Income Shock, Heterogeneity, and Local Policy Responses: Evidence from Indonesia

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Abstract

This paper investigates the role of government in mitigating the risk of exposure to trade policies through local policy responses in Indonesian villages. I study the consequences of sudden and major rice import restriction that imposes sharp increase and considerable variation in domestic rice price across provinces. I combine variation in rice price with geographic variation in rice suitability as an indirect measure of income shock at village level. I find some evidence that rice price hike has larger positive aggregate effects on income for villages more suited in rice production, as indicated by increased nighttime lights intensity and lower demand for public services for the poor (e.g., health insurance). I find that negative income shocks: 1) increase probability of having health facilities but reduce probability for public schools, 2) have no effect on changes in the intensive margins of *any* public goods, and 3) increase the number of development projects. Overall results suggest that adverse income effects improve the distribution of local policies. Heterogeneity analysis reveals that the main results appear to be driven by less ethnically diverse, more unequal, and rural villages.

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JEL Classification: H4,H7,O1,O2,R1.

1 Introduction

- [Limitation of previous studies that can be addressed by this study]
- [Value added of this study; emphasis on general equilibrium impacts because I examine effects at village level.]
- [Data construction effort should be emphasized because this study combines multiple data sources which take a lot of time to merge.]
- [aggregate preferences literature for related studies; see cesi cruz paper on public goods in philippines]
- [Differences with previous studies evaluating changes in food price; previous studies mostly use landholding data to examine impacts on households]

There has been an increasing interest on studying the consequences of trade-related policies on individual or household welfare (Chen and Ravallion, 2004; Edmonds and Pavcnik, 2005; Faber, 2014; Borusyak and Jaravel, 2018). Although the aggregate impacts on communities are equally important, this topic remains relatively underexplored (Feler and Senses, 2017), especially the role of government in mitigating the risk of exposure to trade policies in developing countries.

In this paper, I investigate local policy responses to a trade protection policy that has broad economic consequences in Indonesia. I estimate causal effects of income shocks resulting from the unexpected and stringent rice import restriction on public good provision and development projects at the village level. I use two plausibly exogenous variations. I exploit the fact that the policy has imposed permanent increase and considerable spatial and temporal variations in domestic rice price across provinces. I combine price variation with geographic time-invariant variation in rice suitability at the village level to obtain an indirect measure of aggregate income shock across villages.

Studying the consequences of rice import restriction provides an ideal environment to address my research questions for two main reasons. First, it causes large income shocks to a large

proportion of Indonesian population because rice is a staple food.[1] Second, the policy was implemented during the decentralization era, where district governments have the authorities to allocate resources to villages. Furthermore, decentralization era ushered in democratic reforms that allow freedom of expressions, which had been suppressed during the President Soeharto's regime. [2] These two factors suggest that rice import restriction could have important implications on the distribution of public goods and development projects. Indeed, studies have documented that income shocks may affect political aspiration and demand for redistributive policies (Brückner and Ciccone, 2011; Becker et al., 2016; Di Tella and Rodrik, 2019).

The main results show some evidence that rice price hike has larger positive aggregate effects on income for villages with higher rice suitability, as indicated by increased nighttime lights intensity and smaller number of people eligible for public services for the poor (e.g., health insurance). Negative income shocks increase the probability of having health facilities, but not public schools, especially secondary schools. There is no evidence that income shocks affect changes in the number of any public goods. On the other hand, income shocks are negatively associated with the number of development projects. One potential explanation is that villages have relatively more controls over development projects than public goods provision, which are largely determined by the district government. Overall, these results suggest that negative income shocks increase redistributive policies, especially when villages have more controls over resources. Heterogeneity treatment analysis reveals that the main effects appear to be driven by less diverse, more unequal, and rural villages.

This paper connects to several strands of literature. First, this study is related to a body of research that studies resource allocation and public good provision within communities. Studies have documented evidence that connect income with support for redistributive programs. Moene and Wallerstein (2003) investigate consequences of income inequality on welfare spending in ad-

[1] Existing studies attribute increased poverty rate to increased price of rice (e.g., McCulloch, 2008; Warr and Yusuf, 2014)

[2] The authoritarian President Soeharto ruled for more than three decades, 1967-1998. The 1997/1998 Economic crisis induced massive protests that ended with him resigning in 1998. Ever since then, Indonesia has had a series of political reforms to provide wide-ranging autonomies to district governments to distribute fiscal and public good resources to villages.

vanced industrial countries. They distinguish redistribution from insurance program and find that expenditures on redistributive programs (e.g., pensions and health care) are largely uncorrelated with income inequality, while spending on insurance or income replacement programs (e.g., unemployment insurance) are negatively correlated with income inequality, which is consistent with predictions from theories on redistributive social insurance programs.

This study also contributes to the vast literature on determinants of public good provision, such as decentralization or federalism (Besley and Coate, 2003), ethnic diversity (Alesina et al., 1999; Miguel and Gugerty, 2005), composition of government and coalition formation (Bandiera and Levy, 2011), and types of local revenues (Cassidy, 2019).

This study is also related to research linking economic hardship resulting from trade policies with a broad range of political economy outcomes. For example, Autor et al. (2016) find that districts with more exposure to trade competition with China are more likely to vote for extreme politicians. This study complements the evidence in this literature by focusing on the consequences of import restriction on policy choices at the lowest administrative unit in a developing country.

The remainder of this paper is organized as follows. Section 2 discusses the context: rice import restriction and village institutional settings. Section 3 discusses data and measurement. Section 4 discusses estimation framework. Section 5 discusses main results. Section 6 concludes.

2 Context

The first part of this section discusses the importance of agriculture and rice in Indonesia and the evolution of rice trade policies leading to the import ban. The second part focuses on village institutional settings, public goods, and financial resources.

2.1 Rice Import Restrictions

The last three decades have witnessed a decline in importance of agricultural sector in Indonesian economy in terms of its contribution to GDP. In 1985, agriculture contributed 23% to the

Indonesia GDP, but it dropped to 13% in 2005 and remained relatively stagnant until 2015. Nevertheless, agriculture remains central for labor market. In 2005, more than 40% of Indonesian adult workforce are employed in agricultural sector. The number dropped in 2015, but it still accounted for more than one-third of the adult workforce, 34%. [Provide statistics on rural/urban farming sector, especially rice sector.]

Rice is the most important agricultural commodity in terms of its proportion to expenditure, income, and employment. First, rice is the staple food for the majority of Indonesian population, and it constitutes more than 20% of the food expenditure of the poorest 40% of the population (McCulloch, 2008).[3] Second, rice is an important source of income and employment among farmers. The 2003 agricultural census reveals that 55% of agricultural households are rice farmers, more than any other commodities. Out of those rice growing households, more than 70% are net producers (McCulloch, 2008).

Given the importance of rice, the government has long been obsessed with policies to increase domestic production and limit its dependency on international market through various rice intensification programs (e.g., mass guidance program or *Bimas*) or other protection measures like tariff or non-tariff measures (Timmer, 2005). Despite those policies, Indonesia has regularly been a net importer, as seen in Figure 1.[4]

Before the 1997/1998 economic crisis, the state logistic agency, *Bulog* (Badan Urusan Logistik), was the sole importer.[5] Following financial agreement with the IMF in 1998, the government was forced to abolish *Bulog*'s monopoly role and allow private sectors to participate in rice import business. However, the policy only lasted for less than two years. The growing influence of pro-farmers groups purportedly pressured the government to implement a series of rice import restriction policies aiming to protect farmers.

In 1999, the government introduced a 20% tariff for imported rice, which was sharply raised to approximately 75% in 2003 (Warr, 2005; Fane and Warr, 2008). In 2004, importing rice was

[3] As in many developing countries, food constitutes a large share of total expenditure in Indonesia: well above 60% for more than half of the Indonesian population (McCulloch, 2008)

[4] For a comprehensive overview on historical Indonesian rice cultivation and related policies, see Mears (1984) and Simatupang and Peter Timmer (2008).

[5] In addition to rice, *Bulog* controlled other commodities, such as sugar, maize, and soybeans.

effectively banned. While private sectors were completely prohibited to import rice, *Bulog* could import limited quantities of rice only during certain periods with the goal to secure rice supply (Warr, 2005, 2011). The ban was originally intended to be a seasonal policy to protect rice farmers,[6] but the policy had been repeatedly extended and had not been completely revoked (Warr and Yusuf, 2014).[7] Figure 1 shows that Indonesia's net rice import fell sharply following the ban. The surge in 2007 and 2011 was almost entirely due to emergency supply and buffer stock reasons. It seems that there was no major problem with the domestic production as yields continued to increase.

Indonesia had rarely imported rice exceeding 5% of total national consumption, but the import managed to stabilize domestic price (Dawe, 2008). It is, thus, unsurprising that the domestic rice price increased significantly following the ban. Figure 2 shows that domestic price started to climb in 2005 as the stocks of rice from previous year were starting to thin.[8] Between 2000 and 2014, domestic rice price increased annually by 10%, as shown in Panel B of Table 1. Some estimates suggest that import ban contributed to the price hike by 37% and 64% in 2006 and 2015, respectively (Fane and Warr, 2008; Marks, 2017).[9]

2.2 Village Institutional Setting

Political Context The political context during the period of this study corresponds to the decentralization reform period that started in 1999. Following the fall of the President Seoharto's authoritarian regime (1967-1998) — known as the New Order —, there was a massive urge to decentralize political power to local government. The reform allows districts and villages to merge or proliferate to form a new district or village. This resulted in a significant increase in the number

[6]The Ministry of Trade and Industry regulation No.9/MPP/Kep/1/2004 stipulates that rice import was prohibited one month prior to, during, and two months after the harvest season.

[7]Instead of lifting the ban, the government has been imposing import quotas which vary over time depending on, for example, domestic rice supply and demand.

[8]Due to heavy reliance on domestic supply, the increasing trend in domestic price appears unaffected by the brief period of sharp increase of the global rice price between 2008-2011.

[9]The estimates in both studies are measured in terms of nominal rate of protection (NRP), which measures the effect of the government trade policy at any given nominal exchange rate compared to a situation in absence of said policy. See Fane and Warr (2008) and Marks (2017) for details.

of the new governments at all level.[10]

Governance Structure By 2014, Indonesia is divided into 34 provinces and 511 districts. Each district is divided into subdistricts that are further divided into villages. There are two types of villages based on observable characteristics: *desa*, which is more rural, and *kelurahan*, which is more urban. While the head of *desa* is decided through local election, the head of *kelurahan* is directly appointed by district mayor. Following the decentralization reform in 1999, the number of villages increased significantly from more than 66,000 in 2000 to more than 80,000 in 2014, where well above 85% of them are *desa*.[11]

The categorization of villages into *desa* and *kelurahan* were initiated after the passage of the Village Law No.5 of 1979. The law stipulates that all villages were *desa*, and some of them were categorized as *kelurahan* by the central government. The conversion of *desa* into *kelurahan* stopped in 1992 mainly due to financial reasons (Niessen, 1999).[12] In addition, the law imposed a homogenous governance structure. All villages were required to have a village head and village assembly and had their budgets approved and supervised by district governments. The law practically dismantled village autonomy (Antlöv, 2003).[13]

Public Goods The decision-making process for the provision of public goods in Indonesian villages have evolved since the fall of the New Order era. Before the decentralization reform, the main source of funding for village public goods came from the national budget and was highly centralized. Virtually every important decision regarding village budget and public goods provision required approval from the district mayors (Antlöv, 2003; Tajima et al., 2018). In addition to budget allocation from the central government, villages could submit a proposal to the National Development Planning Process (P5D) for public goods provision. However, village officials were

[10] See Fitrani et al. (2005) for more details on decentralization.

[11] Decentralization reform, which marked the end of Soeharto government in 1998, provided massive far-reaching autonomy to local governments, including fiscal responsibility and splitting or forming new local government.

[12] See Martinez-Bravo (2014) for more detailed explanation on the historical formation and differences between *desa* and *kelurahan*.

[13] The implementation of the law did not go as smoothly as expected. Many villages outside of the Java island, which is the most populated island, expressed their disobedience towards the law. For example, all villages were mandated to have election to choose a village head, but many villages outside Java did not abandon the practice of selecting their leaders based on hereditary or other local traditional practices (Antlöv, 2003).

mainly unaware of this mechanism hampering them to submit high-quality proposals that led to undesirable outcomes for their village (Evers, 2000).

Decentralization reform changed the process for public goods provision in villages, especially the roles of district and village governments. While the role of district governments in funding and allocating public goods remain central, village governments also play an important role in initiating and leading maintenance of the public goods, especially infrastructure, such as roads and bridges (World Bank, 2010).

Overall, to some degree, villages still relied on higher-tier governments for public goods provision both before and after the decentralization reform. However, this does not rule out the influence of village governments in improving the level of public goods provision. This has been documented even before decentralization. Despite top-down and centralized approach in the New Order era, recent studies find that villages could actually affect the level of public goods provision through the roles of educated heads (Martinez-Bravo, 2017) and inter-village competition indirectly induced by the level of ethnic segregation (Tajima et al., 2018). The village's influence is theoretically larger after decentralization because of higher degree of freedom in expressing political aspiration. This has been documented in an extensive longitudinal local level institutions study covering 40 villages over more than a decade (Wetterberg et al., 2014).[14] The study finds that, among other factors, income shocks, shifts in sources of income, and distribution of power and assets within a village contribute to the collective capacity of villagers that can affect level and choice of public goods and development projects. Collective actions and mass mobilization were suppressed during the New Order era.

Development Projects Unlike the allocation of public goods, villages, to some extent, have relatively more control over the allocation of development projects. There are several mechanisms for a village to have development projects. First, villages can submit proposals to the district governments through the National Development Planning Process (P5D). Second, financial resources for

[14]Local-level Institution study is a study on the relationship between local institutions, poverty, and village governance in rural areas in Indonesia combining descriptive and quantitative methods. The study was conducted in 3 provinces, 6 districts, 40 villages, and 1,200 households. It has been conducted three times: 1996/1997, 2000/2001, and 2012.

development projects can come from the National Community Empowerment Program (*PNPM* or formerly known as the *Kecamatan (subdistrict) Development Program or KDP*) and external grants, where villages compete to obtain funding for development resources (Chavis, 2010), and village own budget. While it is useful to be able to distinguish financial source for each project, the data unfortunately does not allow me to do it.

Financial Resources Village financial sources have been evolving over time. Following the first major political reform concerning village governance, Law 5/1979 stipulated that each village received block grant from district government. The massive decentralization reform provided more financial sources to villages. Law 22/1999 stipulated that each village had the autonomy to raise its own revenues in addition to receiving block grants from district government. In 2004, each village was set to receive additional grants from the central government, as mandated by Law 32/2004. The most recent regulation Law 6/2014 provides broad legal framework for additional financial resources for villages (excluding kelurahan) from the central government, which is known as village funds or *Alokasi Dana Desa or ADD*. [15]

In summary, there are two broad sources of village financial resources: village own-source revenues and transfer grants (from district and central governments). Villages raise own incomes through the following sources: own-managed traditional markets, charges on small scale public transportation vehicles that pass through their jurisdictions, and other fees related to administrative services (Antlöv et al., 2016). Most of village revenue comes from transfer grants from higher-level government, especially district government.

3 Data and Measurement

This section presents information on data sets and measurement, construction of the study sample, descriptive statistics, and estimation framework. I combine multiple data sets that include population and village census as well as gridded data to form the basis of the main empirical analysis. The unit of analysis is at village-year level.

[15] The amount of DD is based on the discretion of the central government.

3.1 Public Goods and Development Projects

- [Add more details on health public goods as discussed in Lisa Cameron's paper.]

The data on the main outcomes, public goods and development projects, come from the village census (PODES). This dataset has been collected roughly three times every decade starting in 1980.[16] In each wave PODES collects rich information on village characteristics, such as the land size, geographic location, population and other demographic information, existing infrastructure projects, public goods, violence, village budget, and development projects.[17] The information comes from the official village documentation and interviews with the village head. The PODES sample size has increased over time following the decentralization reform that allow villages to split and merge to form a new village. The 2000 wave covers more than 66,000 villages, but it has expanded to 82,000 in 2014. For the purpose of this study, I use the 2000, 2003, 2005, 2008, 2011, and 2014 waves.

The main outcomes include sets of public goods and development projects variables. In general, the end products of development projects can include both public and excludable goods (Chavis, 2010; Araujo et al., 2008). For example, in PODES, village development projects provide some public goods, such as maintenance or building road infrastructure, and excludable goods, such as capital assistance to the eligible villagers. To avoid confusion, I separate these two outcomes in the analysis even though some products of the development projects are public goods.

