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Political Agency and Public Health Care: Evidence from India

Abstract

A growing literature studies the effect of enhancing the agency relationship between political incumbents and constituents on the use of health care, and specifically maternal and preventive care services. We examine the development of institutions of self-governance in India, and specifically the 2005 reform—the National Rural Health Mission that introduced village health and sanitation committees—to study the effects of the strengthening of the political agency on collective health care decision-making in rural areas. We examine maternal and preventative child health care use, before and after the introduction of village health and sanitation committees. Our results suggest that the introduction of village health and sanitation committees increases access to several maternal health care and some but not all immunisation services. The effect size is larger in larger villages and those closer to district headquarters. Part of the effect is driven by an increase in the utilization of the public healthcare network.

JEL-Codes: H700, I180.

Keywords: decentralization, direct democracy, India, immunization, maternal healthcare, public health care, preventative health care.

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1 Introduction

The development of institutions of self-governance are argued to strengthen the agency relationship between political incumbents and constituents in the delivery of essential public services. This effect is particularly important in guaranteeing access to health care among more vulnerable populations whose specific preferences and needs are not always accounted for by electoral processes. Electoral processes often aggregate preferences in a crude way, and it is not uncommon that political priorities do not align with the preferences and needs of neglected population groups. Traditional forms of political participation did not perform much better insofar as they were often insensitive to the preferences of minorities. However, when such populations are locally concentrated, political processes can be designed to enhance the responsiveness to the demands of vulnerable populations by incolving the public in collective decision making. This is our interest in this paper.

One of the important areas where enhancing local political participation can influence outcomes—is in setting health care priority decisions. Health care is an essential policy area in which public intervention has frequently shown evidence of failure (Chaudhury *et al*. 2006). The latter can be in part attributed to information asymmetries between both patients and providers in determining the quality of care (Dulleck and Kershbamer, 2006), as well we between constituents themselves in setting program priorities However, so far limited research has examined the extent to which the involvement of local preferences in decision-making the use of health care. This paper attempts to contribute to testing the latter proposition. In doing so we inquire about whether all health services equally responsive to

further participation? Are preventative services which produce long term effects any different? What are the mechanisms explaining and effects on health care delivery, if at all?

Testing the effect of furthering local democracy is challenging. A paradigmatic country in which to examine the effects of local health care decentralization is India. India's health care is largely privatised, that is, about 70% of households visit and pay private providers out of pocket. India is one of the world's largest countries run by a quasi-federal system in which states are increasingly gaining more control of their healthcare system. In 1992, the 73rd and 74th Amendments to the Constitution established the Panchayati Raj Institutions (PRIs), self-governance agencies at the local level. The PRIs enjoy financial autonomy, and one of their main activities includes organizing village meetings to provide a forum to reduce problems of agency, which political decision makers typically suffer from. Village meetings (Gram Sabhas) are called by the Village Panchayat (VP) – including 1 to 5 villages - to discuss resource allocation decisions in the village including healthcare, and include a body consisting of participants on the electoral register in addition to playing a role in supervising the VP by ratifying its budget and identifying potential untargeted beneficiaries. Such meetings are intended to reduce problems of political agency, by involving minority groups and interest groups (e.g. women who can advise on maternal health care needs), and raise awareness of the resources available and trade-offs considered. However, we know little about the effect on welfare and wellbeing[1].

This paper examines the effect of the introduction of a Village Health and Sanitation Committees (VHCs) on the use of maternal and preventive health care. Unlike Besley et al (2005), we focus the introduction of VHCs in the context of the National Rural Health

[1] The exception is Besley et al. (2005) who show an effect of VP on the selection of beneficial welfare programmes for disadvantaged groups.

Mission (NRHM). So far, preliminary evaluation of the functioning of the NRHM (Bajpai et al. 2009), is mainly descriptive and examined a handful of healthcare outcomes. This paper fills the gap by estimating an instrumental variable model that adjusts for the non-random introduction of VHCs and provides causal inferences. We have used the number of times the Gram Sabha meetings were held last year, as the instrument variable. More meetings would imply that people are consulted regularly on resource allocation decisions in the village and ensure local accountability. Our estimates include controls for both time (survey interview date) and state-specific effects (given that health care is organized at the state level in India). We further examine the performance of VHCs by investigating whether the VHCs develop village health plans and whether this has an effect on the use of maternal and child health care (MCH) services.

Our paper contributes to the wider literature by examining a specific case in which a policy intervention can be identified. One previous study (Kumar and Prakash 2012) has examined a related question, focusing on two states in India (Bihar and Jharkhand). They studied the effect of both decentralization and women's reservations (a requirement that one-third of village PRIs leadership positions are reserved for women) on safe deliveries and institutional births. We follow a different strategy. Instead we focus here exploiting the variability in the adoption of VHCs and the different timing of births, and study the effect on a more comprehensive set of outcomes—MCH services—for all the representative samples of Indian states covered by the District Level Household Survey (DLHS), which is a sample of 202,000 individual respondents. We employ an instrumental variable strategy to account for the omitted variable bias present in the adoption of VHCs. Namely, the adoption of VHCs is not a random event, but one that results from some common unobservable element such as the performance of village panchayats, which we pick up by examining the how regularly village

panchayats consult the people. Our results are significant and suggest an alternative to extending the role of the private sector in Indian health care as some studies suggest (Das *et al*, 2016).

The organization of the paper is as follows: Section 2 provides the background; Section 3 is devoted to the data and methods; Section 4 contains the results, and Section 5 concludes.

2 Background

2.1 Political agency and health services

The enhancement of local democracy is expected to improve the responsiveness of decision makers to their constituents. However, the precise mechanisms underpinning such effect are still unclear. It is not infrequent in developing country contexts that both opposition and minority groups lose interest in council/village meetings, or see themselves as ineffective, which might consolidate the ruling elite (Bardhan 2002). In the absence of political participation, the traditional prescription of fiscal federalism literature (which envisages decentralization reforms as resulting from a trade-off between the costs associated with the presence of spill overs and economies of scale versus heterogeneity costs), might not work well insofar as governments might not be accountable enough, and instead different forms of local capture can emerge (Bardhan 2002). Hence, whether political decentralisation is indeed responsive to the welfare demands of constituents depends, quite crucially, on the institutional design of the political agency.

