How Does Village Dissolution Affect Property Values?
(Draft – Do Not Quote)
Pengju Zhang

1. Introduction

In the federal system of the U.S., villages and townships typically embody the spirit of local autonomy as they are small enough for people to know each other, to easily assemble to debate and to conveniently exercise democracy. However, streams of institutional, economic and fiscal factors recently have been converging together and substantially changing the landscape of local government in the U.S., including New York (NY) State. First and foremost, a locality’s municipal designation has many implications for governance, service provision and inter-governmental aid. But most of the cities, towns and villages were established prior to 1920 in NY State; since then many changes have taken place in the social-cultural environment, transportation, demographics and economy that encourage local residents to find more efficient ways of public service provision\(^1\). In particular, the financial crisis of 2008 and its aftermath have imposed a variety of fiscal pressures on NY local governments (i.e. counties, cities, towns and villages), including “declining or static tax base, stagnant level of state aid, escalating healthcare and employee benefit costs, the lack of mandate relief and the need to support new security measures”\(^2\). In addition, complicated fiscal relations continue to be a source of contention between towns and villages in NY. According to Local Government Handbook of NY State (2009), village residents are liable for payment of taxes to the village in which they reside, as

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\(^1\) More discussion on the outdated municipal class system in NY State can be found in Outdated Municipal Structures: Cities, Towns and Villages-19th Century Designations for 21st Century Communities, Alan G. Hevesi, Office of The New York State Comptroller. [http://www.yurgartis.net/munistructures.pdf](http://www.yurgartis.net/munistructures.pdf)

well as to the town where their villages are located. When residents are taxed for town services they do not receive or when they do not want to pay the village governments for local services, they begin to doubt the legitimacy of overlapping tax systems and the corresponding government structure. For example, in many towns, village residents are required by town boards to bear the costs of town highway equipment and snow removal on town roads, although the State Highway Law exempts them from paying the cost of repair and improvement of town highways. Many village residents are not satisfied with the duplicative fiscal burdens on their shoulders. Moreover, the redundant and fragmented property tax assessing system may also disappoint residents in villages. According to the NY State Department of Taxation and Finance\(^3\), there are 1,116 property tax assessing units in NY, including 2 counties, 61 cities, 920 towns and 133 villages. Moreover, village assessors are probably duplicative; village residents receive two different assessments for taxes levied by different units of government\(^4\) (Yinger 2012). As a result, outdated municipal class designation, contentious inter-governmental fiscal relationship, increasing budget constraints and fragmented property tax assessing system force local governing bodies and residents to rethink the existing mode of governance and to seek new ways of delivering service. Apart from restructuring, privatization, government entrepreneurship, and some other strategies recommended by experts and professionals, consolidation—an old and new approach—has increasingly drawn public attention nowadays.

The principal argument in favor of consolidation or dissolution is economies of scale, through which production cost is expected to decrease holding service quality constant. However, centralizing local autonomy by eliminating “redundant” layers of government goes directly

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against the traditional wisdom of the Decentralization Theorem. This theorem, formalized by Oates, states that decentralization will increase economic efficiency because local provision of public service is usually tailored to the demand of residents in respective jurisdictions, resulting in higher levels of social welfare than central determination of uniform levels of outputs across jurisdictions (Oates 1972; 1993). The trade-off between harvesting producer efficiency through centralization and enhancing consumer efficiency through decentralization naturally leads to a basic concern that, for dissolved villages in NY State, whether they have obtained “net” efficiency gains after dissolution, or put it differently, whether they have reduced public service cost without sacrificing service quality.

This paper is the first study to provide an overall evaluation of village dissolution by exploring how much home buyers value dissolution as measured by how much they are willing to pay to live in a village that has recently dissolved. It is noteworthy that the focus of this study is not to estimate the average price changes of all sold and unsold houses caused by village dissolution, but to look for a sign whether people care about dissolution by only analyzing property sales data. In this narrow sense, using changes of sold-property values to assess the overall impact of village dissolution is reasonably appealing, as sold-property values comprehensively, although indirectly, capture the impact of any improvements affected by village dissolution. In addition, as the responsibility of providing public service to former village areas will be assumed by town

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5 Both Oates (1972) and Besley & Coate (2003) argue that, for heterogeneous districts, decentralization is welfare superior to centralization in the absence of spillovers, although they differ in justification and implications of centralization.

6 Many village residents may deny dissolution decision because they do not believe the town is able to maintain the same level of public service quality in the village areas after dissolution, while some other residents may approve dissolution either because they believe they will receive the same public service or because they prefer financial bonus brought by productive efficiency. One example exhibiting the tension between these two attitudes is http://blog.syracuse.com/opinion/2013/05/votes_have_consequences_and_ea.html#incart_river.

7 Actually, like many studies on capitalization topics in Urban Economics, it is also very hard to precisely capture the average impact on people’s willingness to pay in a dissolved village, owing to the potential differences of property owners between sold houses and unsold houses, and the lack of information about unsold-house prices and corresponding owners.
governments, this paper also investigates whether the change of village government structure has impact on the local housing market in the town outside village (TOV) areas. In the next session, I will briefly discuss the concept of village dissolution and how it is relevant to property values in Upstate NY, and then review literature in Section III, which is followed by an analysis of methodological challenges and data issues in Section IV. The paper ends with discussions of empirical results and policy recommendations.

2. Village Dissolution and Its Impacts on Housing Prices in New York

Per the definition given by New York State Department of State, Consolidation of Village means “either (a) the combination of two or more local government entities resulting in the termination of the existence of each of the entities to be consolidated and the creation of a new entity which assumes jurisdiction over all of the terminated entities, or (b) the combination of two or more local government entities resulting in the termination of the existence of all but one of the entities which shall absorb the terminated entity or entities.” Dissolution of Village is defined as “a process whereby a village ceases to exist as a governmental entity.” It is noteworthy that the process of village dissolution “does not require the consent of the town in which the village is located.” More often than not, both dissolution and consolidation are put under the same conceptual umbrella of consolidation as village dissolution can also be interpreted as a process that a village consolidates with the town where the village is located. Nevertheless, this paper notes subtle differences between the two terms and only picks up cases of village dissolution in upstate NY.