I focus on the main public goods that are considered important and relevant for the villagers well-being as well as consistently collected across waves (Martinez-Bravo, 2014; Tajima et al., 2018; Cassidy, 2019). These include health care personnels (medical doctors), health care centers (*Puskesmas*),[18] schools (primary and secondary level schools), the main road quality indicators for

[16] The latest wave was recently completed in 2018. PODES has three main themes which alternate every wave: agriculture, economy, and population. For example, the 2003 wave focuses on agriculture. In that year, PODES collects detailed information on village agriculture, such as production yields of cash crops and land plots allocated for each crop. The agriculture module was not collected in the 2006 wave, for example, because in that year PODES focuses on village economy and collects more detailed information on the small enterprises, for instance.

[17] There are some information that are not consistently collected every wave. For example, detailed information on village budget allocation, such as for construction or maintenance of infrastructure, and development projects were only available starting in 2008. The number of health facilities and officials were not collected in 2008.

[18] I divide health centers into two: main (*Puskesmas*) and support (*Puskesmas pembantu or Pustu*). The main

whether the road is asphalt or passable by motor vehicles all year long,[19] and access to safe drinking water.[20] The main health centers are staffed by at least one doctor and roughly five nurses, while the supporting centers are staffed by one nurse because small centers provide relatively basic services. [elaborate what services are defined as the basic services].

The development project consists of three broad sets of outcomes. First, infrastructure project. This project includes maintenance or construction of the following public infrastructures: road, bridge, schools, sanitation, traditional market, irrigation, and other economic support facilities. Second, capital assistance project. This project aims to increase village economic capacity by providing loans for agriculture, non-agriculture, and other types of enterprises. Third, employment assistance project. This project includes training program to increase production and marketing capacity as well as enhancement of civic engagement. To be consistent across waves, I restrict the sample to projects that are not funded by special central government projects.[21]

Flow and Stock Variables Changes in public goods and development projects are examined in its extensive and intensive margins.[22] For intensive margins analyses, I follow Cassidy (2019) by dividing the outcomes into stock and flow variables. Flow variables include variables that are probably only present for limited time, such as development project and health personnel outcomes. For example, the funds for development projects or contracts for medical doctors might not be perpetually renewed. In contrast, stock variables, such as school buildings or health care centers, might remain indefinitely. Thus, by definition, both variables are constructed differently to reflect changes between periods. The outcome flow variables Y_{vt} at village v at the end of period t reflects the number of the variable at that period. On the other hand, the annual change

difference lies on the quantity of the facilities and staff. The large or main health centers have more staff and provide more complete services, while the small ones are only equipped to provide more basic services (Tajima et al., 2018). Along with the INPRES primary schools, health centers were also part of the expansion of basic public services during the Soeharto era in the 1970s (Shah et al., 1994).

[19] I separate these two indicators because the road that is passable by motor vehicles is not necessarily asphalt.

[20] A village has access to safe maining water if most households access their water from a pump or a water company. Unsafe water sources include natural well, rain, river or other source.

[21] Information on development projects was introduced in 2008.

[22] In addition to the three broad measures of development project, I also create two additional variables: 1) an indicator variable for whether a village receives any kind of project in particular year (extensive margin) and 2) a continuous variable that sums up all projects that are available in a village (intensive margin).

in stock variables in period t must take into account the stock of that variable in the previous period, t_0, which is calculated as follows:

$$Y_{vt} = \frac{1}{t_1 - t_0}\left(Y_{vt_1} - Y_{vt_0}\right) \tag{1}$$

3.2 Rice Price and Suitability

- [pass through assumption? Real price: why it's not necessarily needed]

Rice Price The monthly domestic rice price data is collected by the central bureau of statistics (BPS) from a major representative city in each province. This price data collection practice is common in many developing countries (Deaton, 1997). Because data on commodity and food crop prices at village level is not available, I assume that villages within the same province are exposed to the same price. I further assume that provincial price is exogenous to each village. This assumption is reasonable because a single village is less likely to determine the price of rice at the province level.

I use the monthly retail price data spanning from January 2000 to March 2014. While it is probably more ideal to use farmgate than retail price, regional farmgate price data is not available. Figure A.1 shows that it might not pose an estimation problem because the movement of retail price is highly correlated with that of farmgate price.

Using the monthly price data, I construct a key independent variable, price change, to measure the consequences of the rice import restriction on domestic rice price. The variable is defined as the annualized growth in the log rice price between PODES waves. For example, to examine the effects on village outcomes in 2003, the price change measures growth January 2000 to March 2003. For outcomes in 2005, price shock is constructed from April 2003 to March 2005. Price shocks for subsequent waves follow the same construction method.[23]

Figure 5 provides motivation for my approach. The figure shows that there was relatively negligible variation in domestic rice price pre-ban in contrast to that of the post-ban, which indicates a lack of arbitration by domestic traders in the post-ban era. This can plausibly be attributed to

[23] Data collection for PODES generally commenced in the first quarter of the year, around March or April.

three factors. First, a weaker role of the state logistic agency, *Bulog*, in stabilizing domestic price. Second, a disruption to the thriving relationship between the private and international traders during the more liberal trade regime prior to 2004 (Bazzi, 2017).[24]

Rice Suitability Data for rice suitability, which measures potential or maximum attainable yields (ton/hectare) of rice, comes from the FAO-GAEZ project.[26] This measure is arguably exogenous as it is climate-driven productivity, not observed by the actual pattern of production. The climatic record is based on daily weather records observed in each year from 1961 to 1990, which provides good approximation for historical condition (Nunn and Qian, 2011; Costinot et al., 2016; Fiszbein, 2017). To obtain rice suitability information at the village level, I aggregate the suitability information across grids using area weights, i.e., the total area of the grid overlapping with the village, divided by the total village area. Figure 3 describes geographic variation of rice suitability in Indonesia, where darker shades indicate higher values. Rice suitability appears to be a good proxy for rice production (ton/hectare), at least for Indonesian villages, as illustrated by Figure 4.

3.3 Other Variables

To investigate whether an increase in rice price leads to an increase in income, I estimate the effects on village economic well-being. Because economic indicators at the village level are not available, I use several proxy variables. First, I follow the standard approach in the literature by analyzing nighttime lights, which has been increasingly shown to be a reliable indicator for economic development, especially in areas with shortage of quality data (Henderson et al., 2012). I measure extensive margins — indicator for presence of lights — and intensive margins — intensity of lights — of nighttime lights. The data comes from the National Oceanic and Atmospheric Administration (NOAA) Defense Meteorological Satellite Program. The data used in this paper

[24] Bazzi (2017) demonstrates that areas closer to domestic ports and shipping distance to Bangkok and Ho Chi Minh experienced higher increases in price suggesting high dependency to import rice. Third, the overall low elasticity of supply (0.2-0.4); it varies across regions depending on soil characteristics and land types. As a comparison, the elasticity of demand for Thailand's rice exports varies between -2.5 to -5 (Warr, 2005).[25]

[26] The FAO-GAEZ project provides worldwide grid cells information on predicted yields on various crops by combining various high-resolution geographic data with agronomic models, described in detail by Costinot et al. (2016).

spans from 2000 to 2011.[27]

Second, the number of identification card for the poor issued in the last year (*Surat Keterangan Tidak Mampu*, SKTM). This special ID card aims to serve as a proof of household's financial condition that can be used primarily to apply for school tuition waiver or need-based scholarships.[28] Third, the number of health card (*Kartu Sehat*) issued in the last year. The health card program was launched in 1998 as part of the social safety net program (*Jaringan Pengaman Sosial*) intended to protect the poor during the economic crisis. The benefits of health card beneficiaries include various free services at public health care providers, such as outpatient and inpatient care (Sparrow, 2008; Bah et al., 2018). Both variables come from PODES.

I use two other datasets to construct additional village agriculture and demographic characteristics. First, the complete records of 2003 agricultural census to construct inequality in land ownership and other agricultural-related variables.[29] Second, the complete records of the 2000 population census to construct ethnic diversity measures.

3.4 Sample Construction and Summary Statistics

The main analysis is based on a balanced panel of 53,152 villages out of 298 districts and 26 provinces matched across the PODES waves. In total, the final sample has 318,912 village-year observations. To improve accuracy and quality of the data I impose some restrictions. First, I exclude Papua and West Papua provinces due to unreliable data. Second, I drop villages that amalgamated within the study period. To maintain comparability of institutions, I exclude provinces with special autonomy status which may affect provision and distribution of public goods and development projects.[30] To maintain a consistent unit of observation, village outcomes are aggregated up to the 2000 borders.

Table 1 displays summary statistics. An average district is divided into more than 270 villages.

[27] The latest available data is 2013, but to allow comparability with the PODES waves, I only use the data up to 2011.

[28] Salary slips and other documents on household finances are required to obtain the ID card.

[29] The agricultural census has been conducted every decade since 1963 with the latest wave completed in 2013. The 2003 wave records landholding information on 40 million households.

[30] Provinces with special autonomy status include the capital of Indonesia, DKI Jakarta, Nanggroe Aceh Darussalam, and DI Yogyakarta.

On average, each village has a total population of more than 3,500. The Gini coefficient of 0.55 in landholdings indicates high wealth inequality within a village. Primary school is the most ubiquitous form of public school, where almost every village has one.[31] This is in contrast to secondary school, where there is roughly only one school for every three villages. The state of public health services does not seem better than education, where only 20 % and 44 % of villages have at least one doctor and health care center. However, development projects are well distributed. Almost every village has at least one development project (84 %), where infrastructure maintenance project is the most popular (70 %). Additional village characteristics are presented in Table A.1.

4 Estimation Framework

To estimate the causal effects of income shock on local policy responses at the village level, I require plausibly exogenous income shocks that vary across time and villages. The time variation comes from the movement in annual rice price. I exploit a sudden and major rice import restriction that generates substantial rice price variation across provinces, which is arguably exogenous to villages because national rice production and consumption are not driven by a small fraction of villages. The cross-sectional variation comes from geographic variation in rice suitability across villages. I interact both time and spatial variations as an indirect way to measure income shocks at the village level. This approach assumes that villages with higher rice suitability are more likely to benefit from higher rice price. However, this assumption is not guaranteed because an increase in rice price does not necessarily translate to an increase in income. Theoretically, it depends on whether a household is a net producer or a net consumer. Price hike benefits net producers but hurts net consumers (Deaton, 1989).

Because variable that informs net-producer status at village level is not available, I use a proxy variable indicating whether the majority of farmers in a village both sell and consume agricultural

[31] This is most likely the legacy of massive construction effort of INPRES school buildings in the 1970s. See Duflo (2001) for more details on INPRES program.

products. This variable is conditional on a village being an agricultural village.[32] The 2003 and 2005 PODES document that more than eight out of ten villages are mainly agricultural suggesting that the proxy variable is quite representative at the national level. More importantly, Figure A.2 shows that rice suitability is positively correlated with the majority share of farmers selling and consume their products suggesting that my approach is sensible.

This leads to an empirical strategy that is similar in spirit to the standard difference-in-difference method but with continuous treatment intensity, i.e., interaction between changes in rice price and rice suitability. Equation 2 presents the estimating specification:

$$Y_{vt} = \beta_0 + \beta_1 Price_{vpt} + \beta_2 Price_{vpt} \times RiceSuit_v + \theta X_{vt} + \gamma_v + \delta_t + \sigma_d t + \epsilon_{vt} \quad (2)$$

where Y_{vt} denotes public goods and development projects variables in village v and year t. $RiceSuit_v$ is time-invariant measure of rice suitability, measured in thousands of tons per hectare. $Price_{vpt}$ is the annualized log growth of domestic rice price in province p. $\boldsymbol{X}_{vt}$ are time-varying covariates that include (log) population to account for scale effects and access to public goods and projects, (log) distance to district capital and (log) distance to sub-district capital to account for political influence of physical distance on local resources (Stasavage, 2010; Campante and Do, 2014; Henn, 2018).[33] I also control for the interaction between the following time-invariant variables and year fixed effects: (log) village size and (log) harvested lands for rice.[34] These covariates respectively control for changes in the pattern of usage of lands and incentives to plant rice that may affect outcomes.

Village fixed effects, γ_v, and year fixed effects, δ_t, account for time-invariant village characteristics and common nationwide shocks, respectively. District-specific time-trends, $\sigma_d t$, account for potential omitted variables at district level that may cause upward trends in the distributive policies (e.g., public goods provision), such as shifts in political preferences.[35] Robust standard

[32]This variable comes from the 2005 PODES. While it does not have information on specific agricultural products being sold and consumed, it is reasonable to assume that rice drives up the number given that it is the most dominant agricultural product among Indonesian farmers McCulloch (2008).

[33]Distances between village and district and sub-district capital vary because village and district splits over time.

[34]Total village size (in km^2) and total harvested lands for rice (in thousands of hectare) are constructed from the village map in 2000 and the FAO-GAEZ project, respectively.

[35]As a robustness check, I substitute district-specific time-trends with village-specific time trends

errors ϵ_{vt} are clustered at the district level to control for potential serial correlation over time and across villages within a district. This approach is somewhat stringent given that the cross-sectional variation in the key independent variable is at the village level.

This empirical strategy examines whether changes in rice prices affect outcomes disproportionately in villages with higher rice suitability, which is captured by the key coefficient of interest, β_2. In all specifications, $\beta_2 > 0$ implies that positive income shock leads to an increase in public goods and development projects. This approach is commonly used to analyze the effects of commodity or food price shocks (Dube and Vargas, 2013; McGuirk and Burke, 2017; Sviatschi, 2018).

5 Results

In this section, I discuss the main results from estimating equation 2. First, I discuss the differential effects of rice price changes on income. Then I turn to discussion of results on public goods and development projects.

5.1 Aggregate Income

- [References on what can explain changes in income. For example, changes in wages for manual labors. Check out Strauss and Singh chapter in their edited book.]

I start by analyzing the effects of differential rice price change on aggregate income at the village level. I examine the following outcomes: changes in extensive and intensive margins of nighttime lights, the number of identification card and health insurance cards issued for the poor. Bazzi et al. (2016) show that nighttime light is a reliable proxy for income across Indonesian villages. The latter two measures provide rough indicators for poverty rate.[36]

Table 2 presents the results. Columns 1 and 2 show the results on extensive and intensive margins of nighttime lights. Columns 3 and 4 show the results on the number of identification

[36]These social protection measures for the poor are by no means perfect indicators for poverty incidence because there are leakages and undercoverage issues that are common in the targeting of social protection programs in developing countries [provide citations].

cards and health cards issued for the poor. As we can see, the interaction coefficient on $Price \times Suitability$ is statistically significant and positive in the first two columns suggesting that rice price hike leads to an increase in the presence and intensity of lights in villages more suitable for rice production. The sign is negative in the last two columns indicating smaller number of poor people eligible for the social protection programs. This result can also indicate lower demand for public services for the poor as the village economy improves.

Figure 6 shows that the effects are monotonically increasing with rice suitability. Overall, these results confirm that, in aggregate, rice price hike disproportionately benefits villages more suitable for rice.

5.2 Public Goods

Having established the fact that rice price hike indeed has significant aggregate income effects, I turn to examine whether the aggregate income shock has any effects on public goods provision. Figure 7 summarizes the effects of income shock ($Price \times Suitability$) on changes in extensive margins (Panel A) and intensive margins (Panel B). The first part of Panel A shows that villages that experienced negative income shock were more likely to have health care center (total), driven by the supporting centers. There is no detectable effect on increased presence of doctors. This is consistent with the fact that doctors are not assigned to the supporting health centers.

The second part of Panel A indicates that the likelihood of having public schools, especially secondary level schools (significant at 10% level), built in adversely affected villages is lower than the positively affected ones. Taken together, these findings suggest that negative income shocks might have negative implication on health and education reflected by the increased demand for health services but decreased demand for secondary-level education. This is consistent with studies that find negative relationship between aggregate income shock and children's human capital, such as health, nutrition, and school enrollment (e.g., Cogneau and Jedwab, 2012). Moreover, economic hardships have also been documented to force children to work (Edmonds and Pavcnik, 2005; Edmonds, 2007) that could worsen their human capital growth (Sim et al., 2017). Interestingly, I do not find evidence of the effects of income shock on the changes in intensive margins

of any public goods (Panel B). Taken together, I interpret these results as suggestive evidence that negative income shock helps improve redistribution of public goods. Regression results are presented in Table 3.

[This is no longer included. It is combined with other locally managed public goods which do not have significant effects to show that social capital or whatever mechanism I show do not have impact on village public goods] In addition to public schools and health facilities and personnels, I also examine the effects on the improvement in the quality of main road and access to safe drinking water. The main coefficients are presented in the third part of Panel A, while the complete regression results are presented. The results show significant negative relationship between income shock and indicator whether the main village road is passable by motor vehicles. I do not find significant effect on asphalt road. One potential explanation is that the cost to upgrade the quality of road to become passable should be cheaper than to cover the road with asphalt.