Among all areas of government intervention, social services and healthcare in particular, are subject to important information asymmetries, and hence improvement in government accountability might not always translate immediately into better outcomes. However, among

all areas of healthcare delivery, one would expect to see an effect on the uptake of preventive care, which is typically associated with an unsatisfied demand for health and could arguably be better addressed when a channel is offered for collective healthcare decision-making to aggregate demands for health care improvement. Hence, based on this one would expect heterogeneous effects of local accountability across different types of health care, and especially one can distinguish curative and preventive care.

Probably, the most important argument to advocate for further health system decentralization is government accountability. Local or regional governments tend to have an informational advantage in identifying the needs of their populations, and if governments are more accountable at lower levels there might be 'political incentives' for politicians at the local level to use that advantage to get re-elected. Hence, if the latter holds true, one would expect the quality of public healthcare to improve under decentralized governments. Azfar et al. (2000) surveyed the preferences of individuals (constituents) and bureaucrats at different levels of government in the Philippines; they found evidence of a positive correlation between constituents' and bureaucrats' preferences at the local level, but no correlation at higher levels of government. Similarly, evidence of an expansion in the quality of social services in Bolivia after municipalities took control of social service delivery (Faguet, 2001).

Nonetheless, the question of the efficiency of centralization has to grapple with elite capture—that is, whether the central or state government is more likely to be captured by elites than is the local government. This would impact service delivery, together with efficiency, as authority is allocated to those responsive to social needs. The extent of elite capture depends on the existence of social inequality, which could pave the way for some elite collusion and avoid catering to people's needs. As Bardhan (2002) argues, the extent of local capture depends on traditions of public participation, regulation, and media attention.

But the general view is that central governments are more likely to be captured, given the larger returns of doing so, which explains to some extent the large funds being spent on national political campaigns. In contrast, local governments are more trusted and deliver more satisfaction (on visible dimensions of public service) than central governments. Some consistent evidence with the argument is found in Brazil, where the number of public clinics and consultation rooms—the visible public goods—are positively related to voter turnout, but not the number of doctors and nurses (Mobarak et al. 2011). Hence, one would expect decentralized governance to result in greater use of public services (mostly visible to the public), and especially public healthcare.

One of the limitations of traditional fiscal federalism approaches lies in the consideration of *information asymmetries*, specifically among poorer population groups who might not be informed enough to make efficient 'voting with one's feet' decisions. In the case of healthcare, information asymmetries can be significant as information is often technical, and hence the objective quality is not clearly observable. Furthermore, many services are community-specific and often either exclude non-residents or impose transaction costs on non-residents and outsiders. This is especially the case in developing countries, which lag behind in institutional development, and it is not uncommon to find that they are subject to the governance of corrupt bureaucrats. The latter makes accountability more complex to trace, and hence returns of decentralization are not always granted

Given that the funds/taxes decentralized to local levels of government are less flexible and more regressive, there is some degree of concentration of economic activity in certain areas, which can create territorial inequalities. Local governments in poor areas face difficulty in raising fiscal revenues, and thus creating a pervasive fiscal imbalance. In India, Bardhan (2002) argues there is evidence that local democracy and states are more effective than

central government, but then again, there are large differences across states; for example, West Bengal is a state with high trust and Bihar is one with low trust (Mitra and Singh 1999). Despite spending a small share of gross domestic product (GDP) on healthcare, a disproportionate share of the health budget is dedicated to inpatient care, as opposed to preventive care—the latter being more pro-poor (Peters et al. 2002). Hence, this paper focuses primarily on public, preventive, and outpatient care. In India, evidence suggests that while a higher voter turnout in a district increases the allocation of nurses to rural areas of the district, it has no effect on the allocation of doctors and has a negative effect on the allocation of teachers (Betancourt and Gleason 2000).

2.2 Governance in India

Decentralization of governance has always been envisaged in post-independence India. In a predominately rural and heterogeneous country like India, decentralization was foreseen to bring inclusive development. PRIs constitutional amendments were based on the premise that local government would lead and manage social programmes by adapting them to local contexts, and would be accountable to the community they serve. However, the vision that self-government would pave the way for development remained an unrealized goal even after two decades of PRIs. PRIs were riddled with problems: they lacked political and bureaucratic power, which continued to be held by the state and central government, and they were largely constituted of higher caste members. Weaker sections of society, like the scheduled tribes (STs), scheduled castes (SCs), and women, were not adequately represented in local government. This was particularly problematic in healthcare, given the serious consequences of poor governance.

In India, public health and sanitation, and management of hospitals and dispensaries are the state's responsibility. Medical education, medical professionals, and family control are the joint responsibilities of the central government and the states. In terms of health budgets, district[2] officials aggregate demand for healthcare provision from local governments (PRIs) and present them to the state government. These are then discussed in the respective state legislative assemblies and incorporated into state budgets. The implementation of policy decisions mainly rests with the District Planning Committees that coordinate information flows from the lower levels to the states. When power over the implementation of developmental projects was devolved to the district and village levels, according to the 1993 Constitutional Amendments, the PRI structure included elected bodies at the village, block, and districts levels, except for small states with populations under two million people. Panchayat elections take place every five years, and one-third of the seats are reserved for women and SCs/STs; state legislation can further reserve seats for other underrepresented groups.

The PRI amendments listed the functions suitable for devolution to the VPs; states, however, had considerable autonomy in interpreting and defining the scope of decentralization. Although these amendments were a big step in the decentralization process, there was some degree of uncertainty about the precise role of Panchayats in the political, administrative, and fiscal functioning of the states, and over the years the process and reach of decentralization varied across states. Johnson (2003) and Singh (2008) argue that decentralization in India has been implemented with uneven distribution of tax and administrative capacities. Kerala is probably the best example of decentralization, where VPs were given real autonomy and

[2] Districts are administrative units lower than states that play an active role in areas of welfare such as healthcare.

fiscal devolution. In many other states, the role of VPs remained restricted. Gram Sabhas often had no power to approve plans and budgets, their role was mainly seen as consultative. The PRIs, on the other hand, acted mainly as executing and supervisory agents for the state government.

