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Abstract

Developing countries have experienced rapid urbanization, though its causal effect on the welfare of rural households is still not clear. In this study, we utilize a severe earthquake in 2006, which hit one of the largest urban areas in Jawa Island of Indonesia, as a natural experimental event in order to identify the causal relation between urbanization and rural poverty reduction. Referring to the definition of the OECD (2012), we construct an original Indonesian urban area data set from population census data of 2000 and 2010. Then, we merge the data set with household panel data, as well as with village/town level census data. Our estimation results using the instrumental variable approach show that 1) effective market size growth as an index of population urbanization leads to an increase in per capita expenditure of households in rural villages, and especially those of the poorer villagers, and that 2) this increase in the welfare of the poor households seems to be brought about mainly by the increase in income from non-farm business.

Keywords: Natural Experiment, Earthquake, expenditure, income, non-farm business

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The Causal Effect of Urbanization on Rural Poverty Reduction

Quasi-Experimental Evidence using Indonesian Urban Area Data*

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Abstract

Developing countries have experienced rapid urbanization, though its causal effect on the welfare of rural households is still not clear. In this study, we utilize a severe earthquake in 2006, which hit one of the largest urban areas in Jawa Island of Indonesia, as a natural experimental event in order to identify the causal relation between urbanization and rural poverty reduction. Referring to the definition of the OECD (2012), we construct an original Indonesian urban area data set from population census data of 2000 and 2010. Then, we merge the data set with household panel data, as well as with village/town level census data. Our estimation results using the instrumental variable approach show that 1) effective market size growth as an index of population urbanization leads to an increase in per capita expenditure of households in rural villages, and especially those of the poorer villagers, and that 2) this increase in the welfare of the poor households seems to be brought about mainly by the increase in income from non-farm business.

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I Introduction

Does urbanization contribute to the rural poverty reduction in developing countries? Ravallion (2016:ch8) suggests that population urbanization has reduced rural poverty more than urban poverty, because it is widely observed that higher growth rates in the proportion of urban population are associated with faster rates of reduction in poverty, the rate of which is usually higher in rural areas. According to the World Bank, it is estimated that nearly half the population in low- and middle-income countries lived in urban areas in 2015.[1] With the rapid urbanization in developing countries and a pile of studies of the poverty reduction in mind, the World Bank and IMF (2013) emphasized the importance of urbanization because they thought that it could help developing countries achieve the Millennium Development Goals (MDGs) by 2015, and also post-2015 development framework (Sustainable Development Goals: SDGs). However, so far, we have few evidence of the causal relation of urbanization in developing economies on the welfare of the households in rural villages.

In this study, we investigate the causal effect of urbanization on the surrounding rural villagers who used to be poor as well as made a choice to stay in the same villages, using household panel data with our original urban area data set of Indonesia, covering the period 2000 to 2010. During the 10 years, according to official government data, the share of the urban population of Indonesia increased from 42% to 49.9%, while its poverty rate decreased from 19.1% to 13.3% (BPS 2015).

The largest problem in estimating the effect of urbanization on rural poverty is how we deal with unobservable variables that are correlated with population urbanization and the welfare level of households in rural areas. We address this endogeneity problem by exploiting earthquakes in Indonesia as quasi-experimental events. In particular, as discussed in Section II , a large scale earthquake hit one of the largest urban areas of Indonesia in May 2006, killing almost 6,000 residents, causing damage estimated to be more than 3 billion USD.[2] We assume that this natural disaster in Jawa Island must have decreased the growth rate of the population in the affected urban areas, though it was uncorrelated with unobservable factors that affected the welfare level

[1] World Bank Open Data (http://data.worldbank.org/)

[2] Emergency Events Database (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (http://www.emdat.be/database)

of households in villages where no direct earthquake damage was reported. Under this assumption, we estimate the effect of population urbanization by the instrumental variable (IV) approach using the natural disaster as a quasi-experimental situation.

Our results relate to the literature on urbanization and poverty reduction. Ever since the urban-rural migration model of Lewis (1954) and the inequality-economic growth nexus model of Kuznets (1955), theoretical works have suggested that population urbanization can be associated with higher productivity in cities through agglomeration economies,[3] which also bring about higher economic growth (Fujita, Krugman and Venables 1999).

On the other hand, most empirical works identify a simple positive correlation between urbanization and poverty reduction (see Ravallion, Chen and Sangraula 2007 and Ravallion 2002 for developing countries; Christiaensen, De Weerdt and Todo 2013 and Christiaensen and Todo 2014 for the effects of migration to urban areas; and Liu and Yamauchi 2014 for the Indonesian case). However, few studies have investigated the causal effect of urbanization on rural poor households in developing economies. An exception is the work of Cali and Menon (2012),[4] which estimates the effects of urbanization on poverty reduction using district-level aggregated panel data for India for the period 1983-1999. They utilize migrants from other states, predicted urban population, manufacturing share in urban employment, and a post-liberalization dummy as instrumental variables, and conclude that around 75% of the poverty-reducing effect of urbanization can be explained by an increase in the demand for rural goods (*consumption linkages*), followed by rural-urban migration (less than 20%), the land/labor ratio in rural areas[5] (4%), and non-farm employment (3%).

One of our contributions is to analyze the causal effect of urbanization on house-

[3] One of the major forces behind the productivity growth in cities is human capital externality as Moretti (2004) provides an empirical evidence of the externality using a firm-worker matched data set of United States. As a case study for developing countries, Hashiguchi and Higashikata (2017) shows an evidence of human capital externalities in Metropolitan areas using plant-level manufacturing data with the same data set of urban area as this study for the period of 1996 to 2006 in Indonesia.

[4] Emran and Shilpi (2012) investigate the causal relation of urbanization on rural farm businesses using cross-sectional village-level data of Nepal, though they do not directly investigate that of rural poverty.

[5] They suggest that increased land availability per capita, caused by outmigration from rural areas, should lead to growth in the labor productivity of agriculture, creating upward pressure on rural wages.

hold expenditure/income change directly using our original urban area data set. Our results show that effective market size growth, as an index of population urbanization, increases per capita expenditure of rural village households, especially that of poor households living in rural villages. In addition, we find that this increase is brought about mainly by non-farm business for the poor households, on the other hand, farm business might contribute to the increase of real income if we consider the whole sample of households living in the nearby rural villages.

The rest of this paper is structured as follows. Section II describes our data. Then, Section III explains the empirical strategy we use to identify the causal effect of urbanization on rural poverty. Section IV presents the estimation results. Lastly, Section V concludes the paper.

II Data

To construct our panel data set we collected information on household data of expenditure, income, and attributes, as well as community characteristics such as places, size, and earthquake damage. We present the sources and how they are matched in the following subsections. However, before that, we define several terms used in this paper.

In the 2010 population census, there were 33 provinces, 497 regencies/municipalities (*kabupaten*/*kota*), 6,652 sub-districts (*kecamatan*), and 77,031 administrative villages (*desa*/*kelurahan*). The Indonesian statistics office (*Badan Pusat Statistik*: BPS) classify the lowest administrative villages into "urban (*perkotaan*)" and "rural (*pedesaan*)" communities, depending on their total score based on population density, non-agricultural household share, and amenities, such as the number of schools, hospitals, hotels and so on. The official Indonesian urban population is calculated using this dichotomous definition. Previous studies that have conducted quantitative analyses of the Indonesian economy focusing on urbanization issues only use this dichotomous variable, which makes it difficult to do an insightful research because of little information of the degree of agglomeration.