5.3 Development Projects

Figure 9 summarizes the effects of income shock on changes in extensive margins (Panel A) and intensive margins (Panel B) of development projects. The results show somewhat different patterns than those of public goods. Panel A indicates that income shock is negatively correlated with probability of having a capital assistance project (significant at 5% level), but not with other projects. Unlike the effects on public goods, income shocks significantly affect the number of development projects (Panel B). One potential explanation is that villages have relatively more controls over development projects than public goods so that the income shocks can be better translated into effects. Regression results are presented in Table 4.

5.4 Robustness

I conduct the following robustness tests to address several concerns.

- Including provinces with special autonomy status: to address concerns of sample selection bias.

- Including village-specific trends instead of district-specific trends: to address concerns of omitted variable bias that may cause upward trends of the outcomes at village level.
- Including rainfall shock, which is calculated as the deviation from its long-term mean, as an additional covariate: to address concern that the results are partially driven by transitory shocks.
- Using alternative price change definition: to address concerns that the results are sensitive to price change definition, I constructed alternative definition. For example, price change in 2003 is calculated as $Price_{2003}$ - $Price_{2000}/Price_{2000}$.

The robustness tests show that my results hold and my conclusion is unchanged. Results are presented in the appendix.

6 Mechanisms

6.1 Demand Side Effects: Nutrition

Positive relationship between income shock and nutrition, as measured by calories and protein consumption per capita.

To analyze the impacts on health, I assess the direct impact of rice price or income shock on a primary input of health: nutrition intakes in the forms of calories and protein. I leverage detailed data from the consumption module of *Susenas* that includes information on calorie and protein of more than 200 foods out of 13 food groups based on the seven-day recall period. Until 2008, similar to the sociocultural module, the consumption module was collected every three years. It has since been collected every year. I use all available modules in the year that closely corresponds to the PODES waves: 2002, 2005, 2008, and 2011.[37,38,39]

The outcome variables include the total amount of daily calories and protein consumption per

[37]The 2014 *Susenas* does not include village identifier.

[38]The final sample includes more than 300,000 households out of 25,000 unique villages.

[39]Because the 2002 PODES does not exist, I use village covariates from the 2000 PODES to correspond with the 2002 *Susenas*.

capita (in log).[40] I further divide the food groups into two: 1) unprocessed foods, which include groups of cereals (e.g., rice), roots and tubers, fish and seafood, meat, eggs and milk, vegetables, pulses, legumes, and nuts, and fruits [unprocessed food is probably not the right term]; 2) all foods which include oil/fats, sugar/honey, and miscellaneous group (e.g., bread) in addition to unprocessed foods. [I probably will only include the all food group because this food group division is not really supported by theory]. Moreover, I further divide nutrition consumption by its acquisition method: bought or own production. In addition, I also examine the impacts on the share of food expenditure per capita out of the total household expenditure.

The regression specification follows that of social capital. The main exception is the control variables, where I substitute individual with the following household level covariates: indicator for wife's education attainment (primary, junior and senior high school, university, and post-graduate education), wife's age and age squared, indicator for marital status of the household head (not married, married, divorced, widowed), and indicators for the number of household members aged 0-4, 5-9, 10-14, 15-55, and above 55. I also include an indicator for urban village to account for different caloric and protein consumption trend in urban and rural village.

Table 6 presents the results on nutrition intake and the share of food expenditure per capita. The result suggest that households that live in villages benefiting from higher price of rice enjoy higher nutrition both in terms of calories and protein (columns 1 and 3). With the exception of caloric intake from all foods acquired from own products (column 2), I find little evidence that effects on nutrition differ by whether foods are bought or not, as shown in Table A.4.

Together, adverse effects of income shock on nutrition [even though changing consumption pattern can also be a direct effect of more expensive rice] but positive effects on social capital suggest that adverse income shock increase the sense of integration which can help villages obtain more resources from higher-tier government. In short, these findings can help explain why adversely affected villages receive more health centers and development projects.

[40] To obtain per capita measure, I substitute the unadjusted household size with household size adjusted with equivalent scales suggested by Deaton (1997). Based on equivalent scales, household member aged 0-4 years old is equivalent to 0.4 adult, 0.5 for 5-14 years old, and 1 for above 15.

6.2 Heterogeneities

To shed lights on mechanisms of the main results, I conduct heterogeneity analyses — below and above median groups — based on ethnic diversity, land ownership inequality, and urban/rural status. Ethnic diversity is measured by ethnolinguistic fractionalization (ELF). The ELF, which reflects the probability that two randomly selected individuals from a population belonged to different groups. Higher value implies higher diversity. ELF is calculated as follows

$$\text{ELF}_j = 1 - \sum_{i=1}^{N} s_{ij}^2$$

where s_{ij} is the share of group i(i=1 …N) in village j. Both variables are constructed from the universal records of the 2000 Census.

Figure 12 summarizes the results on changes in extensive margins of public goods and development projects. Figure 13 summarizes results on changes in intensive margins. Overall, the results suggest that less diverse, more unequal, and rural villages seem to drive the main results even though some effects are statistically indistinguishable from zero.

6.3 Social Capital

To assess the mechanisms behind the treatment effects on public goods and development projects, I estimate the effects of village income shocks on social capital at individual level. I merge village-level variables with household-level variables. To measure social capital, I constructed eight variables that appear in both the 2009 and 2012 sociocultural module of National Socioeconomic Survey (*Susenas*).[41] *Susenas* is a nationwide household survey. The sociocultural module is included in Susenas every three years. The module was first introduced in 2006, but it does not include village identifier preventing me to merge with the census villages (PODES) and use it in

[41] *Susenas* is conducted twice every year covering almost 300,000 households. In 2011, the survey was changed to quarterly system. The sample distribution also changed. The total sample of 300,000 households is distributed equally each quarter resulting in the smaller sample for the sociocultural module, which only covers 75,000 households out of about 6,000 villages. On the other hand, the module in 2009 covers more than 290,000 households out of about 16,000 villages. After merging with PODES and excluding special status provinces, the final sample covers more than 200,000 households out of 15,000 unique villages.

the analysis.

Particularly, I construct the following social capital variables: trust towards local village governments, trust the neighbors to watch one's house when all household members are away, trust the neighbors to care for one's children (aged 0-12) when adults are not home, willingness to help neighbors in need, frequency of participation in community activities (e.g., religious, sports, ROSCA, etc.), and feelings towards activities of people from different ethnicities. Some variables are measured in 1-4 scale, while others in 1-5 scale. Higher value reflects stronger support for each variable. I construct a mean index variable, which takes average of those variables, to be the main measure of social capital. For easier interpretation, I standardize all variables.

Because Susenas is a cross-sectional household survey, it does not cover all villages preventing me to conduct within-village analysis. Thus, I modify the main specification by substituting village with district fixed effects. In addition to village covariates, I also include responder's covariates, Z_{ivt}, such as sex indicator (male), age, and age square.

$$Y_{ivt} = \beta_0 + \beta_1 Price_{vpt} + \beta_2 Price_{vpt} \times RiceSuit_v + \theta X_{vt} + \theta Z_{ivt} + \gamma_d + \delta_t + \sigma_d t + \epsilon_{vt} \tag{3}$$

Table 5 presents the results. Individuals who live in the relatively more adversely affected villages show higher overall social capital (column 1). The result seems to be driven by trust (columns 2 and 3) and tolerance toward different ethnicity (column 8). Overall, these results suggest that adverse income shock increases intergroup preferences and interaction suggesting higher sense of integration. This can help explain increased public goods and development projects. This result is consistent with Bazzi et al. (2019) who observe that less diverse villages with higher social capital have higher village public goods in Indonesia. The main difference with Bazzi et al. (2019) is that the main mediator of increased social capital in my paper is income shock, while their paper focuses on ethnic diversity in transmigration villages.

7 Can Conditional Cash Transfers Mediate the Impacts on Public Goods

8 Can Health Public Goods Mediate Effects on Mortality?

In an ongoing work, I am further analyzing the effects of adverse income shocks on infant and maternal mortality at the village level using universal record of the 2010 population census. The census records information on deaths in the past year (2009 and 2010). I will conduct mediation analysis, where the candidate mediators for effects on mortality are nutrition (caloric and protein intake) and health facilities. Mediation analysis is basically an analysis to examine the mechanisms, but it allows one to obtain direct and indirect treatment effects. An example of mediation analysis is the one conducted by Adhvaryu et al (2019). They examine the effects of early life income shock on adult mental health. Their mediation analysis employs inverse probability weighting reviewed in Huber et al (2016) and find that savings and self-employment contribute more to the total treatment effects than do literacy and health mediators: BMI and adult height.

9 Conclusion

Negative income shock induced by rice import restriction Indonesia improves distribution of public goods provision and development projects across villages. The results appear stronger in less diverse, more unequal, and rural villages.

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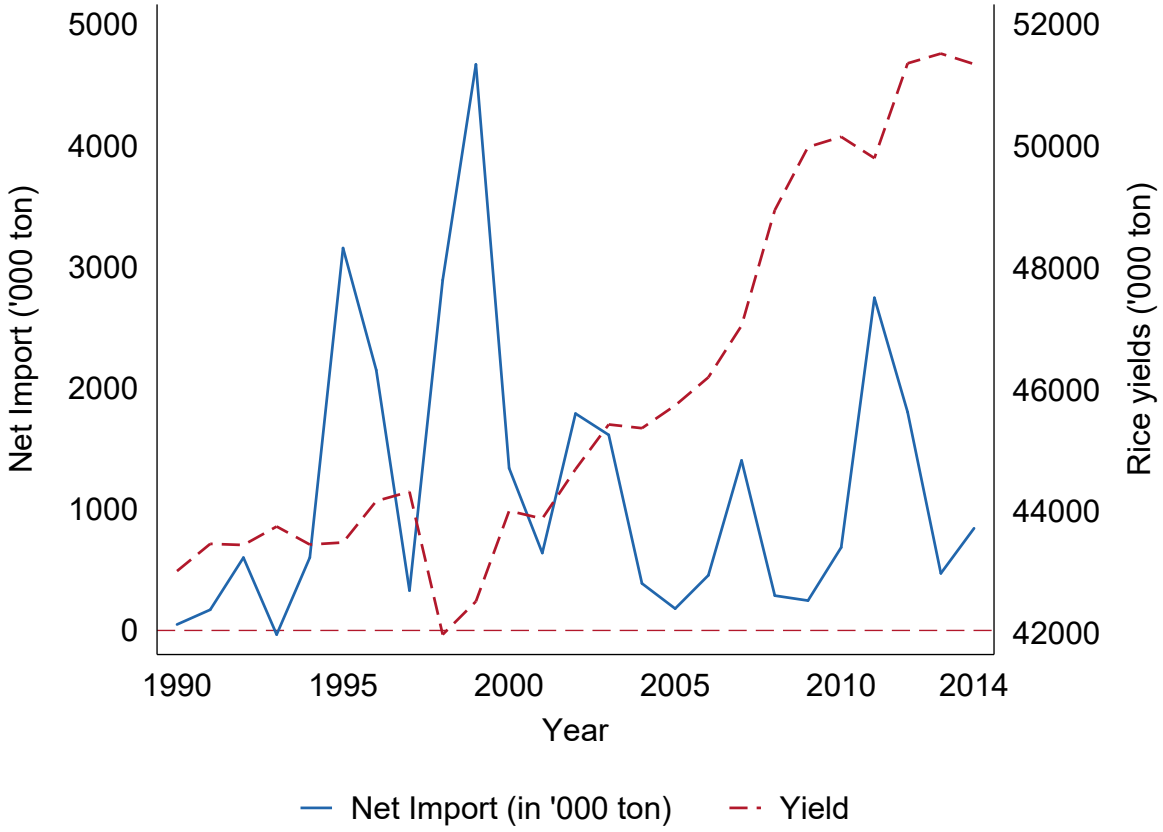
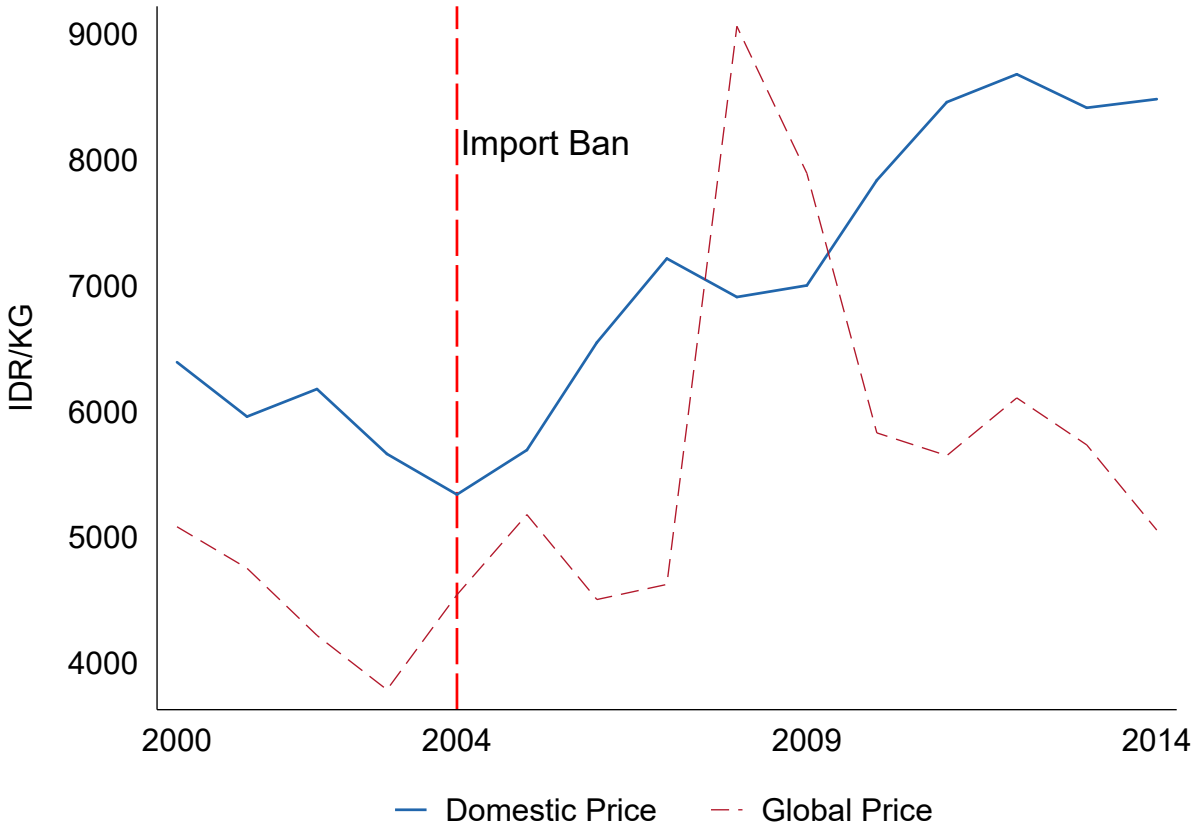
Figures

Figure 1: Net Rice Imports and Rice Yields, 1990-2014.



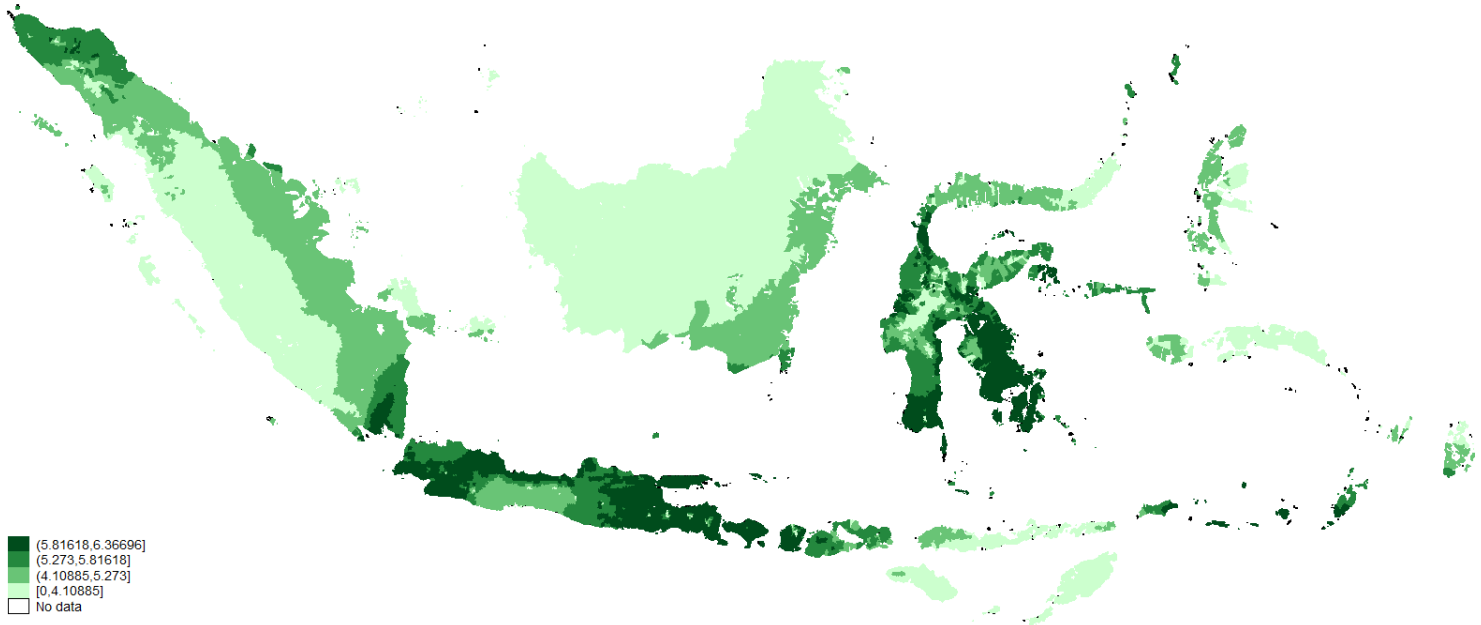
Note: This figure shows Indonesia's net import of rice and rice yields from 1990 to 2014. The rice yields reflect the amount of rice after going through a drying and milling process that converts 100 kilograms of wet paddy to roughly 55 kilograms of rice. Source: FAOSTAT.