The second wave of impetus to decentralization, specifically targeting the health sector, was brought about by the NRHM in 2005. The NRHM was launched to bring about 'necessary architectural correction in the basic healthcare delivery system', with the goal of improving the availability of and access to good-quality healthcare services, especially for those residing in rural areas. The NRHM action plan included multiple, interlinked components aimed at increasing decentralization of decision-making and management of health programmes. It established the VHCs, the standing committee of the VP, to provide oversight of all NRHM activities at the village level. Under the NRHM, VHCs are central to 'local-level community action' and to fostering decentralized health planning. A VHC has a minimum of 15 members, which includes members of the VP (with priority given to elected, women VP members) and community (including those working in the health sector, service users and members of community-based organizations). Fifty per cent of the VHC members should be women, and SCs, STs, and minorities should be adequately represented as per their population in the village.

Specifically, VHCs are responsible for developing village health plans and for managing an untied fund of Rs.10,000 per annum to enable local planning and action. They organize health-promotion activities and mobilize pregnant women and children to access maternal and health care services, especially antenatal care (ANC), facility delivery, postnatal care (PNC), and childhood immunizations.

2.3 Health care governance in India

India's health care performance is still far from what is desired and is still heavily burdened. Importantly, such a burden can be significantly reduced as many existing morbidities and mortalities are preventable, often with access to primary care, which is provided by the public health network. The Indian health system was initially designed as a publicly funded and run system that would provide healthcare free of charge. Policy reform has emphasized primary health care with a limited private sector presence.

In India, public spending on health is about 4 per cent of GDP, but the health system is wasteful and there is great scope for significant efficiency improvements. Currently, it is inefficient and delivers very low-quality health services, so much so that the private sector has become the de facto provider of health services in India. Although privately purchased or employer-provided health insurance is available to only a small share of the population (Reddy 2015), even the poor frequently choose private health care—which is an unregulated sector. Hence, the extra financial burden of ill health can exacerbate problems of poverty. Indeed, 70 per cent of healthcare expenditures consist of out-of-pocket spending, which is highly impoverishing (Reddy 2015).

Healthcare infrastructure has often been underutilized and inefficiently run (Reddy 2015). Most programmes have focused on maternal and child health, infectious diseases, and family planning. Yet, it is inadequate in terms of coverage of the population, especially in rural areas, and grossly underutilized because of the dismal quality of health care provided. It is not uncommon that public health centres are understaffed due to absenteeism and that drugs and equipment are missing or in short supply. Absenteeism is particularly costly because it has an associated salary burden (Chaudhury et al. 2006). Similarly, it is not uncommon for

rural health posts to remain vacant due to lack of availability of qualified doctors and other healthcare workers; further, absenteeism is augmented due to lack of effective monitoring. Rural healthcare structure is often unable to respond effectively to local realities and needs.

It is against the background described above that the NRHM was drafted in 2005 to improve public health services, with a special focus on states with weak public health infrastructure and indicators. The NRHM focuses mostly on maternal and child health, aiming to reduce mortality in those groups in line with the Millennium Development Goal targets; it is focused on 18 states designated as 'high-focus states' (Reddy 2015). The original primary goal was to increase the availability of, as well as access to, quality health care among those living in rural areas, especially the poorest groups, women, and children. The NRHM is undoubtedly the most ambitious rural health initiative to be launched in post-independence India. It envisages an incremental 30 per cent budget over existing budgetary outlays every year to meet the goal of increasing the public health outlay from 0.9 per cent to 2–3 per cent of GDP. The states are expected to raise their contributions by a minimum of 10 per cent per year to support the programme.

3 Data and methods

3.1 The data

We use the Indian District Level Household and Facility Survey (DLHS), repeated cross-sections, to study the effect of the NRHM. The DLHS-3, administered during 2007 and 2008, is one of the largest demographic and health surveys carried out in India, with a sample size of about seven million households, covering all districts of the country. This survey was designed to capture the impact of the NRHM on MCH outcomes, family planning, and other

reproductive health indicators. Unlike the previous two waves, DLHS-3 interviewed both married (aged 15–49) and unmarried women (aged 15–24). Questionnaires were bilingual, in the local language and in English. The advantage of this dataset is that it provides individual-, household-, and village-level information.

MCH information was collected from 1,245,590 women (451,951 households) across India. Women were specifically asked about their use of maternal health services (ANC, delivery, and PNC) for the most recent birth in the last five years, and immunization information was collected for the youngest two surviving children born during this time. We, therefore, use data pertaining to the youngest child born during 2004–08 (169,672 children) to study the use of maternal health services, and we use data pertaining to the youngest two children born during 2004–08 (211,964 children) to explore immunization uptake.

The village data[3] in DLHS-3 allows us to identify the presence of a VHC in the village. It further allows us to access the performance of these committees, for example by examining whether the VHC develops health plans. The DLHS-3 data pertain to 22,508 communities spread across 592 districts and 34 states (excluding Nagaland). After the launch of the NRHM, 28.9 per cent of the villages set up a VHC (see Appendix Table A1 for details). Further, 61.2 per cent of the VHCs develop village health plans and 44.8 per cent manage untied fund of Rs.10,000. Hence, the data allows us to go beyond intention-to-treat estimates and measure the treatment effect on the treated quite precisely. By examining the use of MCH services we can compare the effects of the introduction of VHCs on the probability of using MCH services, before and after the introduction of the NRHM.

[3] In the survey, this refers to the PSU (primary sampling units), which could be a single village or a group of smaller villages. Sometimes larger villages were also split into two or more PSUs.

The DLHS-3 survey was designed using multistage stratified systematic sampling using the 2001 census from India as the sampling frame. Specifically, the design is based on districts alongside 50 primary sampling units (PSUs)—which were census villages in rural areas and urban wards—selected in the first stage by systematic probability proportional to size sampling. PSUs were stratified by the number of households into three strata—fewer than 50, between 50 and 300, and more than 300 households.