As we construct our own original urban area data set to overcome some difficulties which previous studies faced, we redefine several terms in order to avoid confusion. Here, an "urban" area indicates a group of administrative villages that satisfy a certain

definition as shown in a following subsection (in short, a contiguous, highly dense area with a total population of at least 100,000 people), and those areas that exist outside of urban areas are described as "rural" areas. On the other hand, we use the term "village" for *pedesaan* and "town" for *perkotaan*, as per the BPS definition.

(a) Urban area data

For the identification of urban areas, we use population census data (*Sensus Penduduk*) collected by the BPS in 2000 and 2010. Population data from "Village[6] Potential Statistics (*Podes*) 1999" are also used if data are not available for some places in 2000.[7] In order to merge these data with digital map data (*Peta Digital*) of 2012, we refer to historical transition data for administrative villages constructed by the BPS for the period 1998 to 2013. After this matching process, we construct a community-level panel data set, which includes 97% of administrative villages in 2012.[8]

Next, we calculate the area of each administrative village using Peta Digital 2012. Almost all shapefiles included in Peta Digital 2012 use geographical coordinates (WGS84). For our objects, we convert the coordinates into the projection coordinate system for Indonesia (DGN95), and estimate the area of each village. After the estimation, we sum the areas in each province to compare the results with official data (BPS 2015). The average difference is 0.23%, ranging from -5.07% to 6.75%. We adjust these differences by calculating the proportion of community areas in each province

[6] Although the BPS use the word "village" for official translations, the lowest administrative communities are all covered in Podes. The BPS collects information on all administrative villages every three years.

[7] We use population data of Podes 1999 for 4,117 administrative villages. Of these, 3,146 belong to Aceh province, where a rebellion (*Gerakan Aceh Merdeka*: GAM) against the Indonesian government lasted for around 30 years, until 2005, when a peace treaty was signed. The remaining communities are located in Papua and West Papua provinces (778 units) and North Maluku province (108 units), among others.

[8] According to Peta Digital 2012, Indonesia had 78,934 administrative villages in 2012, of which 2,369 lack population data for 2000 in our community-level panel data set. We find that 38% belong to West Sumatera province followed by North Sumatera province (8.8%). Because historical transition data of West Sumatera are not available before 2005, we check town names and places of West Sumatera as of 2010 in order to identify them in 2000 using a community-level map from 1993 (BPS 1995). Then, we apply the definition of urban area to determine the urban areas in 2000 for West Sumatera.

from our estimated data, and dividing the official provincial area into communities accordingly.

Finally, we refer to the definition of the OECD (2012), and construct urban areas as follows: 1) find administrative units with a population density over 1500/km^2, and 2) identify contiguous, highly dense areas with a total population greater than 100,000. According to our calculation, Indonesia had 76 urban areas in 2000 (Figure 1), which increased to 86 in 2010 (see Figure 2). The total population living in urban areas increased from 63.5 million (31.6% of the total population) in 2000 to 82.6 million (35.6%) in 2010.[9]

(b) Earthquake damage data

Podes 2008 collected natural disaster data of floods, landslides, forest fires, earthquakes, and so on during the previous three years, for each of which information such as frequency, peak year, death toll, and economic damage are available. We select communities which had earthquake damage as well as the peak years of 2005 or 2006 under the assumption that the reported damage reflects the peak year of the earthquake, because we analyze the household expenditure/income change from 2000 to 2007/2008. We merge the selected administrative village data with our original urban area data set by referring to the historical transition data on community constructed by the BPS.

If we look back at the history of disasters in Indonesia, Central Jawa and Yogyakarta provinces had severe earthquake damage on May 26, 2006. The estimated death toll was 5,778 people, with damage amounting to 3.1 billion USD.[10] Figure 2 and Figure 3 shows the communities where earthquakes occurred and that suffered eco-

[9] This means that the population of urban areas increased by 30%, compared with the overall population increase of 15.5%. The OECD (2012) categorize urban areas into four types. Applying this category to our urban area data set, Indonesia had seven Large Metropolitan Areas (total population above 1.5 million), 16 Metropolitan Areas (500,000-1.5 million), 23 Medium-sized Urban Areas (200,000-500,000), and 30 Small Urban Areas (100,000-200,000). Ten years later, these numbers had grown to nine Large Metropolitan Areas, 17 Metropolitan Areas, 25 Medium-sized Areas, and 35 Small Urban Areas.

[10] During the period of 2005 to 2006, Indonesia also had a relatively severe earthquake on March 28, 2005, in Aceh and North Sumatera provinces, with a death toll of 915. In addition, West Jawa, Yogyakarta, and Central Jawa were hit by another earthquake with a tsunami which killed 802 people on July 17, 2006. See the Emergency Events Database (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (CRED) for details (accessed on December 11, 2016).

nomic damage of at least 1 million Rp (around 100 USD), as reported in Podes 2008 for the peak year of 2005 or 2006.[11]

(c) Household and community data

Our household panel data come from the Indonesian Family Life Survey (IFLS). The IFLS is designed to collect data on individuals, households, and communities that is representative of the Indonesian population. The survey was first implemented in 1993 (IFLS1), at which time 7,224 households were interviewed. We use the third and fourth waves of the IFLS (IFLS3 and IFLS4) for our analysis. The IFLS3 survey was conducted in 2000 (from June to November), and IFLS4 from November 2007 to April 2008. IFLS3 and IFLS 4 were conducted on the same IFLS1 households and their split-offs, consisting of 13,535 households and 44,103 individuals as of 2007/2008 (Strauss et al. 2004*b*, Strauss et al. 2009).

For matching IFLS household information with our urban area data set, we mainly use community-level data of IFLS4 which collected detailed information on communities, including characteristics of community heads and secretaries. Because IFLS community codes and names are not available, we match the IFLS communities with administrative units in Podes 2008 by sub-district names (after matching regencies/municipalities and provinces), characteristics of community heads and secretaries,[12] as well as characteristics of communities such as area, number of villagers by sex, and distance to capitals of regency/municipality. Through this matching process,

[11] The economic damage value in Podes 2008 is truncated at 9,998 million Rp. In our urban area data set, we have 2,181 communities where economic earthquake damage was reported in 2005/2006, among which 514 communities are classified as towns in 2000 or 2010. Among them, we find that 97 towns reported the truncated number, though we just exploit the face value of this variable to calculate the weighted sum of economic damages by earthquakes as Equation (3). If we use a variable of earthquake death toll instead, which truncated at 98 persons, we find that only 16 towns reached the maximum. Despite that, we use the economic damage information for our analysis because towns with earthquake victims cover only 196 communities in urban areas. However, in order to check the robustness of our IV estimation using the economic earthquake damage variable, we also present the results of estimation using the variable of earthquake death toll as IV. As shown in Table A1 and Table A2, we have almost the same results as presented in Section IV .

[12] Information of community heads and secretaries such as sex, age, educational level are collected in IFLS3, IFLS4 and Podes 2008, though only the community heads' information from Podes 1999.

we successfully identified community locations for 225 of the 311 IFLS villages/towns (see Figure 1).

Our community-level data come from Podes 1999 and Podes 2008, as well as population census data used to construct the urban area data set. We calculate the share of workers in the agricultural industry and that of persons with a higher education in each administrative village, from the population census, as well as the share of households with electricity, taken from the Podes series. These variables are merged with the urban area data set by community, as described earlier.