In NY State, the necessity of village dissolution has been seriously recognized and substantially encouraged by NY State Department of State (DSD), which provides both financial and technical support to help local governments to shrink government size. There are at least two explicit types of grants from the DSD in NY, one is competitive Local Government Efficiency Grant (LGEG), and the other one is noncompetitive The Local Government Citizens Reorganization Empowerment Grant (LGCREG). In the past a couple of years, around 50 villages and towns have applied for LGEG to study possible consolidation of public service with other jurisdictions or dissolution of their village governments. From 2000 to date, 12 villages have successfully approved their dissolution plans and they are scattered among 10 counties in upstate NY (see Table-1 and Figure-1), though at least 24 villages voted against dissolution after 2008.

In NY State, a village can be either formed or dissolved at the full discretion of local residents. Since villages are usually formed within towns, the underlying towns would become fully responsible for governing the territory of the former village after dissolution. The dissolution process can be initiated either by the village board of trustees on its own motion or through an appropriate voter petition to the board of trustees. In either case, the dissolution decision should be finally determined by the voters of the village at an election. Also, in either case, the village board of trustees is responsible for formulating a dissolution plan, which must address several important issues, including: (1), the disposition of the property of the village; (2), the payment of outstanding obligations and the levy and collections of the necessary taxes and assessments; (3), the transfer or elimination of public employees; (4), the continuation of village functions or

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9 Here is the website of Local Government Efficiency Grant [http://www.dos.ny.gov/lg/lege/projects.html#GovConsDiss](http://www.dos.ny.gov/lg/lege/projects.html#GovConsDiss)


11 I’m trying to build a comprehensive inventory of villages which failed to dissolve after 2000. The current 24 fail-to-dissolve villages all held their voting after 2008. More data before 2008 will soon be collected.
services by the town; (5), a fiscal analysis of the effect of dissolution on the village and the area of the town or towns outside the village, and any other matters which are necessary to carry out dissolution\(^2\). The village board of trustees must appoint a study committee to prepare a report on the village dissolution plan and the committee must hold at least one public hearing upon 20 days’ notice published in the official village and town newspapers. In addition, the village board of trustees must also hold at least one public hearing, after which a dissolution proposition will be presented to the village voters at the next regular or special village election of officers held not less than 30 days after the board of trustees hearing. The proposition is used to educate and inform the resident village electors as to the consequence of their vote. If the proposition is approved by a majority of those voting on the question, the village would then be dissolved as of the thirty-first day of December in the year following the year in which the election took place.\(^3\)

Based on dissolution study plans published by both successfully-dissolved and non-successfully-dissolved villages, many village taxpayers in NY believe village taxes are too high, especially in conjunction with county, town and school taxes. By dissolving village governments, village residents are able to cancel at least some administrative cost of village governments through eliminating administrative positions like village mayor, village court, clerks and corresponding salaries and benefits, and possibly shift part of their service cost to other town residents in TOV areas. So, logically, the primary benefits of village dissolution for former village residents is lower property tax burden. For example, the dissolution study plan by the Village of Seneca Falls

\(^2\) The difference between board-initiated process and the voter-initiated procedure lies in that the later one requires an initial public referendum prior to development of a dissolution plan under the Article 17-A of the General Municipal Law. If the initial referendum passes, the village will then be required to draft a formal plan and the drafted plan can either automatically take effect upon approval of the village board, or subsequently determined by a permissive referendum. A similar discussion can be found in http://www.empirecenter.org/publications/streamline-options-for-localities/.

(2009) claimed that dissolution will decrease property tax by approximately 48%\textsuperscript{14}. The literature on property tax capitalization clearly demonstrates that lower property taxes, to some degree, increase property values, so it is reasonable to believe dissolution will be strongly associated with the increase of housing prices\textsuperscript{15}. Practically, however, the degree to which residents’ fiscal burden will be really reduced depends on the specific institutional tools that surrounding towns use to continue public service provision to the former village areas. If surrounding towns simply spread the former village cost to all town citizens, village residents will benefit more than if surrounding towns carefully use special districts to maintain public service in former village areas because special districts will still confine the public service costs within former village areas. In addition to property tax relief, dissolution may increase efficiencies in town management and town-wide resource distribution. Also, eliminating an invisible boundary that divides the townwide community may help economic development and engage more village residents in town affairs.

Despite above-mentioned merits, village dissolution may also bring potential detriments to village residents and their property values. If a village dissolves, it would no longer be a separate corporate entity. As described earlier, most of villages were established before 1920s and losing their status represent a significant change to the culture of the community. For many village residents, especially for property owners, the loss of identity means not only culture changes, but also loss of policy agenda control. Also, it is full of uncertainties about whether the future public service quality will remain the same in terms of sufficient code enforcement, sidewalk snow plowing, brush pickup, and the like. Nobody can guarantee that townwide representation will

\textsuperscript{14} https://www.dos.ny.gov/lg/publications/LGFProjectReports/2008/SenecaFallsDissPlan.pdf

\textsuperscript{15} Technically, of course, property tax savings for village property owners will not be realized until implementation.
effectively account for the interests of village residents who formed and maintained village
governments in order to effectively obtain special services and easily access policemen, fire
fighters and social workers. Many residents may think the projected property tax savings are not
a fair compensation for the great uncertainty and potential loss that dissolution will bring. Under
this circumstance, property values may decrease, even though some village residents are very
active in voting for dissolution.