3.2 Empirical strategy

The empirical strategy of the paper focuses on outcomes that can be measured for the period before and after the NRHM reform. Given that it does not seem reasonable to assume that the VHCs were set up at random, we draw upon an instrumental variable (IV) strategy, using information on the set up of VHC that is unrelated to the health outcomes examined. For the health outcomes, we observe births before and after the reform; we can write the following estimation:

$$Y_{it} = \gamma_0 + \gamma_1 Head_{tg} + \gamma_2 VHC_{itg} + \gamma_3 X_{itg} + \mu_g + \delta_t + \varepsilon_{it} \quad (1)$$

Y refers to the use of MCH services (ANC, public facility delivery, PNC, and childhood immunizations). Our regression on health care utilization and exposure to VHCs allows identification of political externalities, as in Besley et al. (2005), and *i* refers to individuals, *g* refers to the state/village, and *t* refers to time. Our parameter of interest is γ_2, which identifies the changes in health care utilization after the introduction of VHCs, over and above the effect of time trends and state fixed effects and alongside several controls for confounding effects. Our exposure variable refers to being exposed to a VHC. We control for contextual effects such as the characteristics of the household head, mother and child. We include a control variable 'head', which controls for the fact that the heads of Panchayat live in the

village itself might exhibit systematically better outcomes. We use a linear model since fixed effects probit estimates are inconsistent in short panels (Nickell 1981). Standard errors are robust to arbitrary forms of heteroscedasticity and clustered at the household level. The identifying assumption is that the timing of policy change is not correlated with the trends in health care use. Treated cohorts are born after 2005, while control cohorts are born before, and we take advantage of this variation in birth dates.

In this section, we explain further our empirical strategy and discuss how we address some potential threats to the specification that could have biased our results. From an econometric perspective, the natural question would be whether the variation in treatment can be deemed exogenous and, if not, whether we know what determined implementation—for example, whether it was a phased-in programme with phase-in defined by the literacy rate in the district, or whether there was simply a variation in bureaucratic efficiency in implementing a statewide programme. In our data, we can clearly identify the use of healthcare services and whether the village has a VHC, but the data are only available for one wave that contains two years following the implementation of the reform. In addition, it can be argued that the presence of common unobservables may drive both the introduction of VHCs and health care use. Hence, we have chosen to follow an IV strategy. An IV strategy requires an instrumental variable that should influence the intervention (in our case, setting up of the VHC) but should not be related to the outcome (i.e. MCH service use) except through its effect on the intervention. The IV we use is the number of times the Gram Sabha meetings were held last year. We expect this to be an indicator of the performance of the PRIs and local accountability, which will explain the creation and functioning of a VHC but will not influence health care utilization. The instrument is hence theoretically valid, and we will test whether it is statistically significant and strong. We, therefore, estimate the following:

$$VHC_{it} = \vartheta_0 + \vartheta_1 GSmet_{it} + \vartheta_2 X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

The Wu–Hausman test rejects the null hypothesis of endogeneity, and the first stage indicated a value of the F exceeding the Staiger criteria with a value for 23; the coefficient, as expected, appears to be significant and positively associated with the exposure to a VHC. Another threat to the specification lies in the presence of district–year varying changes in other determinants, which we address by controlling for unobservable trends. In the specification illustrated above we control for state-specific trends, and in extensions of this we demonstrate robustness to district-specific trends and district by mother-cohort effects. We also control for time effects that control for the effect of time-specific covariates. We include the date of data collection (month and year) and year of birth. In addition, we run different specifications (OLS and IV), and we employ different treatment variables.

3.3 Falsification and robustness tests

We examine the effects on the use of MCH services before the NRHM for a subsample of states, to confirm that we are identifying the effect of the programme (which we do not report here). In addition, we measure the effect on home deliveries and the use of private healthcare services for deliveries to test whether the effects we are identifying, are the intended outcomes, as the creation of the VHC should encourage the use of public facilities and consequently should reduce deliveries at home and in the private health facilities.

3.4 Variables

Table 1 reports the main dependent variables of the study, which refers to whether the respondent delivered a child in a public health, facility consistent with the hypothesis that increasing the political agency would have enhanced the use of public healthcare in the context of India, where public healthcare is underused. The second set of variables includes a

list of MCH services, including childhood immunizations against tuberculosis (Bacillus Calmette-Guérin vaccine, BCG), diphtheria, pertussis, and tetanus (DTP), and polio, and deliveries under the caesarean section, which mainly refers to surgical procedures typically employed in high-risk deliveries. Table 1 includes the treatment variables of interest, including the presence of a VHC, which affects about 15 per cent of our sample and whether the VHC developed the health plans. In addition, we include information about whether the head of the VP lives in the community (41 per cent), the religion and caste of the household head, socioeconomic status (SES), mother's age at birth, whether the mother ever attended school, and the sex of the child. Also, we include another variable, JSY, which indicates whether the mother received benefits from a cash transfer scheme (Janani Suraksha Yojana, JSY) that was launched at the same time as the NRHM to promote institutional deliveries among poor mothers.

Figure 1 provides evidence on the uptake of immunization pre- and post-NRHM for areas with and without a VHC. For all vaccines considered (BCG, DTP, and polio) we find that where there is no VHC after the introduction of the NRHM there is an average pre-NRHM immunization uptake, while for areas with a VHC there is a spike in immunizations after the introduction of the NRHM. Similarly, Figure 2 shows that non-VHC areas exhibit average maternal health care use of deliveries in public facilities, caesarean section, ANC, and PNC. In contrast, we observe a spike after the introduction of a VHC. Nonetheless, these figures do not allow us to distinguish whether the effects are driven by other confounding factors rather than the introduction of a VHC. We need to review the results in the following section to gather a better picture of the effect of the introduction of VHCs.

4 Results

4.1 Effect of VHCs on maternal health care use

Given that a widespread improvement in MCH would require an expansion of access to public healthcare, Table 1 reports the effect of VHCs on the use of public health facilities for deliveries. Results from Table 1 indicate that village health committees (VHC) increase the probability of a delivery in a public facility (0.18pp or 56% increase), as well as access to ante-natal (0.31pp or 44% increase) and postnatal care (0.25pp or 64% increase). However, the effect on the use of cesarean section is not significant consistent with the need of more intensive use of resources for the success of deliveries by caesarean section. The controls suggest some interesting evidence. Living in the village where the head of panchayat resides, makes no difference on using public health care, antenatal care or post-natal care but increases cesarean section deliveries. ST/SC caste reduces the use of all types of care examined and younger mothers are less likely to use public facilities for deliveries, ANC or PNC. Finally, if the child is a boy as opposed to a girl, we find a significantly larger use of maternal care services, consistent with the higher value of a boy in rural India. Poorer households, larger households, older mothers, and female children have a lower probability of using public facilities for deliveries. These results are consistent with the idea suggested in the paper, that the strengthening of political agency is linked to an expansion of the use of public healthcare.