Figure 2: Domestic and Global Prices of Rice, 2000-2014



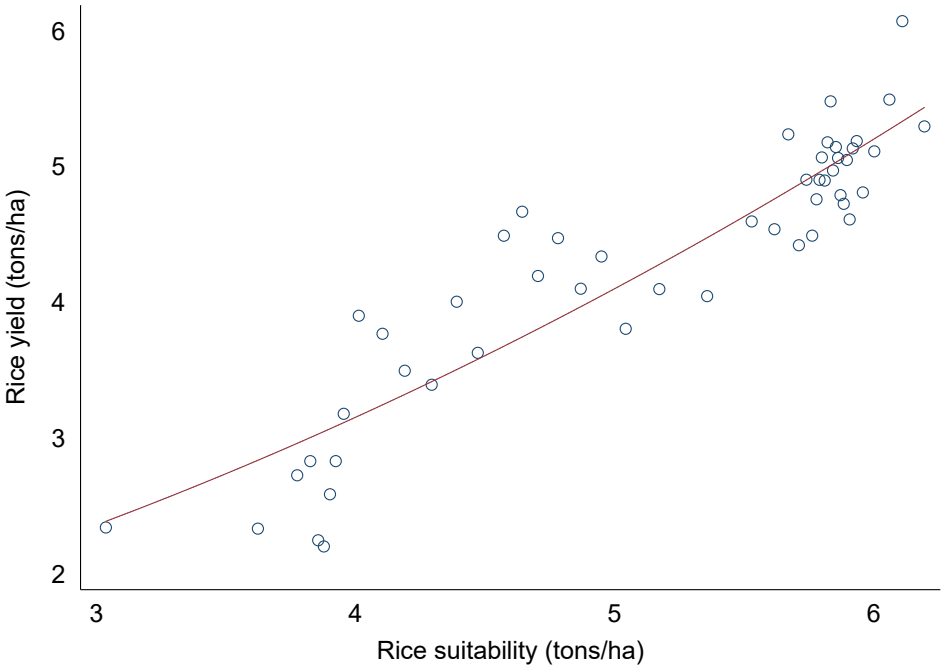
Note: This figure shows the movement of domestic and global rice price from 2000 to 2014. Nominal rice prices are deflated by the national CPI. Global price and domestic rice price are in IDR/Kilogram. Global price refers to price of Thailand milled rice in US $ converted to IDR in current prices using market exchange rate and converted to retail price by adding $20/ton for shipping and a 10 % of mark-up from wholesale to retail (Dawe, 2008). Domestic price is the average of retail prices collected from major markets. Source: Central Bureau of Statistics (BPS) obtained via CEIC database for domestic price and IMF Statistics for global price and market exchange rate (IDR/USD).

Figure 3: Rice Suitability Distribution.



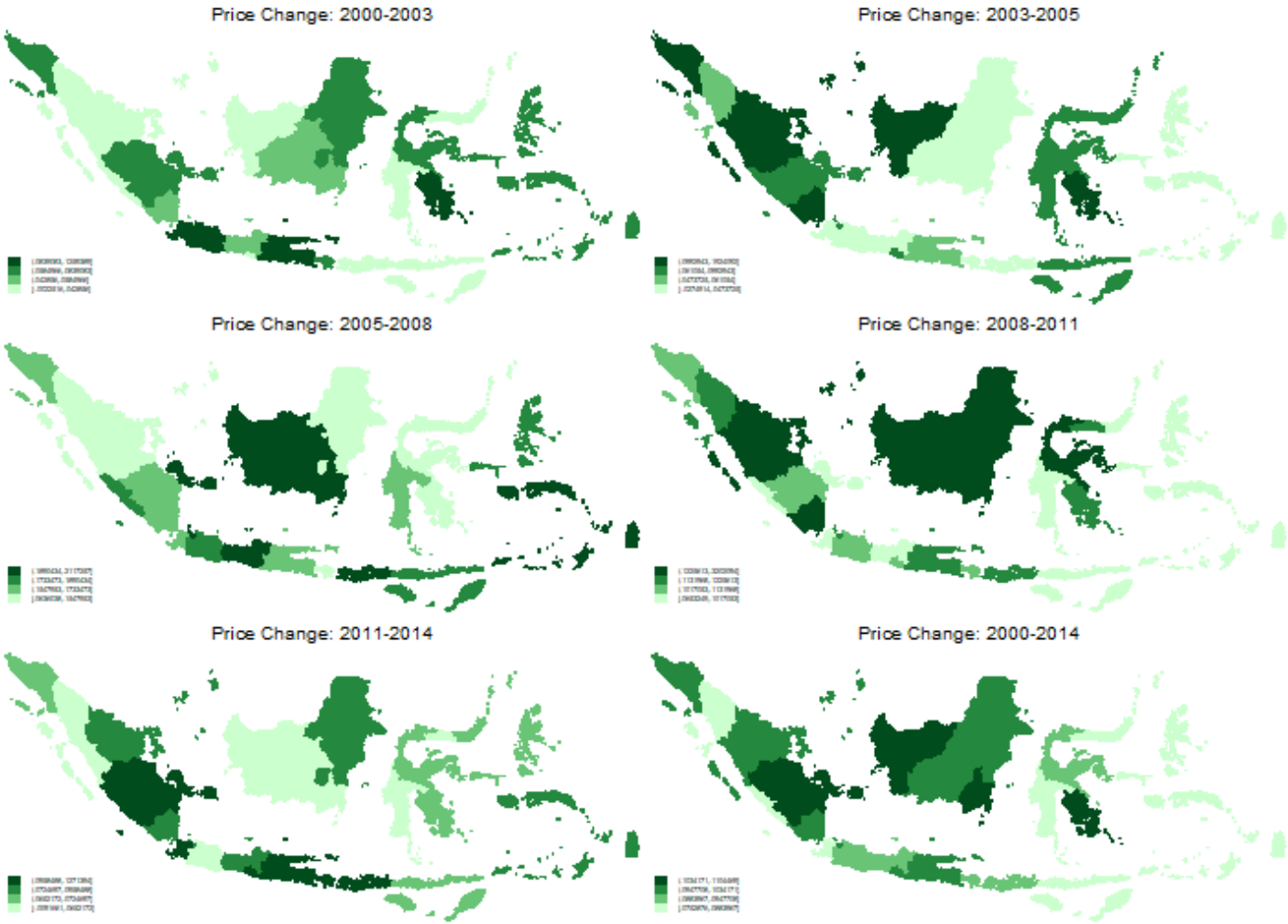
Note: This figure shows distribution of rice suitability in Indonesian villages in 2000, excluding Papua island. Rice suitability measures potential or maximum attainable yields in tons per hectare. Darker shade implies higher suitability than that of lighter shade. Source: FAO-GAEZ.

Figure 4: Rice Productivity and Rice Suitability



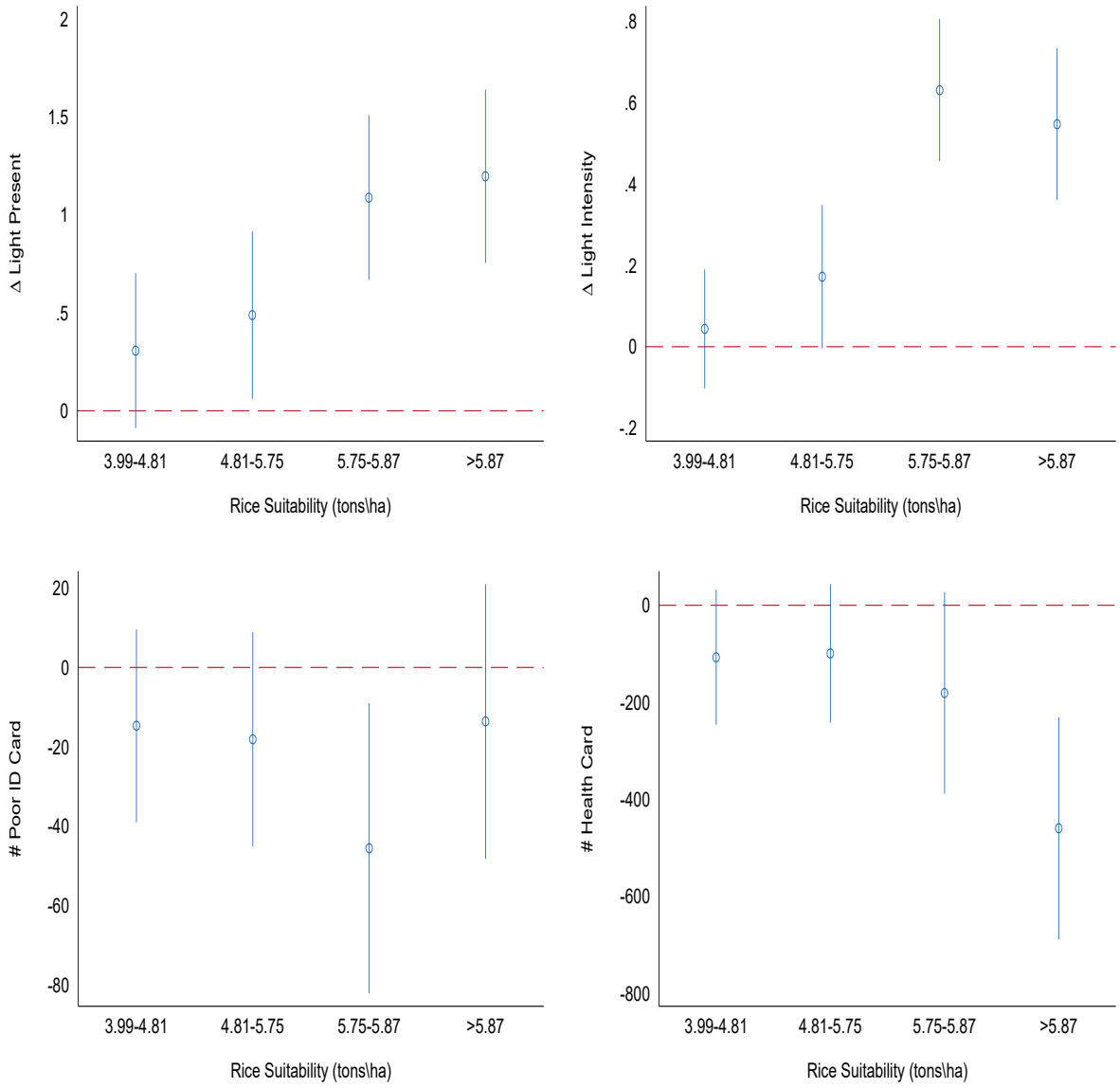
Note: This figure summarizes relationship between rice suitability and productivity, as measured by rice yields. Both variables are measured in tons per hectare. Source: rice suitabiltiy (FAO-GAEZ) and rice yields (the 2003 PODES).

Figure 5: Domestic Annual Rice Price Change: 2000-2014



Note: his figure shows log annualized price change (log points) between 2000 to 2014 across provinces in Indonesia, excluding Papua island. Darker shade implies higher price change than that of lighter shade. Source: Central Bureau of Statistics (BPS) obtained via CEIC database.

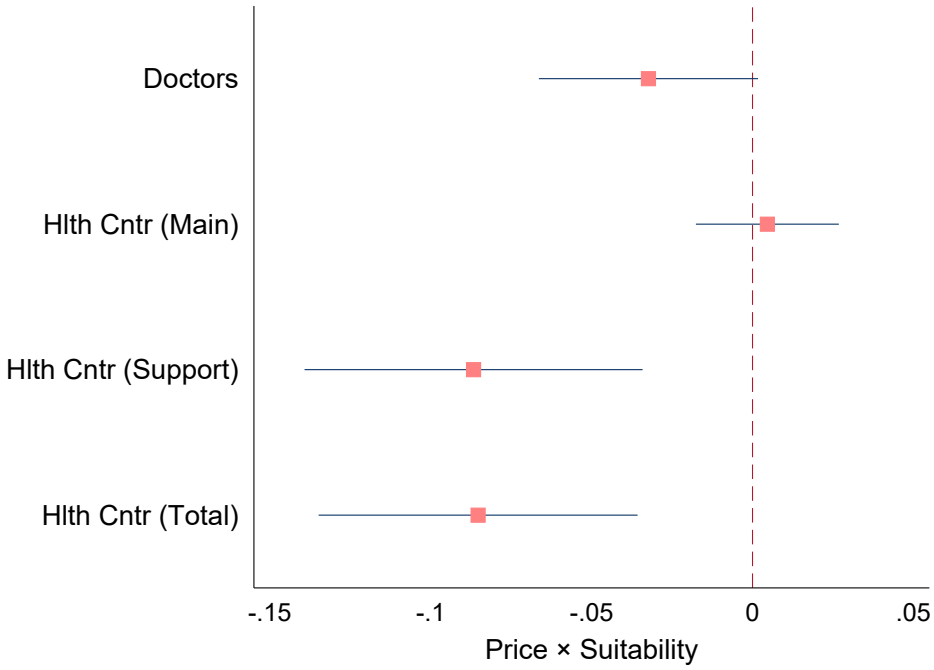
Figure 6: Rice Suitability and Welfare Indicators



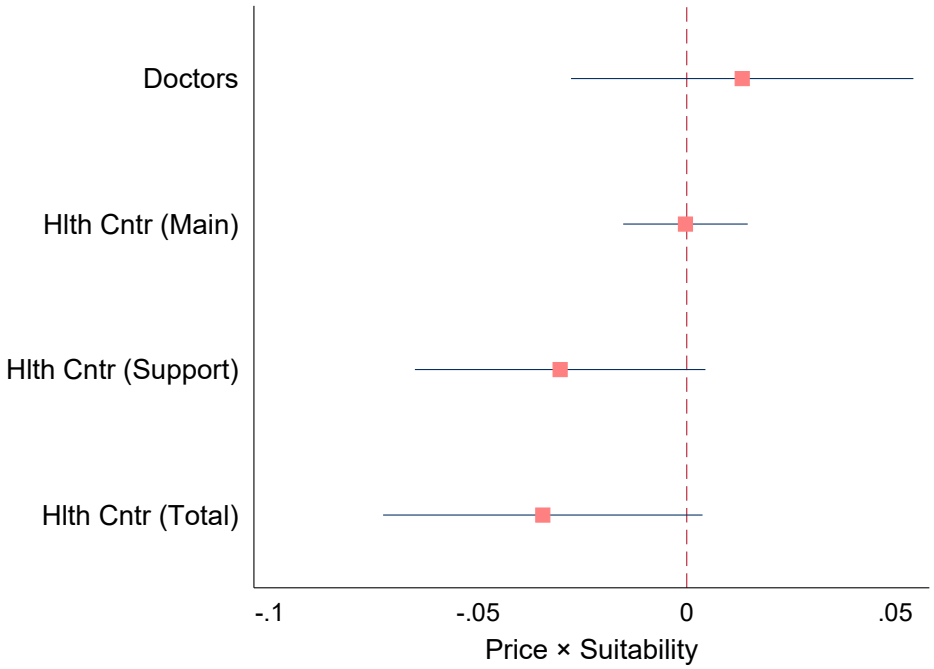
Note: These graphs figure show regression coefficients of estimating equation 2 by quantiles of rice suitability (tons/ha). Standard errors are clustered at the district level with 90% confidence interval.