More interestingly, because village residents are the only electorate who have voting rights to
make a dissolution decision, it is highly possible that village dissolution imposes an exogenous
shock to TOV residents and their properties. The decision-making process of village dissolution
implicitly determines that dissolution may be used by village residents to shift some village
wide-service costs to other town residents living outside of village areas. Although town officers
are usually engaged in developing dissolution plan and special districts are often used to
maintain fire/streetlight service quality in former village areas, as acknowledged in many
dissolution study plans, some costs shifts are unavoidable even if policy makers endeavor to
minimize this cost-shifting impact. Indeed, as mathematical calculation in many village
dissolution study plan demonstrates, property tax burdens usually decrease in potentially
dissolved-village areas, but increase in TOV areas. The unique decision-making process and
substantial difference in property tax burden impacts of dissolution between village and TOV
areas, imply that both the estimation strategy and analytical results of housing price impacts of
village dissolution will be different, which will be described and analyzed in Section IV.
3. Literature Review

Whether village dissolution will be captured by the change in local housing market is a capitalization research topic. Following Oates (1969), scholars have extensively explored capitalization issues in local public finance. According to subjects which have been studied to be capitalized into property values, literature on capitalization can be roughly classified into three streams of thoughts. The first strand of literature focuses on how property tax is capitalized into housing price (Oates 1969; Yinger et al 1988). The second category studies the extent to which the quality of public service and environmental amenities are capitalized into property values and specific topics range from crime rate, water quality (Leggett & Bockstael 20000), proximity to open space (Anderson & West 2006), access to public parks (Lall & Lundberg 2007) to quality of education (Ross & Yinger 1999; Nguyen-Hoang & Yinger 2011). These two streams of research confirm the existence of capitalization and are helpful in revealing the composition of housing price in particular regions. The current study belongs to the third stream of capitalization research which aims to unveil the mystery of the impacts of changing government structure on housing market from a political-economy perspective. I will go through the literature in the third stream and discuss how those previous studies differ from this paper, as below.

Different local government structures imply different governance channels through which the governed are managed, public affairs are handled and public interests are secured in particular jurisdictions. So, logically, changing government structures will affect residents’ perception of tax burden, mode of service delivery, control of local agenda and their own interests and thereby is related with housing demand. Most of existing research on capitalization of government structure concentrates on special-purpose governments in the federal context of the U.S.
Since 1980, more than 30 pairs of school districts choose to consolidate to save costs in NY State. Regarding the property-value impacts of school district consolidation, Brasington (2004) finds that once one control for changes in student test scores and property tax rates, consolidation has a negative impact on property values in urban school districts. It is noteworthy that the estimate cannot be interpreted as a comprehensive evaluation of the value that presents place on all aspects of consolidation, as the service –tax package is controlled. In fact, what he estimates is how much people are willing to pay for consolidation-induced factors that fall outside the school district budget.

By using first differencing and 2SLS strategy to deal with endogeneity problems, Hu and Yinger (2008) identify several causal channels including economics of population scale, state aid, tax share, budgetary and non-budgetary factors affecting school quality, adjustment cost and consolidation-induced changes in tax shares, and propose that consolidation, on average, has a positive effect on housing values in rural school districts, but such an effect is moderated by enrollment size and income groups. Specifically, the property value impacts are largest for the smallest consolidating districts, and positive impacts fade out once a district size of about 1,000 pupils is reached. They also find consolidation has a strong positive impact on house values in census tracts with low average house values and a strong negative impact where average house value is high. In addition, they demonstrate that state aid accompanying consolidation generates approximately one third of the impact of consolidation on house values in small districts. Although they do not test the impact of each causal channel, their specification of causal mechanism illustrates that property value impacts of consolidation are driven by factors that are linked to both productive efficiency and allocative efficiency.
Duncombe et al. (2016) use double sales data in the housing market in upstate NY State and adopt propensity score matching to get rid of selection bias. They find that, except in one large school district, consolidation has a small negative impact on house values. But this average impact reflects a downward trend in house value during the years right after consolidation combined with a positive trend subsequently. In addition, the long-run impacts of consolidation on house values are negative in high-income census tracts. In short, findings on the capitalization of school district consolidation are basically consistent with literature in economies of scale; moreover, both Hu & Yinger (2008) and Duncombe et al. (2016) emphasize the importance of two moderators in the causal path diagrams: one is enrollment size and the other one is income level.

In addition to school district, there are many other types of special-purpose governments in the U.S., such as fire-service districts, water districts, and library districts. Because many special-purpose governments also have power to tax, collect user charges and fees, and deliver public service, the existence of them may affect people’s decision on house purchase. Billings and Thibodeau (2010) use data in Denver Metropolitan area to test whether decentralizing public goods providers affects residential property appreciation rates. Their empirical findings show that institutional decentralization has no influence on single-family property appreciation rates. Specifically, although residential property values for homes located in jurisdictions that added security special districts\textsuperscript{16} experienced rates of appreciation, recreation, fire, water, sewer and other special districts had no measurable influence on appreciation rates. In addition, their results indicate that more overlap among local governments reduces appreciation rates.

\textsuperscript{16} Security districts provide service such as security gate, security guard, neighborhood watch, lighting and so forth.
To sum up, previous research carefully treats methodological challenges and reaches illuminating findings on the capitalization of special-purpose governments. Special-purpose governments, however, are quite different from general-purpose governments primarily in that the latter provide a bundle of public service instead of a single type of service. The mix of public service provision compound difficulties in controlling for public service efficiency when estimating cost function, implying that it is not feasible to directly apply cost function to specify impacts of economies of scale at village level as what Duncombe & Yinger (2007) and Hu & Yinger (2008) do at census tract level. In addition, changes in households across village-township boundaries and tax price suggest difficulties in accurately calculating consumer surplus changes which are crucial to estimate changes in allocative efficiency caused by dissolution. Besides, the total outlay of special-purpose governments (except school district) is not comparable to that of general-purpose governments. Many special districts are even not well perceived by local residents as they are too small and nearly voluntary-based. So, it is entirely possible that empirical findings and theoretical predictions based on special-purpose governments are not applicable to general-purpose governments. Thus, it is important to collect empirical evidence on whether and how village dissolution is capitalized into residential property values.