After matching the household data with the urban area data set using community information, we calculate the distance from each IFLS village to every town belonging to all urban areas, using the median points of communities taken from latitude and longitude data. Then, samples are excluded for those villages directly hit by earthquakes during the period of 2005 to 2008 in order to avoid an endogeneity problem (exclusion restriction).

III Empirical strategy

We estimate the simple reduced-form model like Emran and Shilpi (2012).[13]

$$\Delta y_{i,v,t} = \alpha + \beta \Delta M^{e}_{v,t} + \Delta X'_{i,v,t}\gamma + \Delta Z'_{v,t}\eta + e_{i,v,t} \ , \tag{1}$$

where $y_{i,v,t}$ is per capita expenditure/income of household i in a rural village v at time t, $X_{i,v,t}$ is household attributes, $Z_{v,t}$ is village characteristics, and $M^{e}_{v,t}$ is an effective

[13] Emran and Shilpi (2012) employs a gravity model in order to explore the causal relation between market size of cities and agricultural specialization in surrounding villages. In the literature of urbanization and poverty reduction, most of empirical studies estimate to find statistically significant correlations between population density or the share of urban residents in a region and the welfare level/change of households in rural communities belonging to the same region. For example, Cali and Menon (2012) estimates the effect of urbanization by regressing a measure of rural poverty on urban population using district-level data of India with instrumental variable approach. For the Indonesian case, Liu and Yamauchi (2014) examines the correlation between population density and household outcomes, such as per capita expenditure, share of wages or farm activities in income, and farm landholding, at the sub-district (*kecamatan*) level.

market size for the rural village v. We define the effective market size as

$$M^{e}_{v,t} = \sum_{j=1}^{K} \omega_{v,j}\, m_{j,t} \ , \tag{2}$$

where $m_{j,t}$ is the market size of an urban town j belonging to an urban area where total population is 100 thousand and over, and K is the total number of urban towns included in urban areas where rural villagers in v (potentially) trade. ω is the weight of the urban town j for villagers ($\omega_{v,j} = \delta(d_{v,j})$, where $d_{v,j}$ is the distance from a village v to the town j). We assume $\delta(d_{v,j}) = \frac{1}{1+d^{2}_{v,j}}$ as the model of Emran and Shilpi (2012).[14] As we see in Section I , the literature of urbanization's effect on poverty reduction suggests the growing demand of urban areas for goods produced in rural areas (Cali and Menon 2012), we use population in urban towns as a measure for the market size ($m_{j,t}$).

In the following section, first, we use this effective market size change $\Delta M^{e}_{v,t}$ to check the relation between urbanization and per capita expenditure growth by ordinary least squares (OLS) regression. Then, we use data on earthquake severity as an instrumental variable (IV) to identify the causality of urbanization on per capita expenditure because of a concern that unobserved variables have correlation with the urbanization variable. We expect that larger the earthquake damage in urban areas, lower the growth rate of the effective market size for nearby sample rural villages. Following the idea and notation in Equation (2), we define the size of earthquake damage on urban areas for a village as

$$G_{v,t} = \sum_{j=1}^{K} \omega_{v,j}\, g_{j,t} \ , \tag{3}$$

where $g_{j,t}$ is the damage by earthquakes in town j. If we compare the weighted sum of economic damage by earthquake in 2005/2006 and the effective market size growth, we find a negative correlation between them as we expect (Figure 4).

IV Results

In this section, we first estimate the effects of population urbanization on the wefare of households in rural villages. In particular, we address the causal effects on rural village

[14] Emran and Shilpi (2012) use the distance from villages to urban centers, and the total number of cities and towns was 34 in Nepal according to the Population Census of 1991.

households that were poor initially, using the IV approach. Next, we analyze the effects on income to investigate the channels through which households can increase their per capita expenditure.

(a) The Effects of Urbanization on Expenditure

We analyze the case of 1) all households in rural villages during the period 2000-2007/2008, and 2) poor households, as of 2000, that have lived in the same rural villages during this period. The descriptive statistics of the variables used in our analysis on per capita expenditure are presented in Table 1 and Table 2.[15] Economic variables such as expenditure and assets in 2007 are deflated by province level poverty lines set for urban and rural communities by the BPS when we calculate the real term growth rate.

Table 1 shows that the household level poverty rate of our sample was 18.0% in 2000, which decreased to 8.2% in 2007. Comparing with the official national poverty rate of 19.1% in 2000 and 16.6% in 2007 (BPS 2015), we find that our sample covers rural areas where higher poverty reduction was observed during the period.[16]

Table 3 presents the results of the OLS estimation. The results show that the per capita expenditure of households living in rural villages grew between 1.9% and 2.2% as their effective market size increased by 1%. Interestingly, these effects are larger if they were classified as poor in 2000. Column (4) to (6) indicate that the coefficients of the effective market size are still larger, and show that their per capita expenditure grew from 3.0% to 4.0% against a 1% increase in the effective market size.

Table 4 shows the main results of the IV estimation. The results of first-stage estimation are reported in the lower panel, which show that all coefficients are statistically significant and take negative signs. A 1% increase in the weighted sum of

[15] We drop households from our sample if we cannot calculate their total expenditure or total income precisely, usually because they chose "Don't know" or "Don't want to answer" in interviews. In this study, we just report the results of an analysis in which we identify those households as outliers if the per capita expenditure of a household in 2000 was too low, or the expenditure level of some households which used to be poor were too high in 2007.

[16] Strauss et al. (2004*a*:ch3) reports that the 2000 headcount poverty rate was 15.9% from IFLS3, and Bah (2013) shows that the poverty rate of 17.1% in 2000 and 8.2% in 2007 respectively from household panel data using IFLS3 and IFLS4. They estimate the rate using household sampling weight, though we do not.

economic damage by earthquakes for a village (G_v) leads to about a 0.002% decrease in the growth rate of the effective market size (ΔM_v^e). In the upper panel, we find that all coefficients of the effective market size change have statistically significant and positive values, and the size of which are all larger than its OLS counterpart. In addition, all coefficients for the poor households in rural villages (column (4) to (6)) are larger than those for the all rural village households (column (1) to (3)). This finding suggests that the poor households in 2000 benefited more from the population urbanization.

How did these effects contribute to poverty reduction? Column (6) indicates that a 1 % growth of the effective market size caused 4.74% growth of per capita expenditure of the poor households in rural villages. On average, those poor households experienced 10.2% growth of the effective market size during the seven years (1.4% per annum), which means that their per capita expenditure increased by about 48.4% during this period. The average monthly per capita expenditure of these households in 2000 was 51.5 thousand Rp, or around 5.9 USD.[17] If their per capita expenditure increased by 48.4%, the amount grew to 76.5 thousand Rp, which is slightly over the average poverty line of 2000 for our sample (71.8 thousand Rp).

The results of IV estimation show that the population urbanization caused the increase in the welfare of rural village households, especially that of the poor households. In the following subsection, we investigate the channels that enabled them to increase their per capita expenditure.

(b) The Effects of Urbanization on Income

Which channel worked and enabled the rural households in Indonesia to increase the per capita expenditure during the period of 2000 to 2007? In this subsection, we show the results of an IV estimation to find the effects of population urbanization (effective market size growth) on income sources of households living in surrounding rural areas.