[Insert Table 1 about here]

4.2 Effects of VHCs on childhood immunizations

Similarly, as in Table 1, we find that boys are more likely to be immunised and children of older mothers, belonging to lower caste and lower income households are less likely to be immunised irrespective of the vaccine examined. However, Table 2 does not reveal an effect on preventive care across the board expect from BCG. Although, we find a positive and significant effect (0.15 pp or 16% increase) on VHC on BCG uptake, usually given at the time of birth, it is associated with the increase in public facility deliveries, no effect is found for polio or DTP which are provided after birth. These results are suggestive that VHC might be as responsive to treatments exerting long term effects.

[Insert Table 2 about here]

4.3 Performance of VHCs

In order to examine the main driver of the effect, we specifically were able to identify the whether a VHC drafts village health plans, on the use of maternal healthcare services and childhood immunizations are presented in Tables 3 (only IV models). Consistently, after formally testing the effects sizes, we find that the effect is not significantly different that previous effects reported in Table 2. This suggests that the effects if driven by villages that have drafted village health plans. Indeed, VHCs that draft health plans increase the use of both maternal health care services (deliveries in public health facilities, ANC and PNC) as well as childhood immunizations (BCG). As before, the results are not significant for caesarean sections and DTP and polio vaccinations. Access to health care, as expected, is higher for male children, and lower for households belonging to SC/ST castes and older mothers. It is also lower among poor households, except for public facility deliveries. The probability is less consistent with regard to the household size and younger mothers.

Although larger households have a lower probability of public facility deliveries and caesarean sections, the probability is higher for ANC and PNC. Younger mothers have a lower probability of public facility deliveries, ANC and PNC but a high probability of caesarean sections, and a higher probability also of their children being immunized against DTP.

[Insert Table 3 about here]

4.4 Heterogeneous Effects and Falsification Test

Finally, it seems reasonable to examine whether previous effects were different by billage characteristics. Specifically, Table 4 examines in the first panel whether the effect is heterogeneous across villages with a high concentration of SC/ST populations. Importantly, we do not find an effect and instead, our results show that the effect is independent of minorities and applied across the board. Similarly, we examine whether the effect is heterogeneous across large and small villages. Now, we find some evidence of heterogeneity insofar as the effect is larger effect in larger villages for post-natal care but not on other care examined. Then we examine whether being closer or further from towns exerts a differential effect, and we find that this only influence the probability of accessing public maternal care but no other services. Finally, we study whether being closer to district headquarters exerts a difference, and here we find a negative effect. Table 4 shows that VHC reduced deliveries at home and there was no effect on deliveries in the private health facilities. This reduction in home deliveries is found to be statistically significant for households belonging to lower castes, poor households, larger households, and for male children. This implies a change in preference from deliveries at home to deliveries in the public health facilities. Given the high

costs of private health care, this is not surprising especially since this change is driven by the most disadvantageous households (lower castes and income).

[Insert Table 4 about here]

5 Conclusion

This paper has examined the effects of the strengthening of political agency in the Indian health system after the introduction of the NRHM, which created village health and sanitation committees (VHCs). Such committees increased further the political accountability in health care decision making with regards to maternal health care. Specifically, we have examined the effects of VHC on two of the recurrent health system shortcomings, namely the limited use of public health care and the limited use of preventive care, drawing from several observable services such as the use of caesarean sections, ANC, PNC, childhood vaccinations, and the use of both public and private healthcare. That is, we distingush servicies that exert immediate effects and those with longuer term effects. We have relied on an empirical strategy that is explained by the introduction of voluntary health committees (VHC) which can be identified using a credible IV approach.

Our results suggest that the implementation of VHCs has increased the probability of health care utilization regarding public, ANC and PNC. Hence, VHC seem to address some of the endemic problems of the Indian health system. However, we only find some evidence of the introduction of VHC on preventive care. Specifically, we find that it some childhood immunizations such as BCG provided immediately after delivery but not the rest. We show that part of the effect lies in the increasing probability of using the public health network, which is rather underused in India. That is, the probability of a delivery in a public health

facility was found to increase with the adoption of a VHC. As a falsification test, we find that the home deliveries declined by a comparable magnitude, with no change in the use of private health care.

These findings suggest that strengthening political agency can, as expected, increase the use of public healthcare services, and especially increase the use of (underused) public health care facilities. This is especially important when a programme such as the NRHM targets more deprived areas that have a greater capacity to benefit. However, we fud not evidence of a significant change in preventive care that is not provided at the time of delivery. Policy implications indicate that the strengthening of political agency is an alternative to privatizing the health system, but it would not in itself increase the use of preventive health care. Hence, policy recommendations indicate that greater constituent involvement in collective healthcare decision-making can increase the use of public health, and can have a significant effect on the adoption of desirable preventive approaches.