4. Methodological Challenges and Possible Solutions

This section first discusses key methodological challenges, and then analyzes and compares possible identification strategies to estimate housing price impacts of village dissolution in former village areas, based on both methodological legitimacy of each approach and practical
quality of housing sales data. After that, it will briefly describe empirical strategies for estimating how village dissolution affect housing price in TOV areas.

In non-experimental or observational studies, as exemplified by the village dissolution case in this paper, the houses and corresponding villages between dissolved villages and non-dissolved villages are likely to be different in both observed and unobserved ways. The first methodological challenge is that a simple comparison of house sales in dissolved villages and non-dissolved villages may yield bias whenever the housing price impacts of dissolution depends on observable village or housing traits. For instance, population trends and property tax burdens assumed by village residents may be quite different across villages and they probably influence both housing purchase and village dissolution decisions, as described in many village dissolution study plans. Under these circumstances, covariate bias or sample imbalance should be minimized in order to make house sales comparable between dissolved villages and non-dissolved villages. The second challenge is that village dissolution decision may be influenced by some unobserved factors which also affect house values. As previously described, in any village dissolution election, a dissolution proposition is required to inform citizens of the consequences of government reorganization in terms of possible changes in public service quality, property tax burden, public employee positions, disposition of village assets and liabilities, and the payment of outstanding obligations. So, when residents forecast that village dissolution will (or will not) achieve substantial production cost savings or that the additional gains in producer efficiency will (or will not) substantially exceed the additional loss in consumer efficiency, they will vote for or against dissolution decisions. In either case, dissolution decisions are determined by village residents’ perception of the history, the status quo, and the future trade-off between public service quality and production cost in their communities. These decisions are also
determined by the relationship between their towns and their villages. All these concerns logically and invisibly influence both village dissolution decisions and local real estate market but are hard to explicitly control for in empirical models. So, a comparison between two study groups is susceptible to an omitted variable bias. Last but not least, most village dissolution referendums were held during or after the 2008 financial crisis. Consequently, the unstable underlying trends in housing market further complicates the estimation. It is noteworthy that it usually took a couple of years from dissolution petition/imitation to final dissolution vote, hence, random shocks or short-run changes (i.e. heavy snowstorm in a village in a particular year) would not be expected to drive or dominate the final voting results on village dissolution.

In evaluating housing impacts of educational services and programs, a couple of methods have been raised to deal with the covariate bias and omitted variable bias in the existing literature. When representative and sufficient straddling repeat sales\(^{17}\) are available, an ideal approach is to combine propensity score matching (PSM) with difference-in-difference (D-D) to make an estimation. PSM, unlike regression, does not try to model the relationship between the X’s and outcome but attempts to model the association between X’s and treatment status in order to avoid using outcome data at the stage of sample selection. It replicates the spirit of randomization by creating balanced groups which look only randomly different from one another on the basis of observed variables (Stuart & Rubin 2007; Stuart 2011). The key idea is treatment group and control group are comparable only when the distributions of covariates are very similar between two groups\(^{18}\). As the second step, after obtaining a balanced sample in which each house has been

\(^{17}\) Straddling repeat sales are those repeat sales for which the first sale occur before treatment and the second sale occur after treatment.

\(^{18}\) A series of balance test (e.g. simple T-test, standardized bias test and so on) should be adopted and passed before one claim to obtain a balanced sample.
sold twice (or more), one can estimate a regression with price change of each house as the dependent variable and with an indicator equal to one in villages where dissolution has occurred. The setup of this regression functions like a D-D approach and controls for all time-invariant factors that influence both the house value and dissolution decision19. Again, the validity of this methodology depends on whether two conditions can be satisfied. First, whether one can obtain sufficient straddling repeat sales in both treatment group and control group before matching20. Second, whether the housing and neighboring characteristics of repeat sales are representative of those of all housing sales21. In this paper, it is obvious that I will not have a sufficient amount of straddling repeat house sales in treatment group for matching as housing market in rural areas are not so active as that in urban areas. Therefore, it is predictable that a large sample of straddling repeat sales will not be easily established.22

Although it is not feasible to adopt the above mentioned optimal identification strategy, a repeat sales sample, when coupled with hedonic model, parcel-level fixed effects and village-level time trends, is still very helpful in estimating impacts of dissolution on housing price in former village areas and TOV areas in the past 15 years in upstate NY.23 Conceptually, treatment group observations include all repeat housing transactions in dissolved villages24 from 2000 to 2014; while the counterfactual group involves all repeat housing transactions in comparable villages in

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19 Time-varying factors could be controlled for by adding a series of timing difference variables into regression on the basis of a balanced sample. More details can be found in Duncombe et al (forthcoming).
20 When adopting PSM, both the step of limiting sample to a common-support area and the procedure of matching will substantially filter and reduce the size of repeat sales. So, the original size of repeat sales should be large enough.
21 The external validity of research findings will be threatened without a set of representative repeat sales. That is why both Duncombe et al (2016) and this paper acknowledge the limitation of their sample and claim their research as case studies.
22 It is expected that this approach will be more appropriate after updating the housing sales data next year.
23 Similar identification strategies (i.e. combine repeat sales with a series of fixed effects) have been used in estimating housing price impacts of educational reform or school report cards. See Il Hwan Chung, William Duncombe & John Yinger (2013 under review), and Figlio & Lucas (2004).
the same time period in the upstate NY. By comparable group, this paper means villages in the same geographic divisions within NY State. Specifically, NY City, NYC northern suburbs, Nassau-Suffolk areas, Buffalo Region, Mid-Hudson Region, and Upper Hudson Region will be excluded as no village dissolution took place in those areas in the past 30 years and these areas present significantly different economic features from the remaining regions in upstate NY. In other words, only repeat house sales from regions 2, 3, 4, 6 will be included in my research, as indicated in Figure-2.