Figure 7: Effects on Public Health Facilities and Personnel

(a) Changes in Extensive Margins

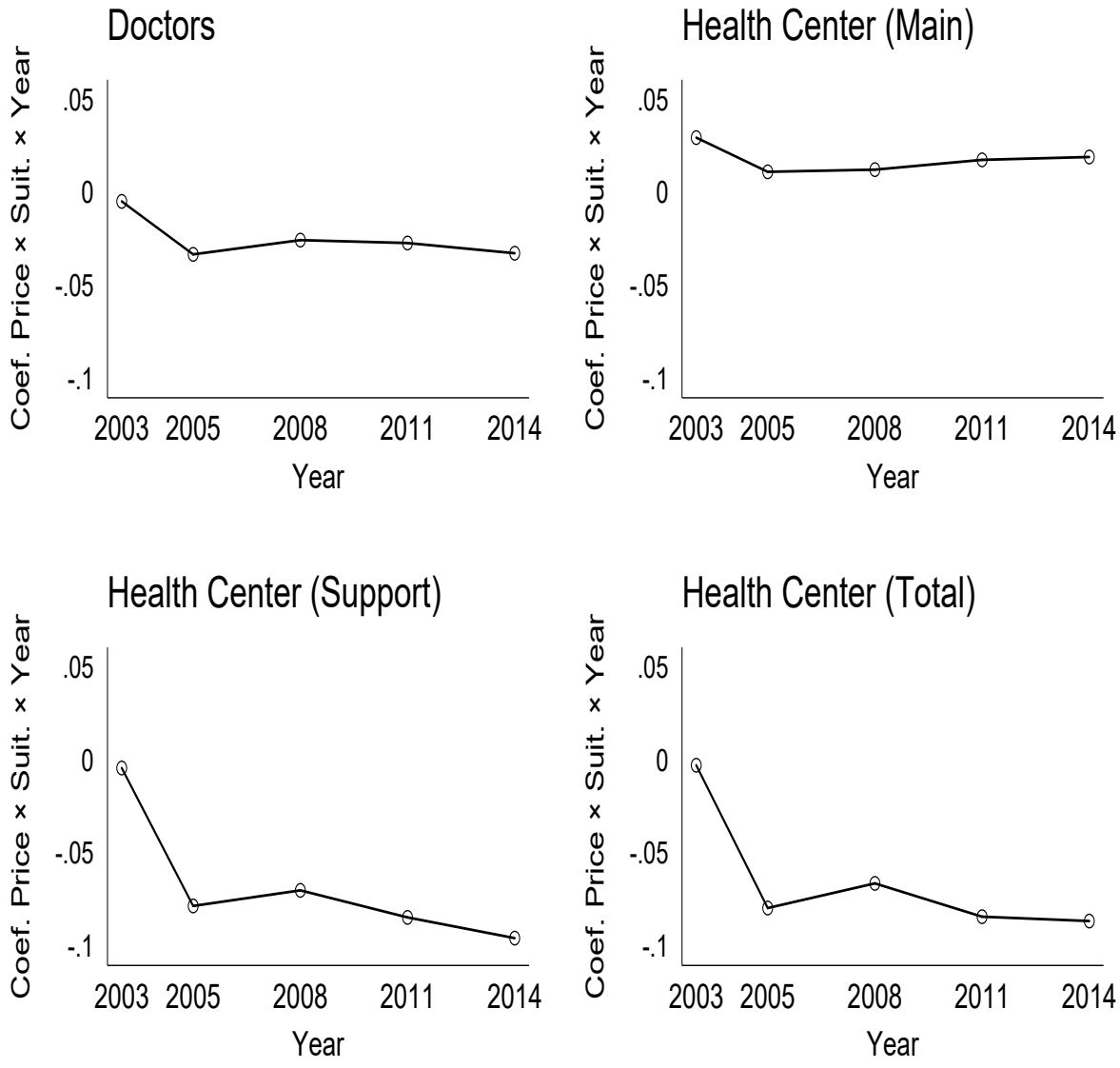


(b) Changes in Intensive Margins



Note: This figure plots regression coefficients of estimating equation 2. Each coefficient comes from each regression conducted separately. Panel (a) and Panel (b) plot effects on changes in the presence and number of public health facilities and personnel, respectively. Standard errors are clustered at the district level with 90% confidence interval.

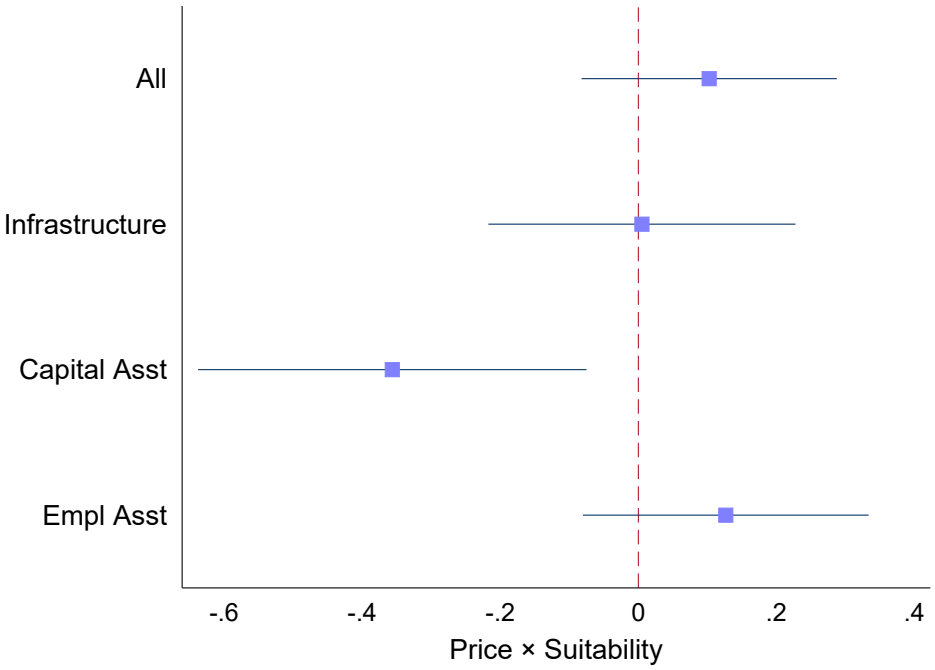
Figure 8: Effects on Public Health Facilities and Personnel by Year



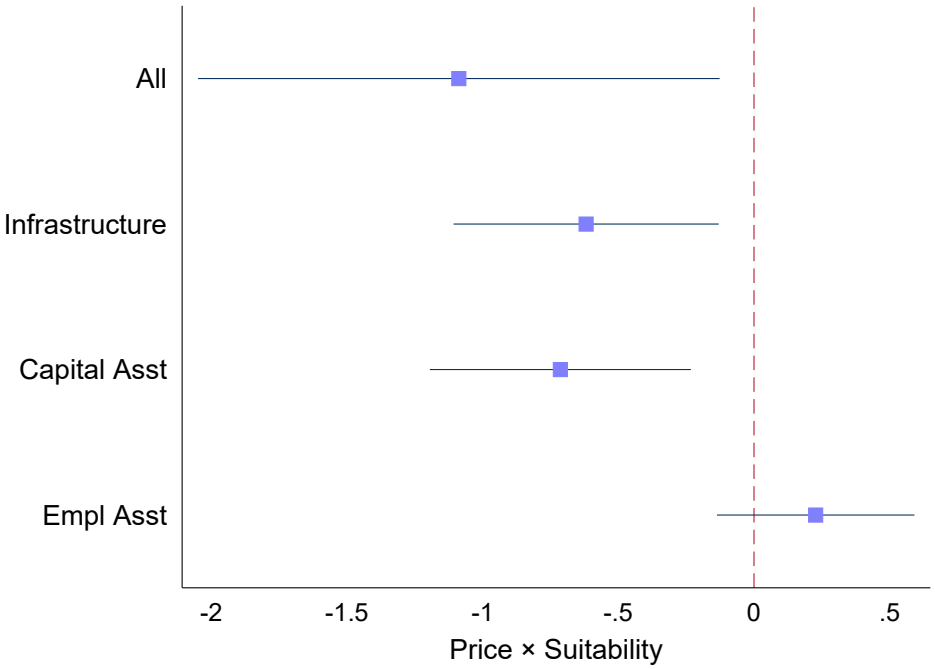
Note: These graphs figure show regression coefficients of estimating equation 2 by quantiles of rice suitability (tons/ha). Standard errors are clustered at the district level with 90% confidence interval.

Figure 9: Effects on Development Projects

(a) Changes in Extensive Margins

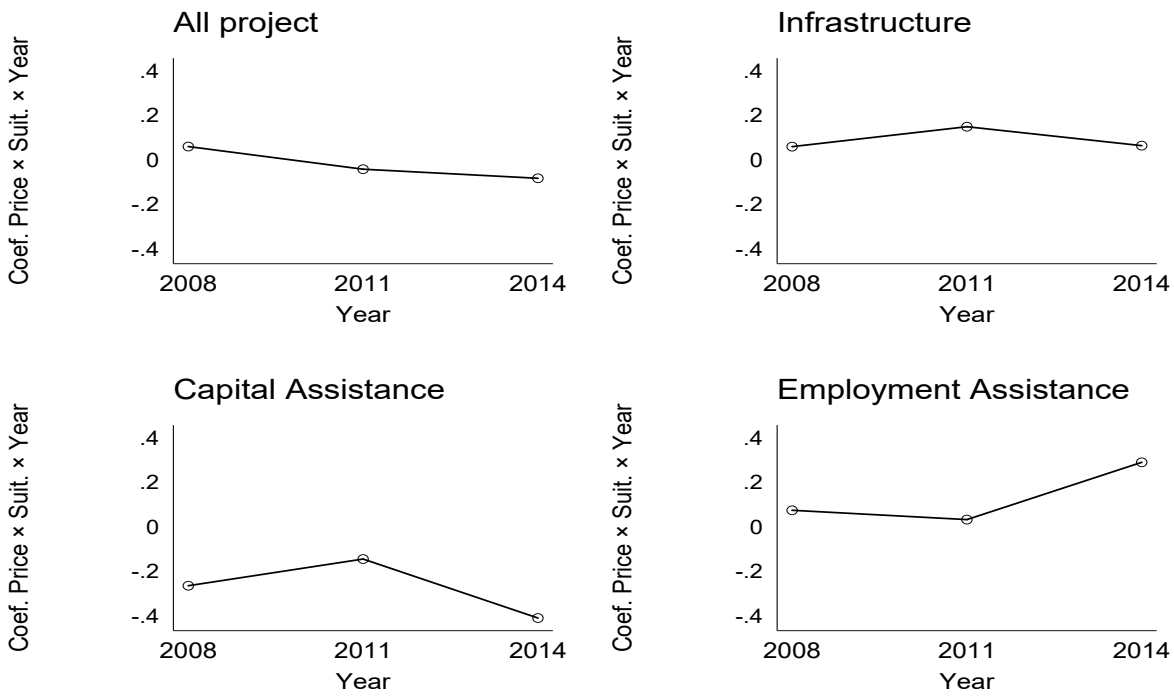


(b) Changes in Intensive Margins



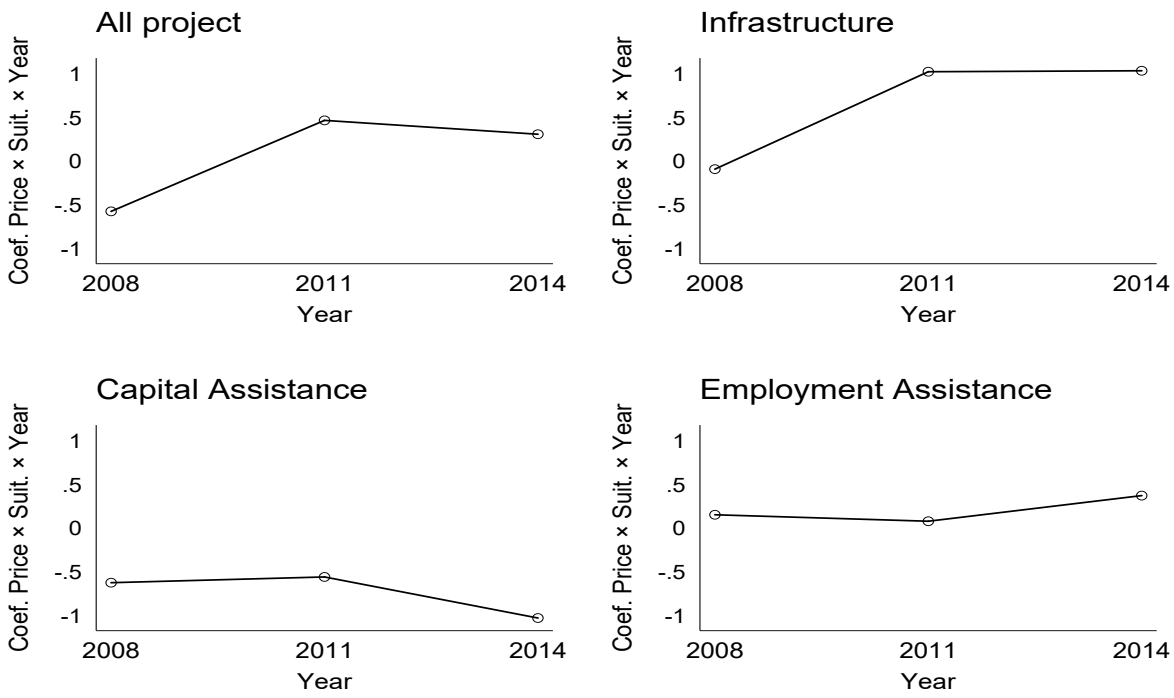
Note: This figure plots regression coefficients of estimating equation 2. Each coefficient comes from each regression conducted separately. Panel (a) and Panel (b) plot effects on changes in the presence and number of development project, respectively. Standard errors are clustered at the district level with 90% confidence interval.

Figure 10: Effects on Development Projects by Year – Changes in Extensive Margins



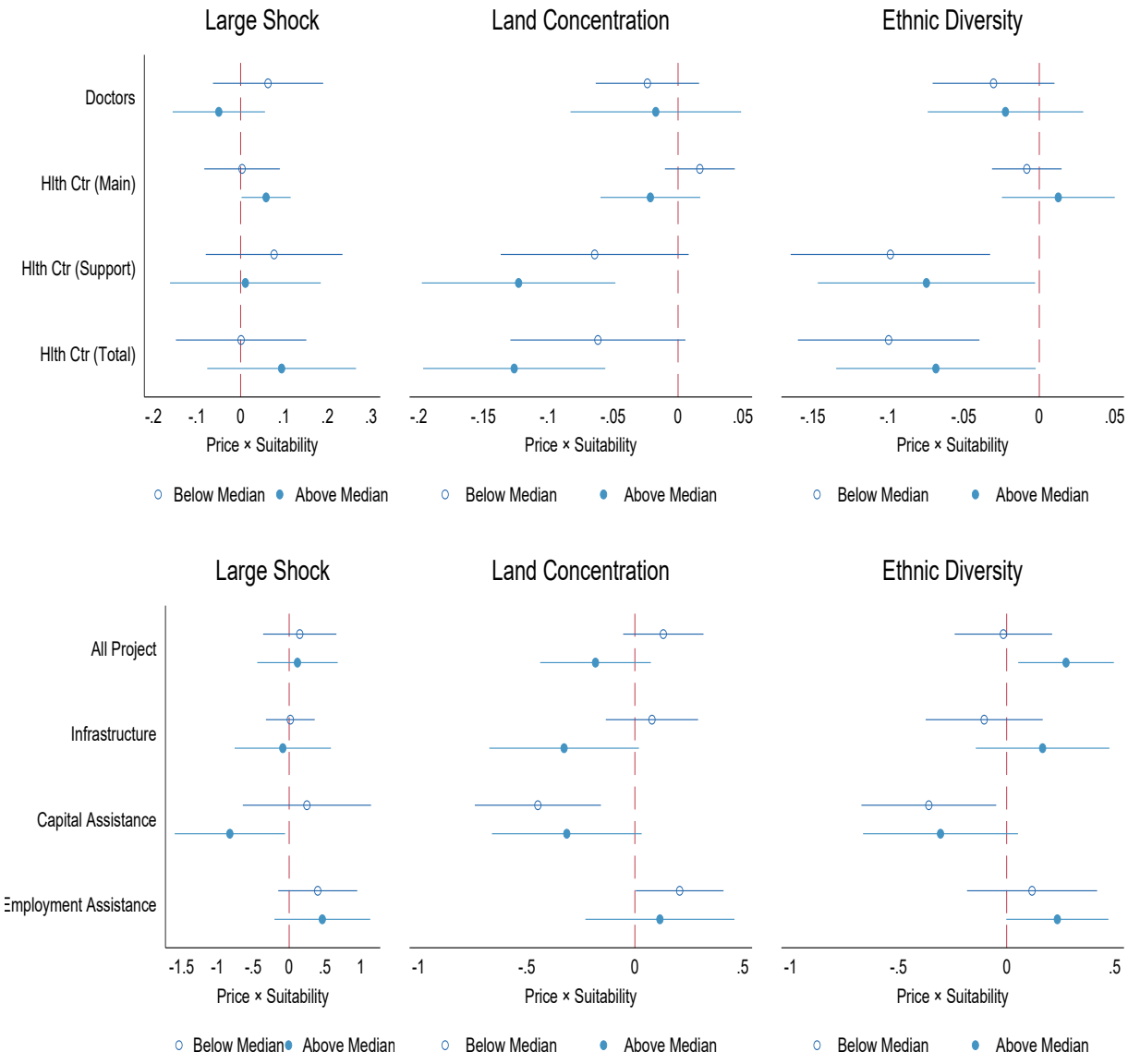
Note: These graphs figure show regression coefficients of estimating equation 2 by quantiles of rice suitability (tons/ha). Standard errors are clustered at the district level with 90% confidence interval.