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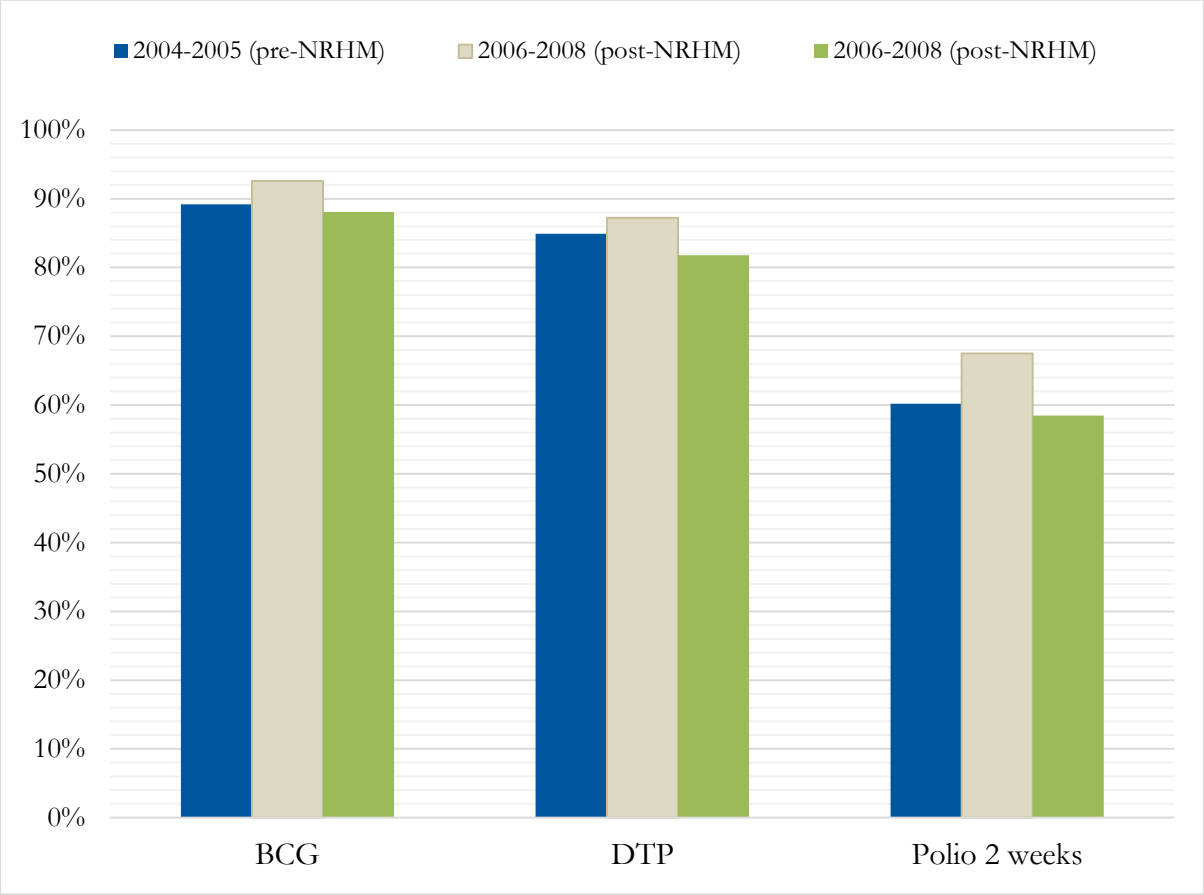
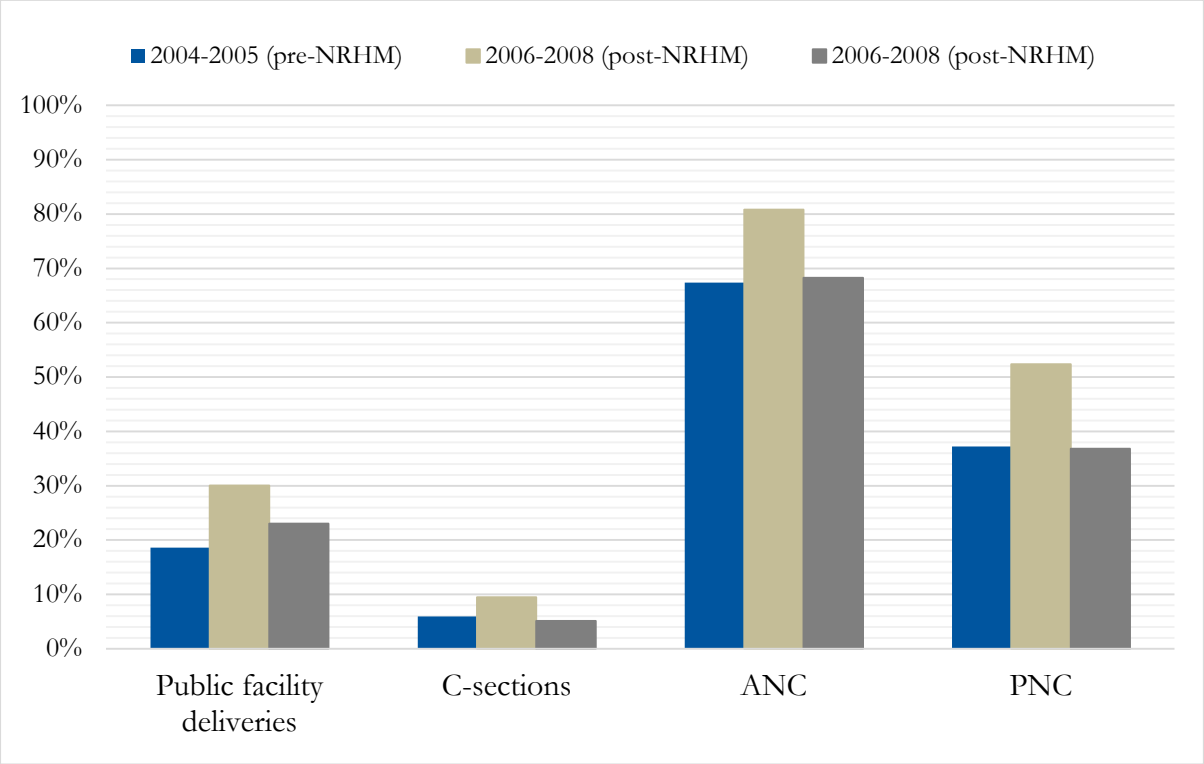
Figures and Tables

Figure 1: Immunization uptake, pre- and post-NRHM period



Source: Indian District Level Household surveys, all waves.

Figure 2: Maternal health care use, pre- and post-NRHM



Source: Indian District Level Household surveys, all waves.