Consider the following hedonic model, with log of housing price as the dependent variable and parcel as the unit of analysis (subscript i, n, v and t mean parcel, census tract, village and year, respectively),

\[
\log(P)_{invit} = \alpha_i + \beta_n + \gamma_v + \delta \times (t - t_0) + \theta R_t + \rho R_t \times (t_2 - t^*) + \mu_i + \epsilon_{invit}
\]

(Equation 1)

Let \(X\) stand for individual housing characteristics, \(N\) include neighborhood and social-demographic variables, \(V\) mean villages characteristics, \(V \times (t - t_0)\) stand for village-specific time trends with \(t_0\) equal the starting date of my sample, \(R_t\) be a binary indicator that equals 1 in a dissolved village after dissolution date and 0 otherwise. Suppose dissolution occurs in year \(t^*\), \((t_2 - t^*)\) captures the timing difference between dissolution date and second-sale date. Moreover, let \(\mu_i\) stand for parcel-level time-invariant heterogeneity, and \(\epsilon_{invit}\) be an error term.

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25 As mentioned earlier, there are 11 villages that tried but failed to dissolve their villages during the same time period. These villages are expected to be more comparable with dissolved villages than other villages who never consider the necessity of dissolution. This provides another opportunity for robustness check.

26 As demonstrated in Yinger (2014), Ns should take quadratic forms based on constant elasticity demand functions for public services and housing. For simplicity, Ns shows up in linear form in Equation 1.
The key methodological challenges of estimating the above hedonic model include, a) it is hard to get sufficient, time-varying and/or time-invariant Xs, Ns and Vs, and b) the existence of unobserved heterogeneity will bias my estimation. However, repeat sales enable me to exploit parcel-level within variations by using fixed effects approach and other tactics to handle those challenges.

First, to avoid the possibility that dissolved villages and non-dissolved villages have systematically different unobserved heterogeneities that also affect housing prices, this paper adopts parcel-specific fixed effects. By doing so, all time-invariant omitted variables, whether at parcel level, census tract level or village level, will be fixed out from my model. Moreover, by getting rid of all houses which have experienced significant changes in inventory, condition, fire, an addition to properties, and all other substantial physical changes over time, my estimation could be largely protected against bias from time-varying parcel-level characteristics.

Second, because some neighborhood and village factors may affect both property values and village dissolution over time, because my sample period partially coincides with the Great Recession, and because dissolution events did not occur at the same time, it is necessary to account for changing macro-economic and social factors by controlling for village-specific time trends. The parcel-specific fixed effects and village-specific time trends together are supposed to account for all unobservable factors that vary linearly over time and therefore eliminate possibility of bias from these factors, even if they are strongly correlated with the treatment events, i.e. village dissolution.27

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27 Bloom (1984) provides an example involving both fixed effects and time trends.
The above methods, however, fail to protect estimation against possible bias caused by unobserved factors that influence both housing prices and village dissolution decisions and that vary in a nonlinear way over time. Fortunately, as I explained earlier, the existing laws on local government reorganization basically guarantee that village residents could be intensively involved in the long dissolution debate and process so that random shocks or short-run changes are not able to drive the final voting results on village dissolution in NY. Procedurally, dissolution plans and public hearing are mandatory; institutionally, permissive referendums give residents second chance to change the initial voting results under the Article 17-A of the General Municipal Law; and economically and politically, rural areas are relatively stable in NY.

Third, the possibility that the effects of dissolution on property values may take time to emerge or that the impact is not constant over time, requires to account for when the post-dissolution sale occur relative to voting date of dissolution. By controlling for the time length between those two points in time, this paper is also able to analyze the possible time pattern of the housing price impacts of village dissolution.

Fourth, when setting the exact date of a particular dissolution event, I prefer the date of referendum to the effective date, because village residents could be immediately aware that dissolution is taking place on voting date\(^\text{28}\). Another motivation to do so is that many effective dates of dissolution events are so close to the end of my sample period that I would lose many post-treatment observations if I employ the effective date as the dissolution date. The choice of using voting date as the treatment date implies that, my estimation results will comprehensively

\(^{28}\) It is rare that permissive referendum change the initial voting results, so I use initial voting date as the dissolution date for those successfully dissolved villages.
pick up non-budgetary effects of dissolution on housing prices between voting date and the effective date of dissolution.²⁹.

In short, this analysis builds on a comparison between repeat housing sales in dissolved villages and those in non-dissolved villages, uses parcel-specific fixed effect and village-specific time trends to deal with heterogeneity and endogeneity issues, and controls for timing difference between the second sale and the voting date of dissolution. By designing so, $R_t$ enables to capture the shift in intercept while $[R_t \times (t_2 - t^*)]$ capture the shift in post-dissolution time trend caused by village dissolution. This equation can also be directly applied to estimate housing price impacts of dissolution in TOV areas. The application of this model to TOV areas make perfect sense as village dissolution can reasonably be treated as an exogenous shock to residents and their properties in TOV areas, as explained earlier.

5. Data

Property sales information and housing characteristics were provided by the New York Office of Real Property Services (ORPS), which has recently been merged into the New York State Department of Taxation and Finance. Property sales data from 2000 to 2014 are available in the “Sales” database, which includes 15 years of parcel-level property sales information for the state. The Sales database includes information on property location, class, sales date, and sales price. This analysis only includes arms-length transactions of single family homes, which are constructed for year-round residence with a sales price greater than $10,000 and which have not

²⁹ When accumulating more data in future, I would like to use the effective date of a dissolution to see how my estimation results would be changed and thereby study time line effect, namely focusing on how reactions to village dissolution change over time. Different reactions at different points in time may point us to one policy implication that when policy makers should compensate people. But, so far, I do not have many observations during post-effective-date period, and this interesting topic will be explored in future. One example with focus on the time line effect is “House Price during a Siting Stages: The Case of an Incinerator from Rumor through Operation” (Kiel and McClain 1995).
experienced significant changes in physical conditions between the taxable status date and the sale date. The Real Property System also collects information from local assessors on a number of parcel characteristics. Quality measures include an assessment of the overall physical condition of the residence (including interior and exterior walls, foundation, kitchen, baths, heating, plumbing and electrical systems). A second quality measure is an assessment of the construction grade of the house, which refers to the quality of the material and workmanship used to construct the house. Additional variables include the number of square feet of living area in a house, the number of bedrooms, and the number of full bathrooms. Special housing features in the data set include whether the house has a full basement, central air conditioning, or a fireplace. Finally, the data set contains an estimate of the house age at the time of sale.