Figure 11: Effects on Development Projects by Year – Changes in Intensive Margins



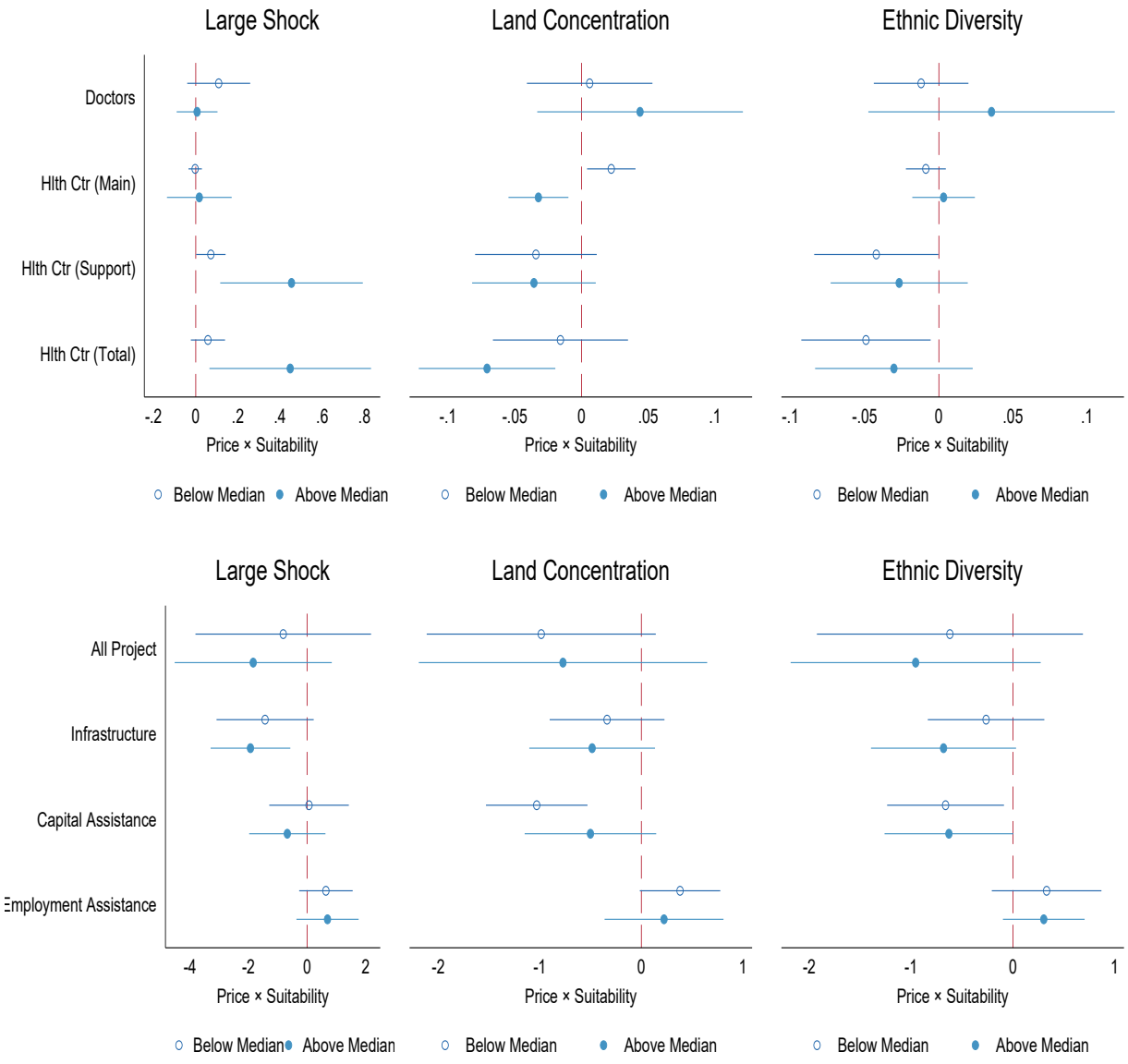
Note: These graphs figure show regression coefficients of estimating equation 2 by quantiles of rice suitability (tons/ha). Standard errors are clustered at the district level with 90% confidence interval.

Figure 12: Heterogeneous Results: Public Goods and Development Projects – Extensive Margins



Note: This figure shows regression coefficients obtained from estimating equation 2 by different subgroups: an indicator of whether shocks are larger than the median of district shock (large shock), an indicator of whether ethnic diversity is larger than the median, and an indicator whether landholding inequality is larger than the median. Each coefficient comes from each regression conducted separately. Standard errors are clustered at the district level with 90% confidence interval.

Figure 13: Heterogeneous Results: Public Goods and Development Projects – Intensive Margins



Note: This figure shows regression coefficients obtained from estimating equation 2 by different subgroups: an indicator of whether shocks are larger than the median of district shock (large shock), an indicator of whether ethnic diversity is larger than the median, and an indicator whether landholding inequality is larger than the median. Each coefficient comes from each regression conducted separately. Standard errors are clustered at the district level with 90% confidence interval.

Tables

Table 1: Summary Statistics

	Mean	SD	Obs.
Panel A: Demographic and administrative characteristics			
Number of population (thousands)	3.59	4.21	318912
Number of villages (hundreds)	2.71	1.31	318912
Ethnic fractionalization	0.18	0.24	317418
Proportion of high education (> primary school)	0.23	0.15	317418
Proportion of Muslim	0.84	0.33	317418
Urban village	0.17	0.38	318899
Distance to district capital (km)	41.31	45.84	318629
Distance to subdistrict capital (km)	8.66	11.91	318580
Panel B: Agricultural characteristics			
Price change (annual growth), 2000-2014	0.10	0.06	265285
Potential rice yields (suitability) (tons/ha)	5.06	0.89	309786
Paddy production (tons/ha)	4.26	3.98	252801
Paddy harvested area (thousands ha)	0.57	0.58	316896
Gini coefficient of land ownership	0.54	0.18	301128
Panel C: Public goods and development projects			
Presence of...			
Doctors	0.20	0.40	318912
Health center (Main)	0.13	0.33	318912
Health center (Small)	0.33	0.47	318912
Health center (Total)	0.44	0.50	318912
Primary school	0.93	0.26	318912
Secondary school	0.26	0.44	318912
Church	0.27	0.44	318912
Mosque	0.87	0.34	318912
Mushola	0.73	0.44	318912
Development project (Total)	0.84	0.37	159456
Infrastructure project	0.71	0.46	159456
Capital asst. project	0.64	0.48	159456
Employment asst. project	0.27	0.45	159456
Number of...			
Doctors	0.54	1.53	265760
Health center (Main)	0.13	0.33	265760
Health center (Small)	0.35	0.50	265760
Health center (Total)	0.47	0.56	265760
Primary school	2.15	1.59	318912
Secondary school	0.33	0.63	318912
Public school	2.49	1.91	318912
Church	0.71	1.61	318912
Mosque	3.81	4.03	318912
Mushola	8.46	11.23	318912
Development project (Total)	3.14	2.61	159456
Infrastructure project	1.68	1.56	159456
Capital asst. project	1.04	1.04	159456
Employment asst. project	0.40	0.76	159456

Note: Number of observations varies due to variation in availability of some variables in village census (PODES) waves

Table 2: Night Light Intensity and Health Insurance Enrollment for the Poor

	Δ Presence of Lights (1)	Δ Lights Intensity (2)	ID Card Poor (3)	Health Card (4)
Price	-2.342***	-1.143***	252.139***	4398.793***
	(0.429)	(0.176)	(81.065)	(607.351)
Price × Suitability	0.476***	0.249***	-46.920***	-897.918***
	(0.081)	(0.035)	(17.201)	(129.685)
Village FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
District-specific Trend	Yes	Yes	No	No
N	188076	188076	237063	237063
R-Squared	0.143	0.299	0.362	0.627
Mean of Dep. Var.	0.663	1.329	62.876	435.137

Note: This table presents the results of changes in the presence and intensity of nighttime lights as well as the number of membership of health insurance and identity card for the poor. The sample for dependent variables in columns 1 and 2 are only up to 2011. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Public Goods: Health Facilities and Personnel

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Support)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Extensive Margins				
Price	0.167*	-0.044	0.461***	0.417***
	(0.094)	(0.067)	(0.153)	(0.149)
Price × Suitability	-0.032	0.005	-0.087***	-0.085***
	(0.021)	(0.013)	(0.032)	(0.030)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	237063	237063	237063	237063
R-Squared	0.080	0.096	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442
	Δ Number			
Panel B: Intensive Margins				
Price	-0.098	-0.005	0.169*	0.181*
	(0.126)	(0.043)	(0.098)	(0.109)
Price × Suitability	0.013	-0.000	-0.030	-0.035
	(0.025)	(0.009)	(0.021)	(0.023)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	190383	188955	188955	188955
R-Squared	0.131	0.155	0.130	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482

Note: This table presents the effects on changes in public good provision in health facilities and personnels. Panel A presents estimation results of changes in extensive margins. Panel B presents results of changes in intensive margins. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Dependent variables in columns 1 to 4 of Panel B are not available in PODES 2008. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Development Projects

	Δ Presence				Δ Number			
	All project (1)	Infrastructure (2)	Capital Asst (3)	Employment Asst (4)	All project (5)	Infrastructure (6)	Capital Asst (7)	Employment Asst (8)
Price	-0.063	0.124	1.691**	-0.593	4.037	1.850	3.292**	-1.072
	(0.509)	(0.634)	(0.780)	(0.599)	(2.673)	(1.352)	(1.327)	(1.052)
Price × Suitability	0.103	0.005	-0.357**	0.127	-1.088*	-0.619**	-0.714**	0.227
	(0.112)	(0.135)	(0.171)	(0.125)	(0.582)	(0.296)	(0.291)	(0.221)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	145654	145654	145654	145654	145654	145654	145654	145654
R-Squared	0.563	0.766	0.506	0.455	0.693	0.736	0.560	0.468
Mean of Dep. Var.	0.840	0.705	0.636	0.274	3.144	1.680	1.044	0.403

Note: The sample for all regressions only include PODES 2008 onwards because information on development projects only available starting in 2008. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. All regressions include village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. $*\ p < 0.10, **\ p < 0.05, ***\ p < 0.01$

Table 5: Heterogeneity Effects on Social Capital

	All (Mean)	Trust Vil. Govt.	Trust Leave House	Trust Leave Child	Help Neighbor	Socialize Neighbor	Loan Money Neighbor	Feeling towards Diff. Ethnic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Baseline Specification								
Price × Suitability	-0.523***	-0.290*	-0.412***	-0.119	-0.182	-0.361	-0.172	-0.448***
	(0.181)	(0.159)	(0.135)	(0.163)	(0.139)	(0.230)	(0.191)	(0.168)
N	229905	220092	197147	219876	209373	228846	198156	220741
R-Squared	0.074	0.041	0.083	0.053	0.049	0.059	0.055	0.065
Panel B: Large Shock								
Price × Suitability	-0.531***	-0.285*	-0.341**	-0.085	-0.230	-0.401*	-0.239	-0.375**
	(0.180)	(0.158)	(0.139)	(0.166)	(0.148)	(0.232)	(0.187)	(0.165)
... × Large Shock	0.003	-0.002	-0.029	-0.013	0.020	0.015	0.028	-0.027
	(0.025)	(0.021)	(0.027)	(0.025)	(0.027)	(0.026)	(0.027)	(0.022)
N	229905	220092	197147	219876	209373	228846	198156	220741
R-Squared	0.074	0.041	0.083	0.053	0.049	0.059	0.055	0.066
Panel C: Land Concentration								
Price × Suitability	-0.518***	-0.239	-0.394***	-0.098	-0.174	-0.458*	-0.118	-0.458**
	(0.189)	(0.172)	(0.145)	(0.170)	(0.149)	(0.236)	(0.201)	(0.177)
... × Gini Coef.	-0.074***	-0.054***	-0.074***	-0.053***	-0.017	-0.016	-0.062***	-0.016
	(0.019)	(0.016)	(0.020)	(0.018)	(0.018)	(0.020)	(0.020)	(0.021)
N	216121	206952	185053	206656	196504	215116	186454	207300
R-Squared	0.074	0.042	0.084	0.054	0.050	0.060	0.057	0.066
Panel D: Ethnic Fractionalization								
Price × Suitability	-0.539***	-0.260	-0.363**	-0.088	-0.203	-0.395	-0.164	-0.576***
	(0.200)	(0.167)	(0.145)	(0.177)	(0.150)	(0.252)	(0.197)	(0.194)
... × ELF	0.010	-0.028	-0.127***	-0.061**	0.009	0.026	0.028	0.197***
	(0.025)	(0.021)	(0.025)	(0.024)	(0.022)	(0.026)	(0.026)	(0.028)
N	229341	219540	196670	219341	208862	228283	197683	220181
R-Squared	0.074	0.041	0.084	0.054	0.049	0.059	0.055	0.067

Note: This table presents the effects on social capital at individual level using sociocultural module of the 2009 and 2012 National Socioeconomic Survey (Susenas). The sample covers 15,088 unique villages. Column 1 measures mean index of all social capital variables (columns 2 to 8). Price is omitted due to collinearity with district-specific trends. The sample varies across outcomes due to non-responses. The regression specification adds an indicator variable for being male, age, and age squared. Additional village-level covariates include those in the main specification. For ease of interpretation, dependent variables are standardized. All regressions include village and year fixed effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at the district level. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$.

Table 6: Nutrition Intake and Share of Food Expenditure per Capita

	Calorie	Protein	Share of Food Exp per capita.
	(1)	(2)	(3)
Price	-0.072	-0.215	-0.014
	(0.167)	(0.198)	(0.053)
Price × Suitability	0.034*	0.050**	0.008
	(0.019)	(0.022)	(0.006)
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes
N	305460	305460	305460
R-Squared	0.177	0.170	0.253

Note: This table presents the effects on nutritional status and the share of food expenditure. Nutrition status is measured by per capita calorie (log) and protein (log) intake in the last seven days at the household level using data from the consumption module of the 2002, 2005, 2008, and 2011 National Socioeconomic Survey (Susenas). The sample covers 25,821 unique villages. To obtain per capita measures, household size is adjusted by equivalent scales. Calorie and protein intakes are converted from various food groups. In addition to the village-level covariates in the main specification, the regression specification also includes household covariates: indicator for wife's education attainment, wife's age and age squared, indicator for marital status of head of household (not married, married, divorced, widowed), and indicators for the number of household members aged 0-4, 5-9, 10-14, 15-55, and above 55. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at the district level.. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table 7: Heterogeneity Effects on Night Light Intensity and Health Insurance Enrollment for the Poor

	Δ Presence of Lights	Δ Lights Intensity	ID Card Poor	Health Card
	(1)	(2)	(3)	(4)
Panel A: Large Shock —above district median				
Price × Suitability	0.409***	0.228***	-11.303	-79.963*
	(0.089)	(0.037)	(8.052)	(47.300)
... × Large Shock	0.053**	0.017	-0.026	-21.954
	(0.021)	(0.011)	(1.902)	(16.894)
N	188076	188076	237063	237063
R-Squared	0.143	0.299	0.116	0.295
Panel B: Land Concentration —above median				
Price × Suitability	0.492***	0.239***	-14.478**	-102.155**
	(0.087)	(0.037)	(6.946)	(42.528)
... × Gini	-0.012	0.011*	2.878**	-1.045
	(0.010)	(0.005)	(1.370)	(9.429)
N	178590	178590	225101	225101
R-Squared	0.143	0.301	0.117	0.298
Panel C: Ethnic Fractionalization —above median				
Price × Suitability	0.478***	0.250***	-11.252*	-118.525***
	(0.081)	(0.035)	(6.763)	(41.232)
... × ELF	-0.036***	-0.005	-0.052	6.310
	(0.013)	(0.007)	(1.951)	(11.573)
N	187556	187556	236408	236408
R-Squared	0.143	0.299	0.116	0.295

Note: This table presents heterogenous treatment effects on changes in public good provision (extensive margins): health facilities and personnels as well as public schools. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$.