Table 1: Effect of VHC on maternal care use

VARIABLES	(1) OLS-1	(2) OLS-2	(3) OLS-3	(4) IV-1	(5) IV-2	(6) IV-3
	Public health facility for deliveries					
VHC	0.086***	0.071***	0.017***	0.135***	0.199***	0.187***
	(0.003)	(0.003)	(0.003)	(0.022)	(0.028)	(0.071)
Constant	0.214***	0.250***	0.445***	0.206***	0.261***	0.477***
	(0.001)	(0.005)	(0.009)	(0.004)	(0.006)	(0.016)
R-squared	0.006	0.023	0.118	0.004	0.011	0.100
First-stage F-test				2642.1***	678.3***	202.4***
First-stage Instrument				0.010***	0.008***	0.003***
Observations	169,572	168,347	168,347	169,572	168,347	168,347
	Caesarean deliveries					
VHC	0.041***	0.041***	0.012***	-0.027**	-0.059***	-0.019
	(0.002)	(0.002)	(0.002)	(0.012)	(0.013)	(0.035)
Constant	0.054***	0.079***	0.125***	0.066***	0.071***	0.119***
	(0.001)	(0.003)	(0.006)	(0.002)	(0.003)	(0.009)
R-squared	0.004	0.011	0.057	-0.007	-0.011	0.055
First-stage F-test				2643.3***	678.3***	202.5***
First-stage Instrument				0.010***	0.008***	0.003***
Observations	169,553	168,328	168,328	169,553	168,328	168,328
	Ante Natal Care Use					
VHC	0.129***	0.118***	0.038***	0.199***	0.203***	0.315***
	(0.003)	(0.003)	(0.003)	(0.024)	(0.028)	(0.076)
Constant	0.679***	0.769***	0.877***	0.667***	0.776***	0.930***
	(0.001)	(0.006)	(0.008)	(0.004)	(0.006)	(0.017)
R-squared	0.011	0.033	0.126	0.008	0.028	0.086
Observations	169,567	168,342	168,342	169,567	168,342	168,342
First-stage F-test				2639.3***	677.3***	202.2***
First-stage Instrument				0.010***	0.008***	0.003***
	Post Natal Care Use					
VHC	0.154***	0.142***	0.025***	0.173***	0.090**	0.252**
	(0.003)	(0.004)	(0.004)	(0.031)	(0.040)	(0.103)
Constant	0.370***	0.440***	0.542***	0.367***	0.436***	0.582***
	(0.001)	(0.006)	(0.010)	(0.005)	(0.007)	(0.021)
R-squared	0.013	0.032	0.144	0.013	0.031	0.122
Observations	162,319	161,167	161,167	162,319	161,167	161,167
First-stage F-test				1894.2***	548.7***	160.4***
First-stage Instrument				0.009***	0.007***	0.003***
Controls	No	Yes	Yes	No	Yes	Yes
Time effects	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes

Notes: controls include whether the head of the panchayat lives in the village, caste, household below poverty, household size, mother's age and gender of the child. Robust standard errors in parentheses.

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

Table 2: Effect of VHC on childhood immunisation

VARIABLES	(1) OLS-1	(2) OLS-2	(3) OLS-3	(4) IV-1	(5) IV-2	(6) IV-3
	BCG vaccine uptake					
VHC	0.042***	0.034***	0.000	0.139***	0.152***	0.153**
	(0.002)	(0.002)	(0.002)	(0.019)	(0.024)	(0.068)
Constant	0.884***	0.842***	0.973***	0.870***	0.826***	0.982***
	(0.001)	(0.004)	(0.005)	(0.003)	(0.005)	(0.007)
R-squared	0.002	0.018	0.106	-0.010	0.002	0.084
First-stage F-test				2297.6***	557.9***	158.9***
First-stage Instrument				0.008***	0.007***	0.003***
Observations	191,952	190,587	190,587	191,952	190,587	190,587
	Polio vaccine uptake					
VHC	0.084***	0.071***	-0.000	0.149***	0.095	0.160
	(0.004)	(0.005)	(0.005)	(0.047)	(0.065)	(0.159)
Constant	0.591***	0.637***	0.552***	0.583***	0.635***	0.560***
	(0.002)	(0.008)	(0.015)	(0.006)	(0.011)	(0.017)
R-squared	0.003	0.008	0.082	0.001	0.007	0.073
First-stage F-test				982.5***	292.8***	98.7***
First-stage Instrument				0.007***	0.006***	0.002***
Observations	108,054	107,370	107,370	108,054	107,370	107,370
	DTP vaccine uptake					
VHC	0.045***	0.048***	0.013***	0.101***	0.074***	0.039
	(0.002)	(0.002)	(0.003)	(0.022)	(0.028)	(0.078)
Constant	0.828***	0.798***	0.968***	0.819***	0.794***	0.970***
	(0.001)	(0.005)	(0.007)	(0.003)	(0.006)	(0.008)
R-squared	0.002	0.031	0.119	-0.001	0.031	0.119
Observations	169,567	168,342	168,342	169,567	168,342	168,342
First-stage F-test				2219.6***	541.0***	154.7***
First-stage Instrument				0.008***	0.007***	0.002***

Notes: controls include whether the head of the panchayat lives in the village, caste, household below poverty, household size, mother's age and gender of the child. Robust standard errors in parentheses.

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

Table 3: Effect of performance of VHC (drafting a village health plan) on maternal health care use and childhood immunisations

VARIABLES	(1) Public	(2) C-Section	(3) ANC	(4) PNC
VHC	0.210***	-0.021	0.354***	0.321**
	(0.079)	(0.040)	(0.084)	(0.131)
Constant	0.440***	0.123***	0.867***	0.534***
	(0.009)	(0.006)	(0.008)	(0.010)
Time effects	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	168,347	168,328	168,342	161,167
R-squared	0.101	0.055	0.079	0.117
VARIABLES		(5) BCG	(6) Polio	(7) DTP
VHC		0.133**	0.134	0.035
		(0.059)	(0.134)	(0.069)
Constant		0.955***	0.535***	0.963***
		(0.009)	(0.023)	(0.011)
Time effects		Yes	Yes	Yes
State FE		Yes	Yes	Yes
Observations		190,587	107,370	185,371
R-squared		0.092	0.075	0.119

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Robustness Checks

VARIABLES	(4.1) Public	(4.2) C-section	(4.3) ANC	(4.4) PNC	(4.5) BCG	(4.6) Polio	(4.7) DTP
	High vs low SC/ST villages						
VHC	0.183**	-0.027	0.337***	0.279**	0.180**	0.139	0.068
	(0.076)	(0.037)	(0.079)	(0.110)	(0.074)	(0.169)	(0.083)
highSCSTxVHC	0.015	0.032	-0.020	-0.036	-0.056	0.064	-0.064
	(0.043)	(0.021)	(0.043)	(0.062)	(0.038)	(0.104)	(0.043)
High SCST	0.003	-0.003	0.011	0.008	0.014**	-0.005	0.020***
	(0.008)	(0.004)	(0.008)	(0.010)	(0.006)	(0.014)	(0.007)
Observations	168,347	168,328	168,342	161,167	190,587	107,370	185,371
R-squared	0.099	0.052	0.078	0.113	0.084	0.070	0.118