Table 5 shows the descriptive statistics of the dependent variables used in the analysis described in this subsection.[18] We choose four income sources for the analy-

[17] We use the average exchange rate of 8,693 Rp/USD in 2000.

[18] We regard samples as outliers if each of the per capita income source differences is out of the range of the mean ± 4s.d.

sis, that is, wage, farm business, non-farm business, and remittance.[19] The total income is the sum of these income sources. Because profit variables take negative values and not all households have all four income sources, we regress the effective market size growth on the difference of real per capita income sources.

First, we check the causal effect on income sources of all households living in rural villages. Panel A in Table 6 reports the results of the IV estimation of the effect of market size growth on real per capita income sources. Column (1) to (3) in Panel A show that all coefficients of the effective market size growth are positive, but they are not statistically significant except column (1). If we consider each income source, we find that all coefficients for farm business are statistically positive, though we find no statistically significant coefficients for wage income and non-farm business profit. On the other hand, a negative causal effect of urbanization on remittances is identified (column (13) to (15)). These results suggest that population urbanization benefited the households in nearby rural villages through the increase of farm business profit which might be brought about by the rise of demand for agricultural crops in urban areas (*consumption linkage*).

Next, we move on to Panel B of Table 6 which shows the results for the poor households (as of 2000) in rural village. In columns (1) to (3) as well as (10) to (12), we find that all coefficients of the effective market size variable are all statistically significant and positive. This suggests that population urbanization affected per capita non-farm business profit of the poor households, through which their per capita total income increased. If we adopt the results of columns (3) and (12), on average, the poor households living in rural villages enjoyed a per capita total income increase of around 54 thousand Rp each year during the periods of 2000 to 2007,[20] and it is suggested that almost half (49.7%) of the increase was mainly through non-farm business. And again, we find no statistically significant coefficients for wage income.

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[19] Profit variables include production for own consumption. Although data on other income sources, such as rent and livestock, are available from IFLS, we do not use them here because not a few households chose “Don’t know” or “Don’t want to answer” for the related questions.

[20] According to an official data of the BPS, an arithmetic average of per capita National Income growth was 179 thousand Rp (at 2000 price) per annum during the seven years. And, as already shown in Table 2, the average poor households in rural villages experienced a growth of 1.4% annually in the effective market size during the period.

Finally, from the comparison of the results shown in Panel A with Panel B, needless to say the difference in statistical significance, we find that the size of the IV coefficients of column (1) to (3) in Panel B are larger than those in Panel A. This trend is in accordance with the results indicated in the analysis of expenditure, where the coefficients of the IV estimation are larger for the poor households (as of 2000) in rural villages (see Table 4).

V Conclusion

This paper provides novel evidence of the causal effects of population urbanization on poverty reduction in rural villages using our original urban area data set with household panel data. Almost all previous studies on this issue suggest a positive correlation, as in Ravallion (2002), or only use district-level aggregated data to determine the causal relation indirectly, as in Cali and Menon (2012) which explains the importance of the *consumption linkage effect*, as well as of the rural-urban migration (*location effect*). In this study, we directly investigated households that stayed in the same rural villages during the period of 2000-2007/2008. And from our IV estimation, first, we found that the effective market size growth, as an index of population urbanization, had positive and a statistically significant causal effect on the increase of per capita expenditure for the rural village households, especially those households which used to be poor initially. Then, we also suggested that the effect on these households derived mainly from the channels of farm business for the rural village households, on the other hand, we showed that the increase of per capita total income for the poor households came mainly from the non-farm business profit. Although much more research is needed, it seems that the increase in demand for rural goods in urban areas (*consumption linkage effect*) affected the income growth in farm business for the rural villagers as a whole, and rise in profit from non-farm business only for the poor rural village households. Besides, in future research, we should make clear the mechanism of resource allocation in households, which determine, first, whether they migrate to urban areas or stay in rural villages, and then, what kind of business they choose in order to get better off with the growing population in nearby urban areas if they decide to live in rural villages.

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Table 1: Summary statistics: All households in rural villages from 2000 to 2007

Variable	Mean	Std. Dev.	Min.	Max.	N
Household characteristics					
Per capita expenditure (monthly, thousand Rp, 2000)	166.9	150.8	11.0	1773.0	1471
Per capita expenditure (monthly, thousand Rp, 2007)	440.6	409.0	38.9	4769.9	1471
Household size (2000)	4.2	1.9	1	13	1471
Household size (2007)	3.9	1.7	1	11	1471
Share of HH member with upper secondary education and higher (2000)	0.053	0.137	0	1	1471
Share of HH member with upper secondary education and higher (2007)	0.076	0.161	0	1	1471
Number of males (2000)	2.0	1.2	0	7	1471
Number of males (2007)	1.9	1.1	0	7	1471
Number of persons aged 15 to 64 years (2000)	2.6	1.3	0	10	1471
Number of persons aged 15 to 64 years (2007)	2.4	1.3	0	9	1471
Asset (million Rp, 2000)	36.0	74.9	0.1	1660.3	1471
Asset (million Rp, 2007)	101.4	173.1	0.0	1738.7	1471
Provincial poverty line (monthly, thousand Rp, 2000)	71.9	3.5	67.8	82.4	1471
Provincial poverty line (monthly, thousand Rp, 2007)	141.8	9.7	115.8	161.2	1471
Poverty dummy (2000)	0.180	0.384	0	1	1471
Poverty dummy (2007)	0.082	0.275	0	1	1471
Community-level characteristics					
Share of labor in agriculture (2000)	0.662	0.223	0.141	0.984	1471
Share of labor in agriculture (2010)	0.621	0.213	0.160	1.000	1471
Share of HH with electricity (1999)	0.632	0.303	0	1	1471
Share of HH with electricity (2008)	0.866	0.246	0	1	1471
Share of person with higher education (2000)	0.010	0.007	0	0.033	1471
Share of person with higher education (2010)	0.024	0.023	0	0.085	1471
Effective market size (2000)	4176.3	4814.4	76.0	19594.0	1471
Effective market size (2010)	4888.2	5745.6	88.2	21376.7	1471
Economic damage by earthquakes	61.1	139.1	0.6	878.7	1471
Earthquake death toll	0.124	0.264	0.001	1.351	1471
Growth per annum (at 2000 price)					
Household characteristics					
Δ ln(per capita expenditure)	0.041	0.104	-0.372	0.416	1471
Δ ln(HH size)	-0.013	0.068	-0.278	0.278	1471
Δ share of HH member with upper secondary education and higher	0.003	0.018	-0.071	0.095	1471
Δ share of male HH member aged 15 to 64 years	-0.001	0.029	-0.143	0.107	1471
Δ share of HH member aged 15 to 64 years	-0.003	0.043	-0.143	0.143	1471
Δ ln(asset)	0.064	0.173	-0.819	1.104	1471
Community-level characteristics					
Δ share of labor in agriculture	-0.004	0.013	-0.065	0.022	1471
Δ share of HH with electricity	0.026	0.035	-0.061	0.106	1471
Δ share of person with higher education	0.001	0.002	-0.001	0.007	1471
Δ ln (effective market size)	0.015	0.006	0.006	0.030	1471

Notes: The unit of analysis is a household that stayed in the same village during the period of 2000 (IFLS3) to 2007/2008 (IFLS4). Per capita expenditure, asset, and poverty line variables are nominal, and the asset variable includes those for business. Provincial poverty line is from BPS (2002) and BPS (2007), which was estimated for village areas and town areas in each province, and households are identified as poor if their per capita expenditure is below the line. Community-level data come from population census and village/town level census data (Podes). Share of labor in agriculture is the share of those who worked in the agricultural industry among persons aged 15 years and over. Share of person with higher education is the share of those who attained an education level of university, higher professional education (*diploma*), or academy (*akademi*) among persons aged 15 years and over. See Section III for variables such as effective market size and economic damage by earthquakes. Economic variables in the panel of Growth per annum, such as per capita expenditure and assets, are calculated in real terms using the provincial poverty line for villages/towns as a deflator.