This paper will also use information about the demographics and socio-economic status of residents in the 2000 census tract in the section of robustness check. Specifically, the data set includes measures of age, race and ethnicity, gender, poverty, income distribution, distribution of house values, educational attainment, enrollment in public schools, employment by industry and occupation, and unemployment. In the section of robustness check, the selection of neighborhood amenity variables and model specification issues will be further discussed.

6. Empirical Results

As I explained earlier, the effects of village dissolution on housing prices in village areas could be positive or negative, conditional on many institutional, cultural, financial and historical factors. Based on Equation 1, the first column in Table-2 captures possible intercept shift in property values caused by dissolution events, while the second column shows us whether the property value effects of dissolution will change during the post-treatment period. Interestingly,
the empirical results did not find any significant shift in either intercept or post-treatment time trends in village areas. One possible, abstract, explanation is that the potential benefits of economies of size are offset by loss of allocative efficiency (e.g. loss of power in local agenda setting, easy access to local police, etc.) Another, more practical, explanation is that the specific institutions through which public services responsibilities are assumed by town governments may prevent financial costs of within-village public service from spreading to surrounding TOV residents. Since special districts are widely designed and used to replace the former village governments in providing fire, police, and sewer and water services, the existing housing demand curve will not substantially change. Actually, it is not common for town governments to unconditionally accommodate village service into their current system in upstate NY, meaning that financial costs of former village residents are not very likely to decrease, and thereby bidding and sorting functions will not be substantially affected30.

Based on the same models, columns 3 and 4 reveal different stories in the TOV areas. First, dissolution decline property values by almost 16% in the TOV areas, and the declining effects become stronger as time goes by31. The magnitude of the negative effect is very large considering the relatively stable economic environment in upstate NY. One possible reason for the negative effects is that TOV residents are usually not engaged in the village dissolution debate but they perceive to unfairly shoulder additional financial cost previously assumed by village residents32. The contrasting empirical effects of dissolution on housing prices between former village areas

30 It is noteworthy that this paper is not designed to differentiate bidding and sorting effects of village dissolution.
31 Due to a relatively small amount of repeat sales in my treatment group, it is not quite meaningful, either logically or statistically, to further explore non-linear patterns of post-treatment time trends.
32 See “Surrounding Towns Not Happy with Village of Medina Dissolution Plan”
and the TOV areas, demonstrate that TOV residents believe it is not fair to be excluded from village dissolution, and they should be effectively involved into policy-making process.

Although the combination of repeat sales, parcel-specific fixed effects and village-specific time trends could significantly improve internal validity of my estimation, it is not helpful in enhancing external validity of my empirical results. Specifically, neither straddling repeat sales nor non-straddling repeat sales could be simply treated as representative of single sales, and therefore, my results cannot be generalized without caution.

7. **Robustness Checks**

My previous estimation results are completely based upon all repeat sales in similar regions within upstate NY. In this section, I will check whether my results are robust against a different sample selection and the inclusion of single sales.

First, as described earlier, twenty-four villages initiated dissolution process but finally failed to pass the voting referendum after 2008. It is therefore interesting for both state policy makers and those willing-to-dissolve villages to understand how property values are affected by dissolution decision between successfully-dissolved villages/TOVs and unsuccessfully-dissolved villages/TOVs. So, my first sensitivity analysis is to confine my control group to repeat sales in villages where residents voted against dissolution and then make an estimation. Not surprisingly, the magnitudes and the significance levels of both dissolution and post-dissolution time trends are quite consistent with my previous results. Dissolution do not have any real and significant effects on housing prices within villages; while it does negatively affect real estate market in corresponding TOVs.
Second, the relatively small sample size of treatment group\(^{33}\), and potentially unobserved difference between houses which have been sold at least twice and those which have been sold only once\((Clapp et al 1991)\), present big challenges to the external validity of my previous estimation results. So, I should check the sensitivity of my results to the inclusion of single sales.

The previous way to estimate Equation 1, however, cannot be directly applied to a full sample with both repeat sales and single sales included. First, it is not appropriate to employ parcel-level fixed effects when single sales are included; second, without parcel-level fixed effects, I have to seek methods to deal with the existence of Xs, Ns, and Vs; third, the presence of Xs, Ns and Vs immediately lead to concerns about model specification issues. Fortunately, the existence of housing characteristics, neighborhood amenities and village factors and the concerns about model specification can be dealt with by direct control methods, village-level fixed effects, village-specific time trend, and referring to previous discussions on hedonic model specifications \(\text{(Yinger 2015)}\). Consider the following hedonic model, which is the same with Equation 1 except the new term, \(\varphi_v\), the village-specific fixed effects,

\[
\log(P)_{invt} = \alpha X_{invt} + \beta N_{invt} + \gamma V_{tv} + \delta V(t - t_0) + \theta R_t + \rho R_v \ast (t_2 - t^*) + \mu_i + \varphi_v + \epsilon_{invt}
\]  

(Equation 2)

Specifically, house age, area, house construction grade, quality measures of basement, central air conditioning, number of bathrooms and bedrooms, fireplaces are all explicitly controlled for as Xs. At the neighborhood level, I use Geo-coding techniques in GIS to find the matched census tract where a house is located and then attach the census tract information to that house. After merging the 2000 census tract data with the property sales data, I can directly control for the

