration - Rural-Rural by Gender

Table 17.8: Total Migration: Within District (Rural-Rural)

	(1) Duration: ALL	(2) Duration: Less than 1 yr	(3) 1-4 yrs	(4) 5-9 yrs	(5) More than 10yrs
Panel A: Rural-Rural Migration (Female) (2011)					
sh_instr_all	-9.59	0.13	-0.51	-0.97	-7.36
	(2.80)***	(0.05)***	(0.29)*	(0.33)***	(2.03)***
Mean	12.28	0.19	1.28	1.46	8.58
N	71.00	71.00	71.00	71.00	71.00
r2	0.21	0.07	0.11	0.19	0.21
Panel B: Emp					
sh_instr_all	-0.01	0.04	0.00	-0.00	-0.04
	(0.04)	(0.01)***	(0.00)	(0.00)	(0.02)*
Mean	0.09	0.01	0.01	0.01	0.05
N	71.00	71.00	71.00	71.00	71.00
r2	0.00	0.26	-0.03	0.01	0.08
Panel C: HH					
sh_instr_all	0.12	0.07	0.05	0.03	-0.05
	(0.08)	(0.01)***	(0.02)***	(0.02)*	(0.04)
Mean	0.22	0.02	0.04	0.04	0.11
N	71.00	71.00	71.00	71.00	71.00
r2	-0.03	0.31	-0.06	-0.04	0.05

Notes: This table shows the district-level regressions on within-district rural-rural migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to three hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 17.9: Total Migration: Within District (Rural-Rural)

	(1)	(2)	(3)	(4)	(5)
	Duration: ALL	Duration: Less than 1 yr	1-4 yrs	5-9 yrs	More than 10yrs
Panel A: Rural-Rural Migration (Male) (2011)					
sh_instr_all	-0.05	0.14	0.10	0.05	-0.20
	(0.29)	(0.03)***	(0.03)***	(0.04)	(0.13)
Mean	0.98	0.05	0.10	0.10	0.41
N	71.00	71.00	71.00	71.00	71.00
r2	0.01	0.32	-0.07	-0.05	0.08
Panel B: Emp					
sh_instr_all	0.21	0.08	0.05	0.04	0.04
	(0.07)***	(0.02)***	(0.01)***	(0.01)***	(0.04)
Mean	0.15	0.01	0.02	0.02	0.08
N	71.00	71.00	71.00	71.00	71.00
r2	0.04	0.35	0.02	-0.02	-0.01
Panel C: HH					
sh_instr_all	0.09	0.06	0.04	0.03	-0.05
	(0.09)	(0.01)***	(0.02)**	(0.02)	(0.05)
Mean	0.23	0.02	0.03	0.04	0.11
N	71.00	71.00	71.00	71.00	71.00
r2	-0.02	0.28	-0.04	-0.03	0.04

Notes: This table shows the district-level regressions on within-district rural-rural migration. In all the regressions, treatment status is instrumented by the cutoff dummy. I restrict the calculation of the treatment share to three hundred below and above the bandwidth. The dependent variable is migration share, which is measured as a share of the total number of migrants out of the rural population. Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$