Table 2: Summary statistics: Poor households in rural villages

Variable	Mean	Std. Dev.	Min.	Max.	N
Household characteristics					
Per capita expenditure (monthly, thousand Rp, 2000)	51.5	14.5	11.0	80.3	258
Per capita expenditure (monthly, thousand Rp, 2007)	253.8	164.0	40.1	980.2	258
Household size (2000)	5.0	2.1	1	12	258
Household size (2007)	4.3	1.8	1	10	258
Share of HH member with upper secondary education and higher (2000)	0.020	0.066	0	0.429	258
Share of HH member with upper secondary education and higher (2007)	0.035	0.099	0	0.500	258
Number of males (2000)	2.4	1.3	0	7	258
Number of males (2007)	2.2	1.3	0	7	258
Number of persons aged 15 to 64 years (2000)	2.8	1.5	0	10	258
Number of persons aged 15 to 64 years (2007)	2.6	1.4	0	7	258
Asset (million Rp, 2000)	18.4	44.2	0.1	508.6	258
Asset (million Rp, 2007)	49.5	75.8	0.0	780.7	258
Provincial poverty line (monthly, thousand Rp, 2000)	71.8	3.5	67.8	82.4	258
Provincial poverty line (monthly, thousand Rp, 2007)	142.5	10.3	115.8	161.2	258
Poverty dummy (2000)	1	0	1	1	258
Poverty dummy (2007)	0.225	0.418	0	1	258
Community-level characteristics					
Share of labor in agriculture (2000)	0.706	0.211	0.141	0.984	258
Share of labor in agriculture (2010)	0.654	0.225	0.160	1.000	258
Share of HH with electricity (1999)	0.563	0.298	0	1	258
Share of HH with electricity (2008)	0.836	0.276	0	1	258
Share of person with higher education (2000)	0.009	0.007	0	0.033	258
Share of person with higher education (2010)	0.020	0.020	0	0.083	258
Effective market size (2000)	3574.8	4627.7	76.0	19594.0	258
Effective market size (2010)	4108.0	5417.1	88.2	21376.7	258
Economic damage by earthquakes	69.6	151.3	0.7	878.7	258
Earthquake death toll	0.146	0.304	0.001	1.352	258
Growth per annum (at 2000 price)					
Household characteristics					
Δ ln(per capita expenditure)	0.113	0.089	-0.138	0.402	258
Δ ln(HH size)	-0.022	0.066	-0.278	0.230	258
Δ share of HH member with upper secondary education and higher	0.002	0.014	-0.061	0.071	258
Δ share of male HH member aged 15 to 64 years	0.000	0.025	-0.086	0.086	258
Δ share of HH member aged 15 to 64 years	0.003	0.040	-0.143	0.095	258
Δ ln(asset)	0.086	0.191	-0.783	1.104	258
Community-level characteristics					
Δ share of labor in agriculture	-0.005	0.014	-0.065	0.022	258
Δ share of HH with electricity	0.030	0.036	-0.061	0.106	258
Δ share of person with higher education	0.001	0.002	-0.001	0.006	258
Δ ln (effective market size)	0.014	0.006	0.006	0.030	258

Notes: Sample households are those rural village households which used to be poor in 2000. See Table 1.

Table 3: The effects of urbanization on per capita expenditure of rural village households: OLS

	All Households			Poor Households in 2000		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ ln (effective market size)	2.070**	1.937*	2.208**	2.994**	3.223**	3.964***
	(0.720)	(0.727)	(0.715)	(1.007)	(0.989)	(0.847)
Δ ln(HH size)		−0.536***	−0.536***		−0.300***	−0.298***
		(0.037)	(0.036)		(0.075)	(0.074)
Δ share of HH member		0.139	0.134		0.357	0.530
with upper secondary education and more		(0.155)	(0.159)		(0.440)	(0.454)
Δ share of male HH member		0.087	0.088		−0.377	−0.354
		(0.093)	(0.094)		(0.272)	(0.269)
Δ share of HH member aged 15 to 64 years		0.343***	0.354***		0.058	0.052
		(0.067)	(0.067)		(0.123)	(0.127)
Δ ln(asset)		0.101***	0.100***		0.101*	0.102**
		(0.018)	(0.017)		(0.039)	(0.036)
Δ share of labor in agriculture			−0.382			−0.175
			(0.377)			(0.568)
Δ share of HH with electricity			0.084			0.308
			(0.116)			(0.189)
Δ share of person with higher education			3.484			7.818
			(2.185)			(4.606)
Constant	0.010	−0.001	−0.014	0.070***	0.050**	0.020
	(0.011)	(0.011)	(0.014)	(0.016)	(0.016)	(0.018)
Observations	1471	1471	1471	258	258	258
Adjusted R^2	0.014	0.175	0.180	0.032	0.104	0.116
Number of clusters	53	53	53	50	50	50

Notes: Robust standard errors clustered at community level are presented in parentheses. * significant at 5 %, ** significant at 1 %, and *** significant at 0.1 %.

Table 4: The effects of urbanization on per capita expenditure of rural village households: IV

	All Households			Poor Households in 2000		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ ln (effective market size)	3.408**	2.802**	3.281**	3.124	3.676*	4.740*
	(1.049)	(0.937)	(1.105)	(2.210)	(1.866)	(1.884)
Δ ln(HH size)		−0.533***	−0.532***		−0.298***	−0.294***
		(0.037)	(0.036)		(0.074)	(0.074)
Δ share of HH member		0.123	0.116		0.329	0.503
with upper secondary education and more		(0.160)	(0.167)		(0.451)	(0.447)
Δ share of male HH member		0.085	0.086		−0.387	−0.366
		(0.091)	(0.091)		(0.243)	(0.246)
Δ share of HH member aged 15 to 64 years		0.345***	0.358***		0.061	0.057
		(0.065)	(0.065)		(0.119)	(0.122)
Δ ln(asset)		0.102***	0.101***		0.102*	0.104**
		(0.018)	(0.017)		(0.040)	(0.037)
Δ share of labor in agriculture			−0.505			−0.199
			(0.458)			(0.560)
Δ share of HH with electricity			0.107			0.340
			(0.107)			(0.216)
Δ share of person with higher education			3.646			8.408
			(2.421)			(4.454)
Constant	−0.011	−0.014	−0.032	0.068*	0.044	0.007
	(0.016)	(0.015)	(0.020)	(0.031)	(0.026)	(0.033)
Observations	1471	1471	1471	258	258	258
Adjusted R^2	0.008	0.173	0.176	0.032	0.103	0.113
Number of clusters	53	53	53	50	50	50
First-stage estimation	dependent variable: Δ ln (effective market size)					
ln(earthquake damage)	−0.0021***	−0.0021***	−0.0020***	−0.0019***	−0.0019***	−0.0019***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)

Notes: Robust standard errors clustered at community level are presented in parentheses. * significant at 5 %, ** significant at 1 %, and *** significant at 0.1 %.