\(^{33}\text{Deng et al (2011) argue that research methods based on repeat sales may face a large reduction in sample size.}\)
following variables at census tract level (i.e. Ns) in my estimation: percent of adults with a bachelor degree or higher, percent of families with income below $20 thousands, percent of properties with values below $50 thousands, percent of properties with values more than $300 thousands, percent of owner occupied house, poverty rate, percent of people with professional occupations, percent of employment in government, percent of unemployment, percent of population older than 65 years old, percent of population under 20, percent of white people and so on. Village-specific fixed effects ($\varphi_i$) and time trends ($\delta V \ast (t - t_0)$) will be jointly used to control for time-invariant and time-varying village-level features which influence both dissolution decisions and property values. Again, the sample exclude all houses experiencing significant changes to physical conditions. Moreover, drawing on the existing research results that quadratic case respond to the assumption that the price elasticity of demand for public services is infinite and that a linear specification for the hedonic is inconsistent with the standard sorting theorem (Yinger 2015), my model adopts quadratic forms for Ns. Hopefully, we control for sufficient Xs and Ns so that we do not need to worry about the presence of $\mu_i$.

To make the results of two datasets comparable, all model specifications follow Equation 2 in Table-4. Then, any difference in estimation results between full sample and repeat sales sample will be simply attributed to sample distinction rather than difference in model specifications. Table-4 demonstrate that the results based on full sample are partially consistent with those based on repeat sales sample, especially when it comes to the declining post-dissolution time trends in TOV areas. The main inconsistent finding is that, statistically, full sample supports a significant declining post-treatment trend. The magnitude, 0.5%, however, is not quite significant in economic sense.
The two robustness check basically provide consistent evidence with my main findings that village dissolutions, although do not significantly affect house prices in former village areas, do impose negative influences on property values in TOV areas where residents are very upset with negative externalities, i.e., possible increase of financial burdens brought by village dissolutions.

8. Discussion

The background for this study is provided by a broad concern among practitioners with improving the design of revenue assignment and expenditure assignment, especially when local governments face tight budget constraints, in the context of American fiscal federalism. In addition, whether government reorganization has economic impacts is a very important academic topic both in political economy and in local public finance. This paper is the first study focusing on whether village dissolution, as a form of general-purpose government structural change, will affect the attractiveness of local communities. Towards that end, a repeat sales sample, coupled with parcel-level fixed effects and village-specific time trends, is built to estimate whether local housing demand has been affected by village dissolution, both in former village areas and TOV areas.

Basically, dissolution events do not bother housing prices in former village areas, probably due to the institutional design of using special districts to replace former village governments in providing basic public service in NY State. However, TOV residents do not feel fair to assume externalities of a possible increase of financial burdens caused by local government reorganization. Because they are not really engaged in the decision-making process, the decline of housing demand reflects their attitudes towards possible negative spillover effects of village dissolution. Even worse, the decrease of property values may backfire in future, as town
governments will continue to face a shrinking property tax base. So, an important policy implication of this research is, even though TOV residents are not geographically affected by dissolution, it is important to take account of their benefits and interests in policy design.

Future research agenda includes, a) collecting more political and fiscal information on the operation of special districts which have been used in eliminated village areas, b) estimating net cost of village dissolution in NY, and c) comparing public service cost under different institutions, namely whether special districts are more efficient in providing fire service, water service, and police service than village governments.
References


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Figure 1
Geographical Distribution of Village Dissolution History in Upstate NY (2000-Present)

Note: Four villages passed the voting for dissolution in Cattaraugus County. In addition, the dissolved Keeseville was a village in Clinton and Essex Counties.
Figure 2
Geographical Regions within New York State

1. Buffalo
2. Rochester
3. Syracuse/Otsego-Rome
4. Southern Tier
5. Upper Hudson
6. North Country
7. Mid-Hudson
8. New York City
9. NYC Northern Suburbs
10. Nassau-Suffolk
<table>
<thead>
<tr>
<th>Village Name</th>
<th>Town Name</th>
<th>County Name</th>
<th>Date of Referendum</th>
<th>Effective Date of Dissolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village of Andes</td>
<td>Town of Andes</td>
<td>Delaware County</td>
<td>2002, June 3</td>
<td>2003, December 31</td>
</tr>
<tr>
<td>Village of Pike</td>
<td>Town of Pike</td>
<td>Wyoming County</td>
<td>2008, March 18</td>
<td>2009, December 31</td>
</tr>
<tr>
<td>Village of Limestone</td>
<td>Town of Carrollton</td>
<td>Cattaraugus County</td>
<td>2009, September 28</td>
<td>2010, December 31</td>
</tr>
<tr>
<td>Village of Randolph</td>
<td>Town of Randolph</td>
<td>Cattaraugus County</td>
<td>2010, March 16</td>
<td>2011, December 31</td>
</tr>
<tr>
<td>Village of East Randolph</td>
<td>Town of Randolph &amp; Town of Conewango</td>
<td>Cattaraugus County</td>
<td>2010, March 16</td>
<td>2011, December 31</td>
</tr>
<tr>
<td>Village of Seneca Falls</td>
<td>Town of Seneca Falls</td>
<td>Seneca County</td>
<td>2010, March 16</td>
<td>2011, December 31</td>
</tr>
<tr>
<td>Village of Perrysburg</td>
<td>Town of Perrysburg</td>
<td>Cattaraugus County</td>
<td>2010, March 16</td>
<td>2011, December 31</td>
</tr>
<tr>
<td>Village of Edwards</td>
<td>Town of Edwards</td>
<td>St.Lawrence County</td>
<td>2011, March 15</td>
<td>2012, December 31</td>
</tr>
<tr>
<td>Village of Altmar</td>
<td>Town of Albion</td>
<td>Oswego County</td>
<td>2011, December 6</td>
<td>2013, May 1</td>
</tr>
<tr>
<td>Village of Keeseville</td>
<td>Town of Ausable &amp; Town of Chesterfield</td>
<td>Clinton County &amp; Essex County</td>
<td>2013, October 22</td>
<td>2014, December31</td>
</tr>
<tr>
<td>Village of Bridgewater</td>
<td>Town of Bridgewater</td>
<td>Oneida County</td>
<td>2014, March 18</td>
<td>2014, December31</td>
</tr>
<tr>
<td>Village of Lyons</td>
<td>Town of Lyons</td>
<td>Wayne County</td>
<td>2014, March 18</td>
<td>2015, December31</td>
</tr>
</tbody>
</table>