Table 8: Heterogeneity Effects on Public Health Facilities and Personnel – Extensive Margins

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Small)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Large Shock —above district median				
Price × Suitability	-0.032	0.015	-0.084**	-0.068**
	(0.023)	(0.015)	(0.034)	(0.032)
... × Large Shock	-0.000	-0.006*	-0.001	-0.010
	(0.006)	(0.004)	(0.008)	(0.007)
N	237063	237063	237063	237063
R-Squared	0.080	0.096	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442
Panel B: Land Concentration —above median				
Price × Suitability	-0.016	0.005	-0.081**	-0.083**
	(0.022)	(0.015)	(0.035)	(0.033)
... × Gini	-0.015**	-0.003	-0.011	-0.007
	(0.007)	(0.003)	(0.008)	(0.008)
N	225101	225101	225101	225101
R-Squared	0.079	0.095	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442
Panel C: Ethnic Fractionalization —above median				
Price × Suitability	-0.031	0.005	-0.088***	-0.085***
	(0.021)	(0.013)	(0.032)	(0.030)
... × ELF	-0.002	-0.004	-0.005	-0.004
	(0.006)	(0.004)	(0.007)	(0.007)
N	236408	236408	236408	236408
R-Squared	0.080	0.096	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442

Note: This table presents heterogenous treatment effects on changes in public good provision (extensive margins): health facilities and personnels as well as public schools. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$.

Table 9: Heterogeneity Effects on Public Health Facilities and Personnel – Intensive Margins

	Δ Number			
	Doctors	Health Center (Main)	Health Center (Small)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Large Shock —above district median				
Price × Suitability	0.029	0.004	-0.034	-0.035
	(0.027)	(0.010)	(0.022)	(0.024)
... × Large Shock	-0.010	-0.002	0.002	0.000
	(0.007)	(0.001)	(0.003)	(0.003)
N	190383	188955	188955	188955
R-Squared	0.131	0.155	0.130	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482
Panel B: Land Concentration —above median				
Price × Suitability	0.024	0.001	-0.028	-0.031
	(0.028)	(0.010)	(0.022)	(0.024)
... × Gini	-0.011	-0.004**	0.000	-0.004
	(0.007)	(0.002)	(0.004)	(0.004)
N	180777	179444	179444	179444
R-Squared	0.129	0.154	0.129	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482
Panel C: Ethnic Fractionalization —above median				
Price × Suitability	0.018	0.000	-0.030	-0.032
	(0.025)	(0.009)	(0.022)	(0.024)
... × ELF	-0.018*	-0.002	-0.002	-0.005
	(0.011)	(0.002)	(0.004)	(0.004)
N	189855	188434	188434	188434
R-Squared	0.131	0.155	0.129	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482

Note: This table presents heterogenous treatment effects on changes in public good provision (extensive margins): health facilities and personnels as well as public schools. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$.

Table 10: Heterogeneity Effects on Development Projects

	Δ Presence				Δ Number			
	All project	Infrastructure	Capital Asst	Employment Asst	All project	Infrastructure	Capital Asst	Employment Asst
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Large Shock								
Price × Suitability	0.134	0.054	-0.353**	0.175	-0.934	-0.578*	-0.665**	0.280
	(0.110)	(0.126)	(0.174)	(0.126)	(0.582)	(0.297)	(0.289)	(0.219)
... × Large Shock	-0.031**	-0.048***	-0.004	-0.047***	-0.152*	-0.040	-0.048	-0.052*
	(0.015)	(0.018)	(0.022)	(0.018)	(0.086)	(0.049)	(0.039)	(0.031)
N	145654	145654	145654	145654	145654	145654	145654	145654
R-Squared	0.563	0.767	0.506	0.456	0.693	0.736	0.560	0.468
Panel B: Land Concentration								
Price × Suitability	0.003	-0.071	-0.454***	0.170	-0.929	-0.461	-0.838***	0.366
	(0.114)	(0.140)	(0.167)	(0.130)	(0.598)	(0.291)	(0.278)	(0.227)
... × Gini	0.054***	0.047***	-0.002	-0.024	-0.197***	-0.125***	-0.011	-0.070***
	(0.015)	(0.014)	(0.017)	(0.014)	(0.073)	(0.035)	(0.033)	(0.025)
N	138253	138253	138253	138253	138253	138253	138253	138253
R-Squared	0.562	0.768	0.505	0.453	0.690	0.736	0.556	0.465
Panel C: Ethnic Fractionalization								
Price × Suitability	0.084	-0.023	-0.376**	0.127	-1.139**	-0.625**	-0.761***	0.234
	(0.113)	(0.137)	(0.170)	(0.129)	(0.575)	(0.294)	(0.290)	(0.227)
... × ELF	0.027*	0.033*	0.019	-0.013	0.038	0.021	0.045	-0.033
	(0.015)	(0.018)	(0.021)	(0.019)	(0.097)	(0.047)	(0.041)	(0.032)
N	145255	145255	145255	145255	145255	145255	145255	145255
R-Squared	0.563	0.767	0.506	0.455	0.693	0.736	0.560	0.468

Note: This table presents heterogenous treatment effects on changes in public good provision (extensive margins): health facilities and personnels as well as public schools. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$.

Table 11: Heterogeneity Effects on Infant and Maternal Mortality

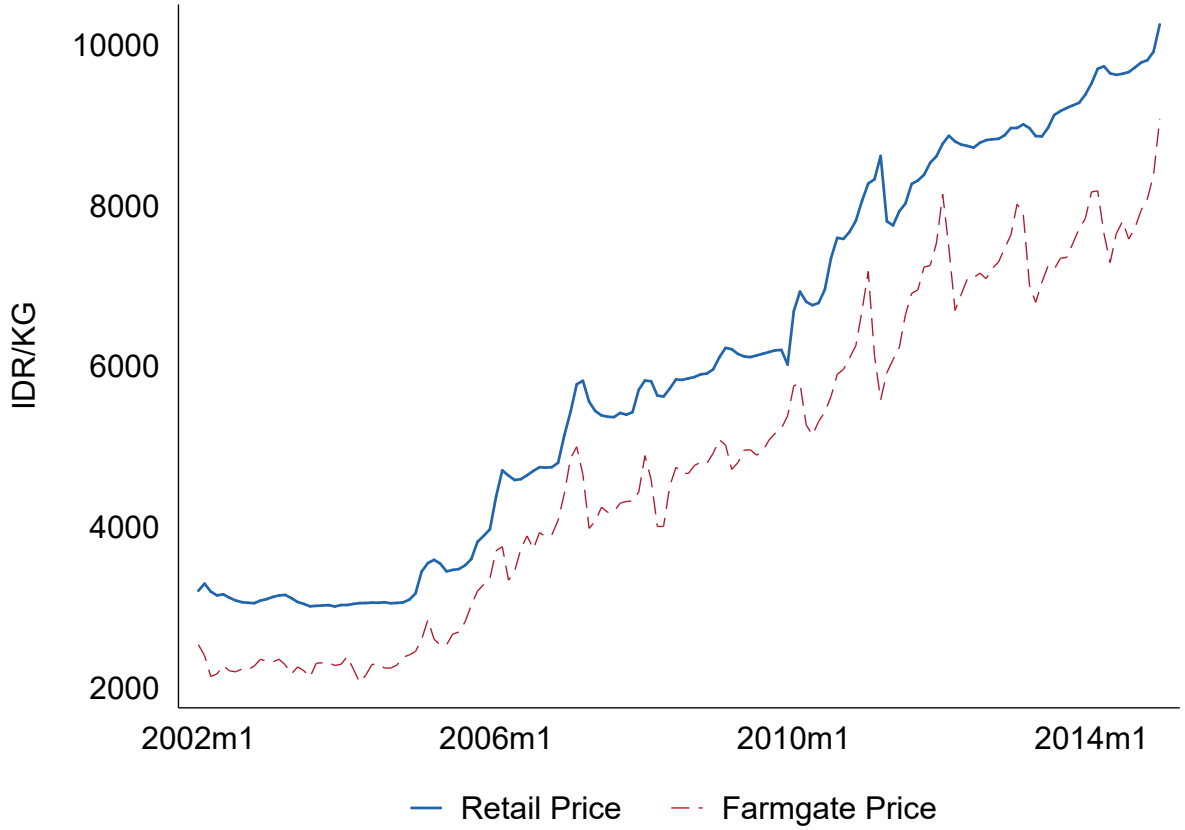
	Extensive Margins		Intensive Margins	
	Infant Mortality	Maternal Mortality	Infant Mortality	Maternal Mortality
	(1)	(2)	(3)	(4)
Panel A: Baseline Specification				
Price	0.988*	1.223***	78.724	16.401**
	(0.544)	(0.260)	(49.295)	(6.993)
Price × Suitability	-0.181*	-0.099**	-4.786	-1.077
	(0.095)	(0.041)	(10.259)	(1.149)
R-Squared	0.127	0.037	0.029	0.007
Panel B: Health Center (Support)				
Price × Suitability	-0.190**	-0.101**	-5.682	-1.167
	(0.095)	(0.041)	(10.283)	(1.148)
... × Hlth. Ctr (Support)	0.032**	0.009	3.318***	0.334
	(0.013)	(0.008)	(1.167)	(0.204)
R-Squared	0.127	0.037	0.029	0.007
Panel C: Health Center (Total)				
Price × Suitability	-0.194**	-0.106**	-5.965	-1.240
	(0.095)	(0.041)	(10.328)	(1.137)
... × Hlth. Ctr (Total)	0.040***	0.022***	3.703***	0.510***
	(0.013)	(0.007)	(1.113)	(0.170)
R-Squared	0.127	0.037	0.029	0.007
Panel D: Floor				
Price × Suitability	-0.066	-0.066	6.850	-0.568
	(0.084)	(0.042)	(9.354)	(1.292)
... × Tiled Floor	-0.174***	-0.049***	-17.541***	-0.768**
	(0.025)	(0.013)	(2.219)	(0.347)
R-Squared	0.130	0.037	0.032	0.007
Panel E: Cooking Energy				
Price × Suitability	-0.125	-0.078*	3.882	-0.802
	(0.090)	(0.041)	(9.214)	(1.216)
... × Safe Cooking Energy	-0.104***	-0.039***	-16.225***	-0.515
	(0.027)	(0.013)	(2.125)	(0.330)
R-Squared	0.128	0.037	0.032	0.007
Panel F: Drinking Water				
Price × Suitability	-0.175*	-0.107***	-1.637	-1.125
	(0.093)	(0.041)	(10.103)	(1.143)
... × Safe Drinking Water	-0.011	0.015	-5.757***	0.086
	(0.019)	(0.010)	(1.621)	(0.246)
R-Squared	0.127	0.037	0.029	0.007
N	52285	52285	52233	52267
Mean of Dep. Var.	0.603	0.108	30.422	1.908

Note: This table presents baseline (uninteracted) and heterogeneity treatment effects on infant and maternal mortality by the presence of public health centers and whether safe housing characteristics are above the median. Safe housing characteristics consist of proportion of houses with tiled floors (Panel D), proportion of houses using safe cooking energy such as electric or gas (Panel E), proportion of houses with access to safe drinking water, such as bottled water, pump, or tap water (Panel F). Public health centers, both supporting and total, are taken from the 2008 PODES. Housing variables are constructed from the universe of the 2010 population census. In addition to the village-level covariates in the main specification, all regressions include indicator for urban village, proportion of employment in agricultural sector, proportion of high educated people (higher than primary school). *Price*, which measures log annualized price change from 2006 to 2009, is not displayed in Panels B to F for better visualization. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A Appendix

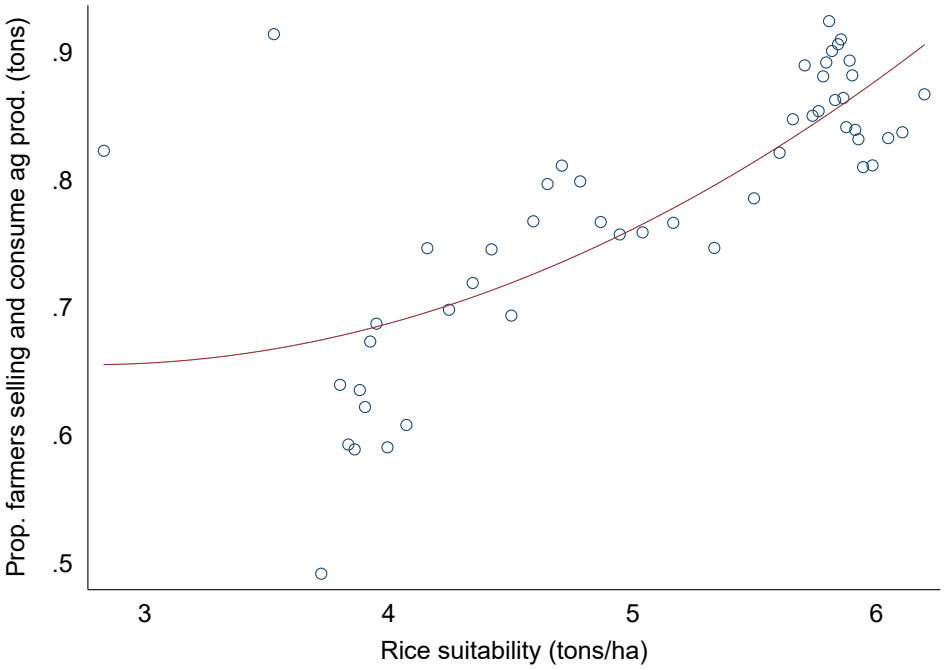
A.1 Figures

Figure A.1: Domestic Retail and Farmgate Price: 2002-2014



Note: This figure shows the close relatonship between national farmgate and retail rice prices from 2002 to 2014. Farmgate prices are quoted in wet paddy. Drying and milling process converts 100 kilograms of wet paddy to roughly 55 kilograms. Source: Central Bureau of Statistics (BPS) and CEIC database.

Figure A.2: Proportion of Producer and Consumer Farmers and Rice Suitability.



Note: This figure summarizes relationship between rice suitability and proportion of farmers selling and consuming their agriculture products conditional on majority of villagers working in agricultural sector. Source: FAO-GAEZ (rice suitability) and PODES 2005 (proportion of farmers sellers).

A.2 Tables

Table A.1: Summary Statistics

	Mean	SD	Obs.
Panel A: Agricultural characteristics			
Share of HH plant sawah (wetland) >0	0.37	0.31	301533
Share of HH plant palawija >0	0.29	0.31	301533
Share farmers sell and consume ag prod.	0.78	0.41	264928
Panel B: Δ Number of public goods and development projects			
Doctors	0.02	0.33	212608
Health center (Main)	0.00	0.06	212608
Health center (Support)	0.00	0.13	212608
Health center (Total)	0.00	0.13	212608
Primary school	-0.01	0.23	265760
Secondary school	0.01	0.12	265760
Total school	0.00	0.26	265760
Church	0.02	0.20	265760
Mosque	0.08	0.43	265760
Mushola	0.10	1.42	265760
Panel C: Other village characteristics			
Total village revenues (in millions)	127.46	193.47	189394
Village own-source revenues (in millions)	64.05	111.17	157430
Transfer grants (in millions)	110.08	183.63	185911
Village head education (years)	11.57	2.97	313183
Village head male	0.96	0.20	313151

Note: This table highlights additional key characteristics of 53,152 villages. Number of observations varies due to variation in availability of some variables in village census (PODES) waves

Table A.2: Public Goods: Schools

	Δ Presence			Δ Number		
	Primary School (1)	Secondary School (2)	Total School (3)	Primary School (4)	Secondary School (5)	Total School (6)
Price	-0.104	-0.197*	-0.087	0.072	-0.076	-0.001
	(0.067)	(0.116)	(0.065)	(0.101)	(0.046)	(0.116)
Price × Suitability	0.019	0.042*	0.015	-0.013	0.014	-0.001
	(0.014)	(0.024)	(0.013)	(0.021)	(0.010)	(0.024)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	237063	237063	237063	237063	237063	237063
R-Squared	0.062	0.114	0.065	0.104	0.125	0.119
Mean of Dep. Var.	0.926	0.261	0.933	2.181	0.343	2.523

Note: This table presents the effects on changes in provision of public schools. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table A.3: Locally Managed Public Goods: Clinics, Garbage Disposal, and Drinking Water

	Polyclinics (1)	Garbage Disposal (2)	Safe Drinking Water (3)
Price	0.348*	-0.398	0.092
	(0.190)	(0.384)	(0.153)
Price × Suitability	-0.059	0.050	-0.042
	(0.038)	(0.078)	(0.033)
Village FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes
N	237063	237063	237063
R-Squared	0.068	0.064	0.091
Mean of Dep. Var.	0.099	0.758	0.221

Note: This table presents the results of changes in the presence of locally managed health-related public goods: polyclinics, garbage disposal, and access to safe drinking water. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table A.4: Nutrition Intake: Bought and Own Food