VARIABLES	(5.1) Public	(5.2) C-section	(5.3) ANC	(5.4) PNC	(5.5) BCG	(5.6) Polio	(5.7) DTP
	Larger vs smaller villages						
VHC	0.194***	-0.017	0.343***	0.191*	0.163***	0.220	0.060
	(0.072)	(0.036)	(0.074)	(0.100)	(0.062)	(0.154)	(0.073)
bigPSUxVHC	0.009	-0.011	-0.092*	0.198**	-0.016	-0.178	-0.051
	(0.050)	(0.025)	(0.052)	(0.082)	(0.048)	(0.124)	(0.055)
BigPSU	-0.005	0.011**	0.031***	-0.004	-0.000	0.024	0.004
	(0.010)	(0.005)	(0.011)	(0.015)	(0.009)	(0.018)	(0.010)
Observations	168,347	168,328	168,342	161,167	190,587	107,370	185,371
R-squared	0.097	0.051	0.087	0.100	0.084	0.073	0.118

VARIABLES	(6.1) Public	(6.2) C-section	(6.3) ANC	(6.4) PNC	(6.5) BCG	(6.6) Polio	(6.7) DTP
	Villages closer and farther to towns						
VHC	0.255***	0.005	0.379***	0.338***	0.164**	0.201	0.067
	(0.076)	(0.037)	(0.081)	(0.110)	(0.073)	(0.174)	(0.082)
nearTownxVHC	-0.134***	-0.037	-0.098*	-0.143*	-0.011	-0.076	-0.048
	(0.049)	(0.024)	(0.051)	(0.075)	(0.042)	(0.118)	(0.050)
nearTown	0.069***	0.015***	0.060***	0.061***	0.022***	0.029**	0.033***
	(0.008)	(0.004)	(0.009)	(0.012)	(0.006)	(0.015)	(0.007)
Observations	168,347	168,328	168,342	161,167	190,587	107,370	185,371
R-squared	0.097	0.052	0.076	0.110	0.083	0.071	0.119

VARIABLES	(7.1) Public	(7.2) C-section	(7.3) ANC	(7.4) PNC	(7.5) BCG	(7.6) Polio	(7.7) DTP
	Villages closer and farther to district headquarters						
VHC	0.243***	0.018	0.419***	0.343***	0.189**	0.142	0.072
	(0.080)	(0.039)	(0.084)	(0.124)	(0.075)	(0.178)	(0.086)
nearHQxVH	-0.112**	-0.063***	-0.189***	-0.157**	-0.069	0.030	-0.062

C							
	(0.047)	(0.023)	(0.049)	(0.071)	(0.042)	(0.115)	(0.049)
nearHQ	0.063***	0.025***	0.080***	0.077***	0.034***	0.037***	0.040***
Covariates	Yes	Yes	Yes	Yes	(0.006)	(0.014)	(0.007)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	168,347	168,328	168,342	161,167	Yes	Yes	Yes
R-squared	0.099	0.051	0.076	0.113	190,587	107,370	185,371
					0.083	0.074	0.119

Covariates: Head, BPL, Size, Mother's Age, Boy
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix

Table A1: Variable definitions and description

Variable	Definition	Mean (SD) or Percentage
Dependent variables		
Public	Delivery in a public health facility = 1; 0 otherwise	23%
Caesarean	Caesarean delivery = 1; 0 otherwise	6%
ANC	Had at least one antenatal care visit = 1; 0 otherwise	70%
PNC	Had PNC within two weeks of birth = 1; 0 otherwise	39%
BCG	Child had BCG vaccine = 1; 0 otherwise	89%
Polio	Child had polio vaccine within two weeks of birth = 1; 0 otherwise	60%
DTP	Child had at least one dose of DTP vaccine = 1; 0 otherwise	83%
Independent variables—decentralization		
VHC	Village had a VHC = 1; 0 otherwise	15%
Health plan	VHC developed village health plans = 1; 0 otherwise	14%
Independent variables—other variables		
Head	Panchayat head lives in the village = 1; 0 otherwise	59%
ST/SC	Household belongs to ST/SC caste = 1; 0 otherwise	40%
BPL	Household belongs to the Below Poverty Line group =1; 0 otherwise	34%
Size	Number of family members in the household	7 (3)
Age	Mother's age at the time of delivery <20 years = Age <20	15%
	Mother's age at the time of delivery 20-29 years = Age 20-29	68%
	Mother's age at the time of delivery 30-39 years = Age 30-39	16%
	Mother's age at the time of delivery ≥40 years = Age ≥40	1%
Boy	Child is a boy = 1; 0 if girl	52%

Table A2: Villages that had a VHC in 2008

State	Villages with a VHC	Percentage	Total number of villages
Jammu and Kashmir	40	6.78	590
Himachal Pradesh	81	14.75	549
Punjab	179	22.57	793
Chandigarh	2	50.00	4
Uttarakhand	64	11.35	564
Haryana	145	17.68	820
Delhi	7	21.88	32
Rajasthan	126	9.43	1,336
Uttar Pradesh	714	20.68	3,452
Bihar	29	1.71	1,694
Sikkim	64	28.44	225
Arunachal Pradesh	12	2.48	483
Manipur	88	21.62	407
Mizoram	205	52.16	393
Tripura	80	37.04	216
Meghalaya	79	22.57	350
Assam	123	10.52	1,169
West Bengal	125	16.03	780
Jharkhand	72	7.36	978
Orissa	41	3.56	1,153
Chhattisgarh	139	18.83	738
Madhya Pradesh	613	28.33	2,164
Gujarat	324	29.86	1,085
Daman and Diu	16	36.36	44
Dadra and Nagar Haveli	8	18.18	44
Maharashtra	825	46.56	1,772
Andhra Pradesh	527	50.10	1,052
Karnataka	466	37.92	1,229
Goa	3	6.82	44
Lakshadweep	9	29.03	31
Kerala	466	71.47	652
Tamil Nadu	615	53.62	1,147
Pondicherry	16	28.57	56
Andaman and Nicobar	22	28.57	77
Total (average for percentage)	6,325	24.21	26,123

Note: the average percentage is computed from the survey data rather than the numbers shown in the table.

Source: authors.