Main Data Source: Village Dissolutions since 1900 in NY State
http://www.dos.ny.gov/lg/village-inc-diss.html
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Village Model 1</th>
<th>(2) Village Model 2</th>
<th>(3) TOV Model 1</th>
<th>(4) TOV Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolution</td>
<td>-0.0382</td>
<td>0.0547</td>
<td>-0.159*</td>
<td>0.0525</td>
</tr>
<tr>
<td></td>
<td>(0.121)</td>
<td>(0.0733)</td>
<td>(0.0853)</td>
<td>(0.148)</td>
</tr>
<tr>
<td>Months Since Dissolve</td>
<td>-0.00662</td>
<td>-0.0115**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00542)</td>
<td>(0.00555)</td>
<td></td>
<td></td>
</tr>
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<td>Constant</td>
<td>11.16***</td>
<td>11.16***</td>
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<td>11.53***</td>
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<td></td>
<td>(0.000414)</td>
<td>(0.000362)</td>
<td>(0.000151)</td>
<td>(0.000174)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.911</td>
<td>0.911</td>
<td>0.936</td>
<td>0.936</td>
</tr>
<tr>
<td>Parcel-Level FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Village-Specific Time Trends</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Town-Specific Time Trends</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations**</td>
<td>18,612</td>
<td>18,612</td>
<td>41,272</td>
<td>41,272</td>
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</table>

Note: The dependent variable is housing price in log form. As explained in text, the variable “month since dissolve” equals the time length between the date of dissolution and the date of second sale. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Model 1s capture the shift in intercept, and Model 2s additionally capture shifts in post-dissolution time trends.

**There are 268 observations in finally dissolved villages (Village Model 1 and Model 2) and 260 observations in corresponding TOV areas (TOV Model 1 and Model 2).
Table 3: The Effects of Village Dissolution on Property Values in Upstate NY, 2000-2014
Robustness Check: Comparison with Unsuccessfully-Dissolved Villages/TOVs
(Models are based on Equation 1)*

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Village Model 1</th>
<th>(2) Village Model 2</th>
<th>(3) TOV Model 1</th>
<th>(4) TOV Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolution</td>
<td>-0.0382 (0.123)</td>
<td>0.0547 (0.0742)</td>
<td>-0.182** (0.0863)</td>
<td>0.0248 (0.128)</td>
</tr>
<tr>
<td>Month Since Dissolve</td>
<td>-0.00662 (0.00549)</td>
<td>-0.0121** (0.00588)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>11.04*** (0.00318)</td>
<td>11.04*** (0.00278)</td>
<td>11.54*** (0.000428)</td>
<td>11.54*** (0.000478)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.894</td>
<td>0.894</td>
<td>0.937</td>
<td>0.937</td>
</tr>
<tr>
<td>Parcel-Level FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Village-Specific Time Trends</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Town-Specific Time Trends</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>2,456</td>
<td>2,456</td>
<td>14,272</td>
<td>14,272</td>
</tr>
</tbody>
</table>

Note: The dependent variable is housing price in log form. As explained in text, the variable “month since dissolve” equals the time length between the date of dissolution and the date of second sale. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Model 1s capture the shift in intercept, and Model 2s additionally capture shifts in post-dissolution time trends.
**There are 268 observations in finally dissolved villages (Village Model 1 and Model 2) and 260 observations in corresponding TOV areas (TOV Model 1 and Model 2).
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Full Sample***</th>
<th>Repeat Sales Sample****</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Village Model 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village Model 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOV Model 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOV Model 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissolution</td>
<td>-0.0268</td>
<td>0.0372</td>
</tr>
<tr>
<td>(0.0471)</td>
<td>(0.0577)</td>
<td>(0.0743)</td>
</tr>
<tr>
<td>Month Since Dissolve</td>
<td>-0.00570***</td>
<td>-0.00880***</td>
</tr>
<tr>
<td></td>
<td>(0.00270)</td>
<td>(0.00270)</td>
</tr>
<tr>
<td>Constant</td>
<td>11.03***</td>
<td>11.02***</td>
</tr>
<tr>
<td></td>
<td>(1.185)</td>
<td>(1.185)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.625</td>
<td>0.625</td>
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<tr>
<td>Direct Control**</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Village FE</td>
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<td>Yes</td>
</tr>
<tr>
<td>Village-Specific Time Trends</td>
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<td></td>
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<tr>
<td>Town FE</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Town-Specific Time Trends</td>
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<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>48,352</td>
<td>48,352</td>
</tr>
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</table>

Note: The dependent variable is housing price in log form. As explained in text, the variable “month since dissolve” equals the time length between the date of dissolution and the date of second sale. My full sample only picks up house sales from regions 2,3,4,6 in Figure-2 as well. Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

*Model 1s capture the shift in intercept, and Model 2s additionally capture shifts in post-dissolution time trends.
**There are 10 housing-characteristic variables and 13 neighborhood-feature variables directly controlled in all models.
***When using a full sample (Column 1-4), there are 1,015 observations in finally dissolved villages (Village Model 1 and Model 2) and 800 observations in corresponding TOV areas (TOV Model 1 and Model 2).
****4 observations are lost due to the missing values of control variables when I estimate Equation 2 on the basis of repeat sales sample (Column 5-8).