Table 5: Summary statistics: Per capita income (monthly)

Variable	Mean	Std. Dev.	Min.	Max.	N
All households (rural villages in 2000 & 2010)					
Per capita income (thousand Rp, 2000)	63.9	75.3	-296.7	588.8	1326
Per capita income (thousand Rp, 2007)	196.0	200.6	-342.8	1716.7	1326
Wage (thousand Rp, 2000)	22.9	48.6	0.0	547.5	1326
Wage (thousand Rp, 2007)	54.1	119.8	0.0	1110.4	1326
Farm business profit (thousand Rp, 2000)	21.9	39.6	-94.4	333.3	1326
Farm business profit (thousand Rp, 2007)	72.3	122.2	-359.4	861.1	1326
Non-farm business profit (thousand Rp, 2000)	9.3	39.9	-327.8	500.0	1326
Non-farm business profit (thousand Rp, 2007)	38.3	103.1	0.0	1073.0	1326
Remittance (thousand Rp, 2000)	9.8	22.5	0.0	260.8	1326
Remittance (thousand Rp, 2007)	31.4	64.9	0.0	694.4	1326
Difference per annum (at 2000 price, thousand Rp)					
Δ per capita income	5.1	14.1	-60.5	80.1	1326
Δ wage	0.7	7.5	-40.0	47.9	1326
Δ farm business profit	2.1	8.2	-37.9	48.8	1326
Δ non-farm business profit	1.5	8.0	-61.5	63.6	1326
Δ remittance	0.9	4.9	-30.8	37.2	1326
Poor households in 2000					
Per capita income (thousand Rp, 2000)	32.2	34.1	-18.3	188.5	236
Per capita income (thousand Rp, 2007)	115.6	101.1	0.0	675.0	236
Wage (thousand Rp, 2000)	14.0	27.0	0.0	145.6	236
Wage (thousand Rp, 2007)	39.6	68.7	0.0	375.0	236
Farm business profit (thousand Rp, 2000)	10.7	17.0	-17.1	130.1	236
Farm business profit (thousand Rp, 2007)	41.4	61.1	-25.0	375.0	236
Non-farm business profit (thousand Rp, 2000)	2.8	9.0	-18.3	66.9	236
Non-farm business profit (thousand Rp, 2007)	15.1	41.6	0.0	300.0	236
Remittance (thousand Rp, 2000)	4.8	11.3	0.0	120.2	236
Remittance (thousand Rp, 2007)	19.5	32.7	0.0	208.3	236
Difference per annum (at 2000 price, thousand Rp)					
Δ per capita income	3.7	7.7	-16.7	43.9	236
Δ wage	0.9	5.2	-20.7	21.6	236
Δ farm business profit	1.4	4.2	-10.5	23.5	236
Δ non-farm business profit	0.7	3.1	-9.6	21.7	236
Δ remittance	0.7	2.7	-12.3	14.7	236

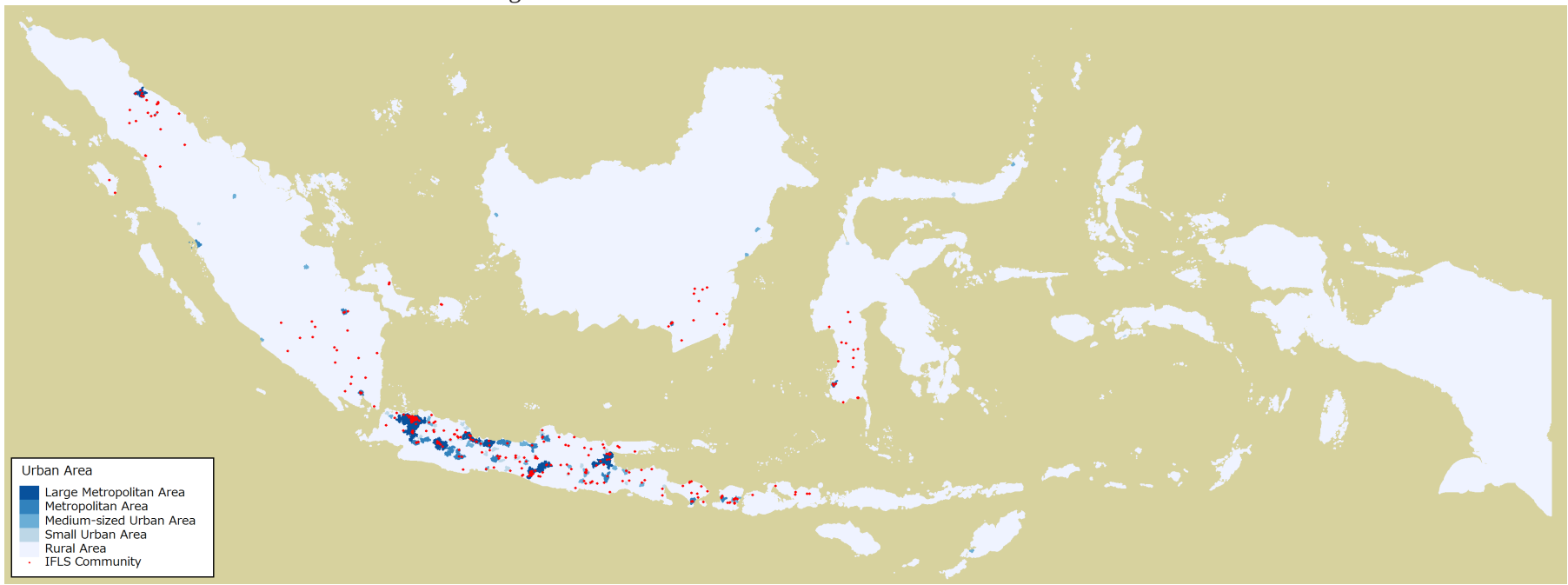
Notes: Economic variables in the panel of Difference per annum are calculated in real terms using the provincial poverty line for villages/towns as a deflator.

Table 6: The effects of urbanization on income of rural village households: IV

	Total Income			Wage			Farm Business			Non-farm Business			Remittance		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Panel A: All households in rural villages	(Observations: 1,326			Number of clusters: 53)											
Δ ln (effective market size)	211.0^{+}	172.0	166.4	28.8	20.8	9.7	181.3*	157.2^{+}	179.8^{+}	87.0	78.7	86.5	−86.1^{+}	−84.8^{+}	−109.7*
	(110.0)	(108.9)	(130.0)	(51.2)	(49.0)	(54.1)	(87.7)	(84.5)	(101.9)	(55.6)	(58.0)	(62.2)	(45.0)	(46.7)	(49.8)
Control variables															
Household characteristics	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Village-level characteristics	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Adjusted R^2	0.008	0.045	0.046	−0.000	0.030	0.029	0.002	0.033	0.035	0.008	0.010	0.013	−0.003	0.028	0.025
Panel B: Poor households in rural villages	(Observations: 236			Number of clusters: 50)											
Δ ln (effective market size)	311.5*	332.9**	321.7*	51.9	54.8	22.6	98.6	93.5	87.7	101.1*	122.4*	159.8**	59.9	62.2^{+}	51.6
	(125.8)	(127.8)	(142.8)	(78.4)	(81.6)	(90.1)	(67.4)	(68.1)	(69.2)	(48.5)	(51.7)	(60.0)	(39.2)	(37.7)	(32.8)
Control variables															
Household characteristics	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Village-level characteristics	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Adjusted R^2	−0.022	0.009	−0.002	−0.012	−0.002	0.009	−0.025	0.034	0.035	0.048	0.068	0.082	−0.011	0.066	0.079