	Calorie Bought (All) (1)	Calorie Own (All) (2)	Calorie Bought (Unprocessed) (3)	Calorie Own (Unprocessed) (4)	Protein Bought (All) (5)	Protein Own (All) (6)	Protein Bought (Unprocessed) (7)	Protein Own (Unprocessed) (8)
Price	-0.036	0.084	0.052	-0.144	-0.237	0.647	-0.319	0.284
	(0.232)	(0.810)	(0.412)	(0.888)	(0.267)	(0.730)	(0.307)	(0.800)
Price × Suitability	0.014	0.201**	-0.040	0.145	0.039	0.087	-0.015	0.069
	(0.024)	(0.079)	(0.041)	(0.096)	(0.027)	(0.087)	(0.032)	(0.101)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	305292	208476	304488	185987	305255	207581	304486	185977
R-Squared	0.190	0.200	0.135	0.206	0.211	0.189	0.149	0.207

Note: This table presents the effects on nutritional status in the forms of per capita calorie (log) and protein (log) intake in the last seven days at the household level using data from the consumption module of the 2002, 2005, 2008, and 2011 National Socioeconomic Survey (Susenas). The sample covers 25,821 unique villages. To obtain per capita measures, household size is adjusted by equivalent scales. Calorie and protein intakes are converted from all and unprocessed food groups. All-food group includes processed and unprocessed food. Both food groups are further divided into whether the food are bought or obtained from household own production. In addition to the village-level covariates in the main specification, the regression specification also includes household covariates: indicator for wife's education attainment, wife's age and age squared, indicator for marital status of head of household (not married, married, divorced, widowed), and indicators for the number of household members aged 0-4, 5-9, 10-14, 15-55, and above 55. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at the district level.. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table A.5: Village Revenues

	Total Revenue (1)	Own Revenues (2)	Total Transfers (3)
Price	6.361***	6.504***	1.485
	(1.522)	(1.423)	(1.712)
Price × Suitability	-0.842***	-1.201***	0.245
	(0.320)	(0.311)	(0.383)
Village FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes
N	167507	128725	163578
R-Squared	0.648	0.716	0.690
Mean of Dep. Var.	4.195	3.078	3.944

Note: This table presents the effects on village revenues (log): total revenues, total own village revenues, and total revenues from transfer grants. The number of observation varies because of missing values in dependent variables. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.6: Public Health Facilities and Safe Housing Characteristics

	Health Center (Support) (1)	Health Center (Total) (2)	Tiled Floor (3)	Safe Cooking Energy (4)	Safe Drinking Water (5)
Price	-0.362	0.040	-5.091***	-5.416**	-1.226**
	(0.463)	(0.466)	(0.567)	(0.823)	(0.607)
Price × Suitability	-0.168***	-0.255***	0.469***	0.467***	0.268**
	(0.057)	(0.059)	(0.083)	(0.117)	(0.134)
N	52285	52285	52285	52285	52285
R-Squared	0.129	0.144	0.601	0.513	0.292
Mean of Dep. Var.	0.370	0.478	0.284	0.282	0.272

Note: This table presents the effects on public health centers and housing characteristics that can contribute to health status. Safe housing characteristics consist of an indicator for whether floors are tiled (column 3), an indicator for whether a household uses safe cooking energy such as electric or gas (column 4), and an indicator for whether the main source for drinking water is either bottled water, pump, or tap water (column 5). Housing variables are constructed from the universe of the 2010 population census. Health centers variables come from the 2008 PODES. To reflect differences in the timing of health centers and safe housing characteristics, *Price* is adjusted. As in main specification, *Price* measures log annualized price change from 2005 to 2008 for columns 1 and 2 and from 2006 to 2009 for columns 3 to 5. In addition to the village-level covariates in the main specification, all regressions include indicator for urban village, proportion of employment in agricultural sector, proportion of high educated people (higher than primary school). Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Additional Results: Alternative Specifications

Table B.1: Night Light Intensity and Health Insurance Enrollment for the Poor – All Provinces

	Δ Presence of Lights (1)	Δ Lights Intensity (2)	ID Card Poor (3)	Health Card (4)
Price	-2.259***	-1.196***	290.351***	4783.831***
	(0.438)	(0.189)	(84.319)	(648.431)
Price × Suitability	0.467***	0.279***	-56.822***	-1005.725***
	(0.082)	(0.040)	(18.234)	(141.699)
Village FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
District-specific Trend	Yes	Yes	No	No
N	208944	208944	263364	263364
R-Squared	0.141	0.275	0.383	0.621
Mean of Dep. Var.	0.649	1.295	62.913	419.129

Note: This table presents the results of changes in the presence and intensity of nighttime lights as well as the number of membership of health insurance and identity card for the poor. The sample for dependent variables in columns 1 and 2 are only up to 2011. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.2: Public Goods: Health Facilities and Personnel – All Provinces

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Support)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Extensive Margins				
Price	0.162*	-0.057	0.438***	0.378**
	(0.091)	(0.067)	(0.150)	(0.146)
Price × Suitability	-0.032	0.007	-0.083***	-0.078***
	(0.020)	(0.013)	(0.031)	(0.030)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	263364	263364	263364	263364
R-Squared	0.080	0.097	0.075	0.073
Mean of Dep. Var.	0.194	0.126	0.318	0.424
	Δ Number			
Panel B: Intensive Margins				
Price	-0.098	-0.023	0.144	0.138
	(0.128)	(0.043)	(0.095)	(0.108)
Price × Suitability	0.011	0.004	-0.025	-0.025
	(0.025)	(0.009)	(0.021)	(0.023)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	211429	209966	209966	209966
R-Squared	0.131	0.155	0.130	0.136
Mean of Dep. Var.	0.669	0.130	0.333	0.463

Note: This table presents the effects on changes in public good provision in health facilities and personnels. Panel A presents estimation results of changes in extensive margins. Panel B presents results of changes in intensive margins. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Dependent variables in columns 1 to 4 of Panel B are not available in PODES 2008. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: Development Projects – All Provinces

	Δ Presence				Δ Number			
	All project	Infrastructure	Capital Asst	Employment Asst	All project	Infrastructure	Capital Asst	Employment Asst
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Price	-0.340	0.254	1.556**	-0.475	5.329**	3.002**	3.214**	-0.808
	(0.496)	(0.658)	(0.749)	(0.586)	(2.685)	(1.451)	(1.287)	(1.027)
Price × Suitability	0.166	-0.026	-0.328**	0.097	-1.404**	-0.894***	-0.698**	0.160
	(0.109)	(0.140)	(0.163)	(0.123)	(0.589)	(0.320)	(0.282)	(0.216)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	161761	161761	161761	161761	161761	161761	161761	161761
R-Squared	0.563	0.756	0.503	0.462	0.697	0.734	0.568	0.475
Mean of Dep. Var.	0.837	0.700	0.639	0.264	3.074	1.627	1.042	0.389

Note: The sample for all regressions only include PODES 2008 onwards because information on development projects only available starting in 2008. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. All regressions include village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table B.4: Night Light Intensity and Health Insurance Enrollment for the Poor – Village-Specific Trend

	Δ Presence of Lights (1)	Δ Lights Intensity (2)	ID Card Poor (3)	Health Card (4)
Price	-2.452***	-1.226***	265.497***	4379.210***
	(0.522)	(0.215)	(92.946)	(688.734)
Price × Suitability	0.500***	0.267***	-49.950**	-895.557***
	(0.099)	(0.042)	(19.729)	(146.871)
Village FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
Village-specific Trend	Yes	Yes	No	No
N	188076	188076	237063	237063
R-Squared	0.330	0.495	0.573	0.786
Mean of Dep. Var.	0.663	1.329	62.876	435.137

Note: This table presents the results of changes in the presence and intensity of nighttime lights as well as changes in the number of membership of health insurance and identity card for the poor. The sample for dependent variables in columns 1 and 2 are only up to 2011. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

Table B.5: Public Goods: Health Facilities and Personnel – Village-Specific Trend

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Support)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Extensive Margins				
Price	0.164	-0.051	0.475***	0.429**
	(0.108)	(0.077)	(0.175)	(0.171)
Price × Suitability	-0.032	0.007	-0.090**	-0.087**
	(0.024)	(0.015)	(0.036)	(0.035)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Village-specific Trend	Yes	Yes	Yes	Yes
N	237063	237063	237063	237063
R-Squared	0.229	0.237	0.204	0.198
Mean of Dep. Var.	0.199	0.129	0.335	0.442
	Δ Number			
Panel B: Intensive Margins				
Price	-0.140	-0.018	0.184	0.180
	(0.141)	(0.051)	(0.119)	(0.134)
Price × Suitability	0.023	0.003	-0.033	-0.034
	(0.028)	(0.011)	(0.026)	(0.029)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Village-specific Trend	Yes	Yes	Yes	Yes
N	190383	188955	188955	188955
R-Squared	0.383	0.393	0.311	0.324
Mean of Dep. Var.	0.639	0.131	0.350	0.482

Note: This table presents the effects on changes in public good provision in health facilities and personnels and schools. Panel A presents estimation results of changes in extensive margins. Panel B presents results of changes in intensive margins. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Dependent variables in columns 1 to 4 of Panel B are not available in PODES 2008. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$.

Table B.6: Development Projects – Village-Specific Trend

	Δ Presence				Δ Number			
	All project (1)	Infrastructure (2)	Capital Asst (3)	Employment Asst (4)	All project (5)	Infrastructure (6)	Capital Asst (7)	Employment Asst (8)
Price	0.399	0.712	3.104**	-0.478	6.982	2.564	4.978**	-0.441
	(0.828)	(1.087)	(1.344)	(1.029)	(4.289)	(2.254)	(2.240)	(1.675)
Price × Suitability	0.005	-0.119	-0.655**	0.104	-1.705*	-0.771	-1.067**	0.098
	(0.180)	(0.233)	(0.293)	(0.218)	(0.944)	(0.492)	(0.493)	(0.354)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	145654	145654	145654	145654	145654	145654	145654	145654
R-Squared	0.838	0.888	0.766	0.745	0.860	0.869	0.799	0.757
Mean of Dep. Var.	0.840	0.705	0.636	0.274	3.144	1.680	1.044	0.403

Note: The sample for all regressions only include PODES 2008 onwards because information on development projects only available starting in 2008. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. All regressions include village and year fixed-effects as well as Village-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.7: Night Light Intensity and Health Insurance Enrollment for the Poor – Control for Rainfall Shock

	Δ Presence of Lights (1)	Δ Lights Intensity (2)	ID Card Poor (3)	Health Card (4)
Price	-2.330***	-1.142***	253.253***	4434.526***
	(0.429)	(0.176)	(80.784)	(603.487)
Price × Suitability	0.473***	0.249***	-47.318***	-910.692***
	(0.081)	(0.035)	(17.095)	(128.108)
Village FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
District-specific Trend	Yes	Yes	No	No
N	188076	188076	237063	237063
R-Squared	0.143	0.299	0.362	0.627
Mean of Dep. Var.	0.663	1.329	62.876	435.137

Note: This table presents the results of changes in the presence and intensity of nighttime lights as well as the number of membership of health insurance and identity card for the poor. The sample for dependent variables in columns 1 and 2 are only up to 2011. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, and rainfall shock. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.8: Public Goods: Health Facilities and Personnel – Control for Rainfall Shock

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Support)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Extensive Margins				
Price	0.170*	-0.046	0.465***	0.420***
	(0.095)	(0.068)	(0.154)	(0.149)
Price × Suitability	-0.033	0.005	-0.088***	-0.086***
	(0.021)	(0.014)	(0.032)	(0.030)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	237063	237063	237063	237063
R-Squared	0.080	0.096	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442
	Δ Number			
Panel B: Intensive Margins				
Price	-0.089	-0.008	0.170*	0.180*
	(0.126)	(0.044)	(0.097)	(0.109)
Price × Suitability	0.009	0.001	-0.031	-0.034
	(0.025)	(0.009)	(0.021)	(0.023)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	190383	188955	188955	188955
R-Squared	0.131	0.155	0.130	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482

Note: This table presents the effects on changes in public good provision in health facilities and personnels. Panel A presents estimation results of changes in extensive margins. Panel B presents results of changes in intensive margins. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, and rainfall shock. Dependent variables in columns 1 to 4 of Panel B are not available in PODES 2008. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.9: Development Projects – Control for Rainfall Shock

	Δ Presence				Δ Number			
	All project (1)	Infrastructure (2)	Capital Asst (3)	Employment Asst (4)	All project (5)	Infrastructure (6)	Capital Asst (7)	Employment Asst (8)
Price	-0.056	0.119	1.702**	-0.585	4.053	1.828	3.316**	-1.057
	(0.513)	(0.634)	(0.777)	(0.602)	(2.672)	(1.358)	(1.321)	(1.055)
Price × Suitability	0.103	0.005	-0.357**	0.127	-1.088*	-0.618**	-0.714**	0.227
	(0.112)	(0.135)	(0.170)	(0.126)	(0.582)	(0.297)	(0.290)	(0.221)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	145654	145654	145654	145654	145654	145654	145654	145654
R-Squared	0.563	0.766	0.506	0.455	0.693	0.736	0.560	0.468
Mean of Dep. Var.	0.840	0.705	0.636	0.274	3.144	1.680	1.044	0.403

Note: The sample for all regressions only include PODES 2008 onwards because information on development projects only available starting in 2008. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects, and rainfall shock. All regressions include village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.10: Night Light Intensity and Health Insurance Enrollment for the Poor – Alternative Price Change Definition

	Δ Presence of Lights (1)	Δ Lights Intensity (2)	ID Card Poor (3)	Health Card (4)
Price	-0.723***	-0.418***	92.394***	1575.005***
	(0.146)	(0.067)	(29.651)	(221.537)
Price × Suitability	0.144***	0.092***	-16.491***	-317.224***
	(0.026)	(0.013)	(6.212)	(46.794)
Village FE	Yes	Yes	No	No
Year FE	Yes	Yes	No	No
District-specific Trend	Yes	Yes	No	No
N	188076	188076	237063	237063
R-Squared	0.141	0.299	0.362	0.627
Mean of Dep. Var.	0.663	1.329	62.876	435.137

Note: This table presents the results of changes in the presence and intensity of nighttime lights as well as the number of membership of health insurance and identity card for the poor. The sample for dependent variables in columns 1 and 2 are only up to 2011. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.11: Public Goods: Health Facilities and Personnel – Alternative Price Change Definition

	Δ Presence			
	Doctors	Health Center (Main)	Health Center (Support)	Health Center (Total)
	(1)	(2)	(3)	(4)
Panel A: Extensive Margins				
Price	0.055	-0.016	0.142**	0.124**
	(0.035)	(0.024)	(0.057)	(0.056)
Price × Suitability	-0.010	0.002	-0.025**	-0.024**
	(0.008)	(0.005)	(0.012)	(0.011)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	237063	237063	237063	237063
R-Squared	0.080	0.096	0.075	0.073
Mean of Dep. Var.	0.199	0.129	0.335	0.442
	Δ Number			
Panel B: Intensive Margins				
Price	-0.024	-0.002	0.020	0.026
	(0.042)	(0.016)	(0.035)	(0.040)
Price × Suitability	0.002	-0.000	-0.002	-0.003
	(0.008)	(0.003)	(0.008)	(0.009)
Village FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes
N	190383	188955	188955	188955
R-Squared	0.131	0.155	0.129	0.136
Mean of Dep. Var.	0.639	0.131	0.350	0.482

Note: This table presents the effects on changes in public good provision in health facilities and personnels. Panel A presents estimation results of changes in extensive margins. Panel B presents results of changes in intensive margins. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. Dependent variables in columns 1 to 4 of Panel B are not available in PODES 2008. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.12: Development Projects – Alternative Price Change Definition

	Δ Presence				Δ Number			
	All project (1)	Infrastructure (2)	Capital Asst (3)	Employment Asst (4)	All project (5)	Infrastructure (6)	Capital Asst (7)	Employment Asst (8)
Price	-0.015	0.044	0.622**	-0.211	1.495	0.654	1.236**	-0.387
	(0.192)	(0.240)	(0.295)	(0.225)	(1.005)	(0.506)	(0.502)	(0.395)
Price × Suitability	0.037	0.002	-0.132**	0.045	-0.408*	-0.227**	-0.269**	0.082
	(0.042)	(0.051)	(0.064)	(0.047)	(0.218)	(0.110)	(0.110)	(0.083)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-specific Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	145654	145654	145654	145654	145654	145654	145654	145654
R-Squared	0.563	0.766	0.506	0.455	0.693	0.736	0.560	0.468
Mean of Dep. Var.	0.840	0.705	0.636	0.274	3.144	1.680	1.044	0.403

Note: The sample for all regressions only include PODES 2008 onwards because information on development projects only available starting in 2008. All regressions include population (log), distance to district capital (log), distance to sub district capital (log), village area (log) interacted with year fixed effects, harvested areas (log) allocated for planting rice interacted with year fixed effects. All regressions include village and year fixed-effects as well as district-specific trends. Standard errors, reported in parentheses, are robust to heteroskedasticity and clustered at district level.. $* \ p < 0.10, ** \ p < 0.05, *** \ p < 0.01$