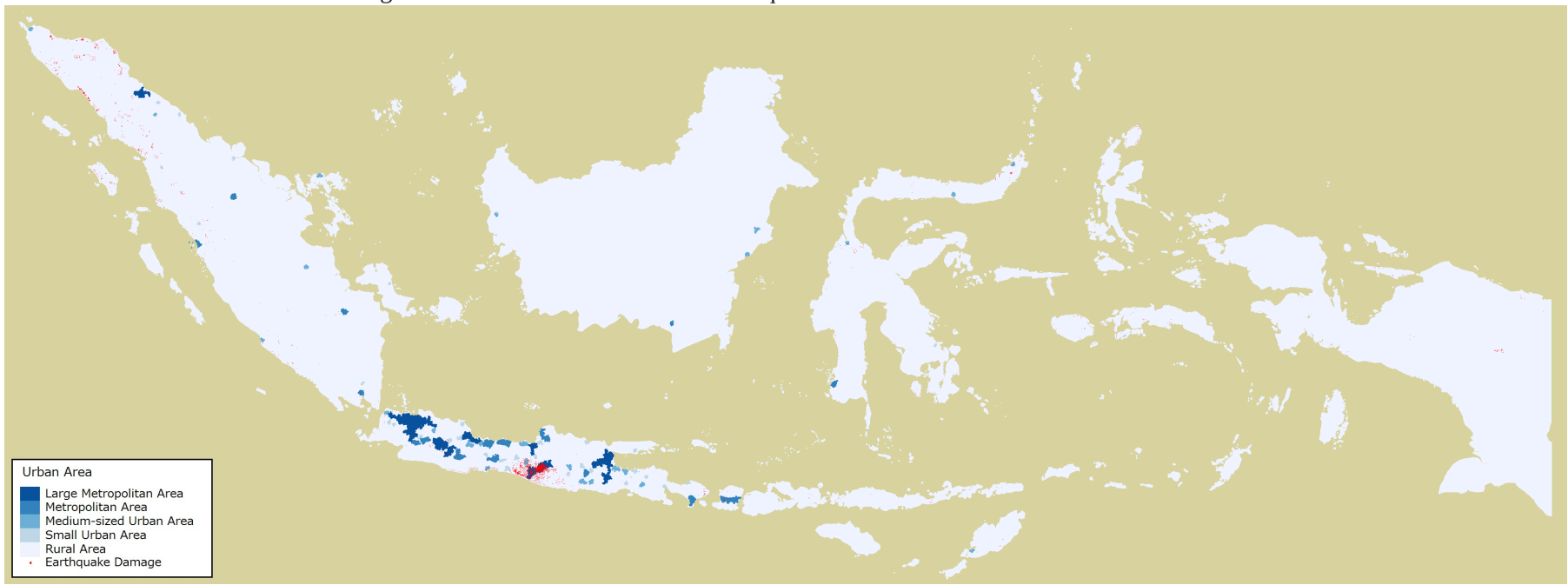
Notes: Robust standard errors clustered at community level are presented in parentheses. $^{+}$ significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%. Control variables used in this table are the same as those used in Table 3 and Table 4. Poor households in rural villages reported in Panel B are those households of which per capita expenditure was below the poverty line in 2000.

Figure 1: Urban areas in 2000 and IFLS communities



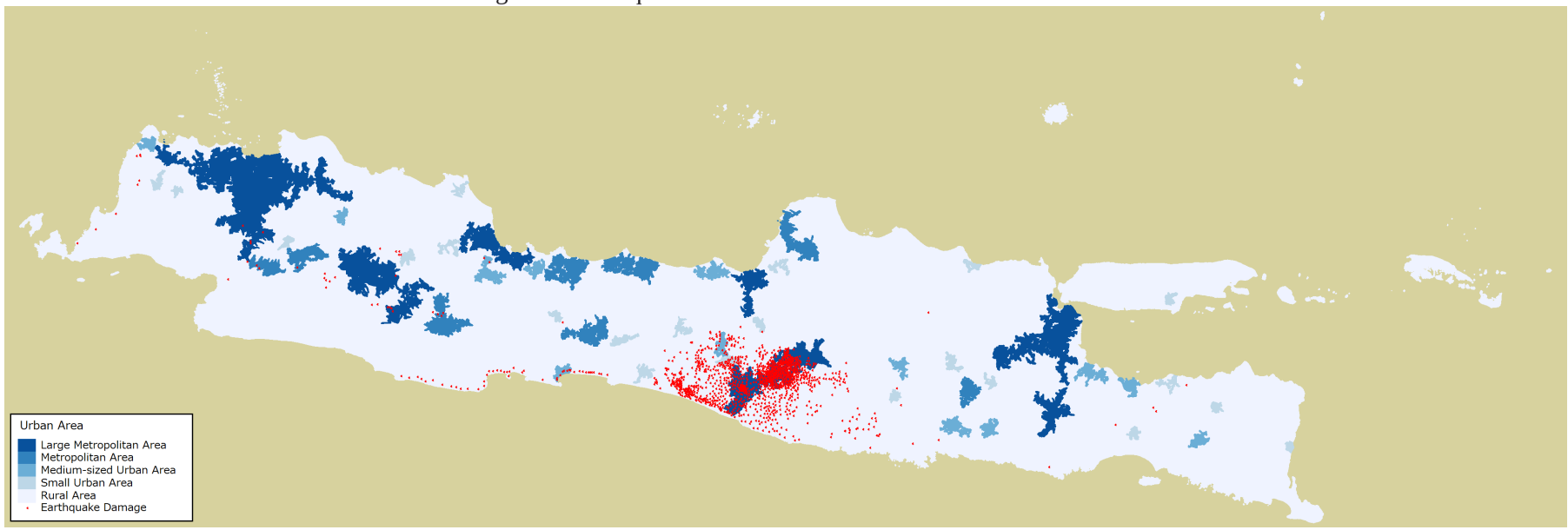
Notes: We report location of IFLS communities we successfully matched with our urban area data set. In 2000, Indonesia had seven Large Metropolitan Areas (total population above 1.5 million), 16 Metropolitan Areas (500,000-1.5 million), 23 Medium-sized Urban Areas (200,000-500,000), and 30 Small Urban Areas (100,000-200,000). Those communities which we cannot merge with population data are included in Rural Area for easiness of representation. See Section II for detail.

Figure 2: Urban areas in 2010 and earthquakes in Indonesia from 2005 to 2006



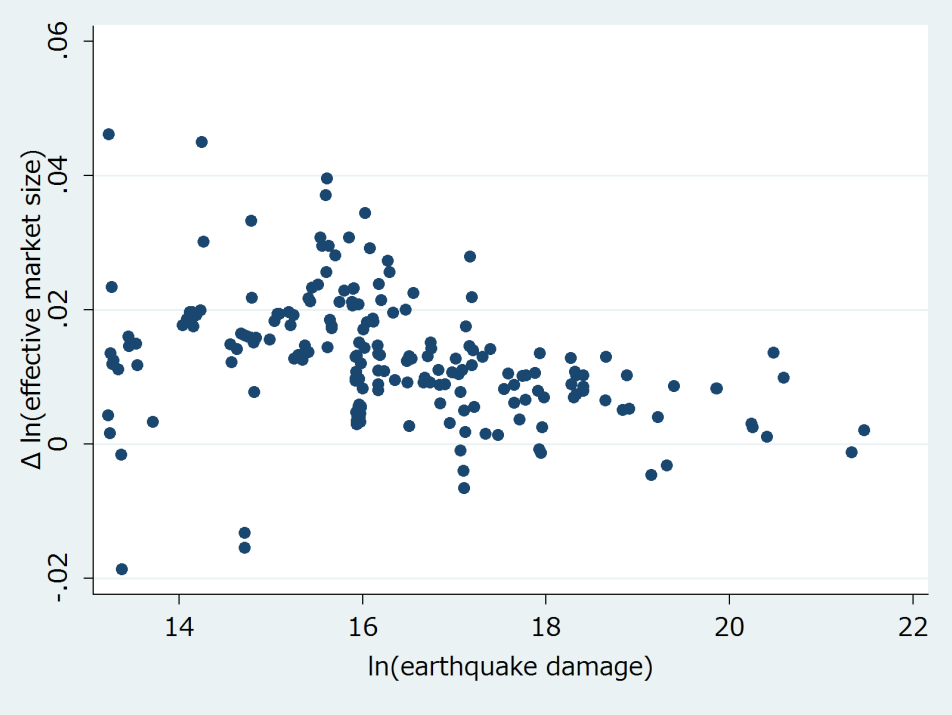
Notes: We show locations of the villages/towns where earthquakes occurred and that suffered economic damage of at least one million Rp (around USD 100) from 2005 to 2006 as recorded in Podes 2008. During the period, Indonesia had a relatively severe earthquake in Aceh, North Sumatera, Central Jawa, Yogyakarta, and West Jawa provinces. In 2010, Indonesia had nine Large Metropolitan Areas (total population above 1.5 million), 17 Metropolitan Areas (500,000-1.5 million), 25 Medium-sized Urban Areas (200,000-500,000), and 35 Small Urban Areas (100,000-200,000). Those communities which we cannot merge with population data are included in Rural Area for easiness of representation. See Section II for detail.

Figure 3: Earthquakes in Jawa island from 2005 to 2006



Notes: We show locations of the villages/towns where earthquakes occurred and that suffered economic damage of at least one million Rp (around 100 USD) from 2005 to 2006 as recorded in Podes 2008. Central Jawa and Yogyakarta provinces had severe earthquake damage on May 26, 2006. According to the Emergency Events Database (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (CRED), the estimated death toll was 5,778 people, with damage amounting to 3.1 billion USD. West Jawa, Yogyakarta, and Central Jawa were hit by another earthquake and a tsunami which killed 802 people on July 17, 2006. Those communities which we cannot merge with population data are included in Rural Area for easiness of representation. See Section II .

Figure 4: Earthquake damage and growth of effective market size



Notes: We used only matched IFLS communities where no direct damage was reported from 2005 to 2008 in Podes 2008. Earthquake damages were calculated as the weighted sum of economic damages (in Rupiah) by earthquake, for each IFLS village. Only the largest economic damages in towns during the survey period are available in Podes 2008, and the minimum value is one million Rupiah (around 100 USD) as well as the maximum value is truncated at 9,998 million Rp. See Section II .

Table A1: The effects of urbanization on per capita expenditure of rural village households using earthquake death toll as IV

	All Households			Poor Households in 2000		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ ln (effective market size)	3.499**	2.840**	3.304**	3.352	3.880*	5.021*
	(1.084)	(0.968)	(1.130)	(2.274)	(1.946)	(1.986)
Δ ln(HH size)		−0.533***	−0.532***		−0.297***	−0.293***
		(0.037)	(0.036)		(0.074)	(0.074)
Δ share of HH member		0.122	0.116		0.317	0.493
with upper secondary education and more		(0.160)	(0.167)		(0.452)	(0.447)
Δ share of male HH member		0.085	0.086		−0.391	−0.371
		(0.090)	(0.091)		(0.242)	(0.244)
Δ share of HH member aged 15 to 64 years		0.345***	0.358***		0.063	0.058
		(0.065)	(0.065)		(0.119)	(0.122)
Δ ln(asset)		0.102***	0.101***		0.103*	0.105**
		(0.018)	(0.017)		(0.040)	(0.037)
Δ share of labor in agriculture			−0.508			−0.208
			(0.456)			(0.561)
Δ share of HH with electricity			0.107			0.352
			(0.107)			(0.216)
Δ share of person with higher education			3.650			8.621
			(2.429)			(4.459)
Constant	−0.012	−0.015	−0.032	0.065*	0.041	0.003
	(0.017)	(0.015)	(0.020)	(0.032)	(0.027)	(0.034)
Observations	1471	1471	1471	258	258	258
Adjusted R^2	0.007	0.172	0.176	0.031	0.102	0.112
Number of clusters	53	53	53	50	50	50
First-stage estimation	dependent variable: Δ ln (effective market size)					
ln(earthquake death toll)	−0.0021***	−0.0021***	−0.0020***	−0.0019***	−0.0019***	−0.0019***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)

Notes: Robust standard errors clustered at community level are presented in parentheses. * significant at 5 %, ** significant at 1 %, and *** significant at 0.1 %.

Table A2: The effects of urbanization on income of rural village households using earthquake death toll as IV

	Total Income			Wage			Farm Business			Non-farm Business			Remittance		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Panel A: All households in rural villages	(Observations: 1,326		Number of clusters: 53)												
Δ ln (effective market size)	219.2*	175.6	173.5	32.5	23.4	13.7	187.5*	160.9+	185.3+	89.6	80.3	87.2	−90.4+	−89.0+	−112.7*
	(109.3)	(108.3)	(129.0)	(50.5)	(48.3)	(53.5)	(89.7)	(86.5)	(104.4)	(56.2)	(58.7)	(61.9)	(47.1)	(49.2)	(52.4)
Control variables															
Household characteristics	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Village-level characteristics	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Adjusted R^2	0.008	0.046	0.046	−0.000	0.030	0.029	0.001	0.033	0.035	0.008	0.010	0.013	−0.004	0.027	0.025
Panel B: Poor households in rural villages	(Observations: 236		Number of clusters: 50)												
Δ ln (effective market size)	321.8*	340.3**	330.2*	55.9	56.5	21.6	104.9	97.7	93.7	102.3*	124.6*	162.3**	58.6	61.5	52.6
	(126.8)	(128.4)	(143.4)	(78.9)	(82.7)	(90.2)	(67.1)	(67.6)	(69.4)	(51.1)	(54.6)	(62.6)	(39.1)	(37.4)	(32.6)
Control variables															
Household characteristics	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Village-level characteristics	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Adjusted R^2	−0.024	0.007	−0.003	−0.012	−0.002	0.009	−0.028	0.033	0.033	0.049	0.068	0.082	−0.010	0.066	0.079

Notes: Robust standard errors clustered at community level are presented in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%. Control variables used in this table are the same as those used in Table 3 and Table 4. Poor households in rural villages reported in Panel B are those households of which per capita expenditure was below the poverty line in 2000.