

Ahlfeldt, Gabriel M.; Maennig, Wolfgang; Richter, Felix J.

**Working Paper**

## Zoning in reunified Berlin

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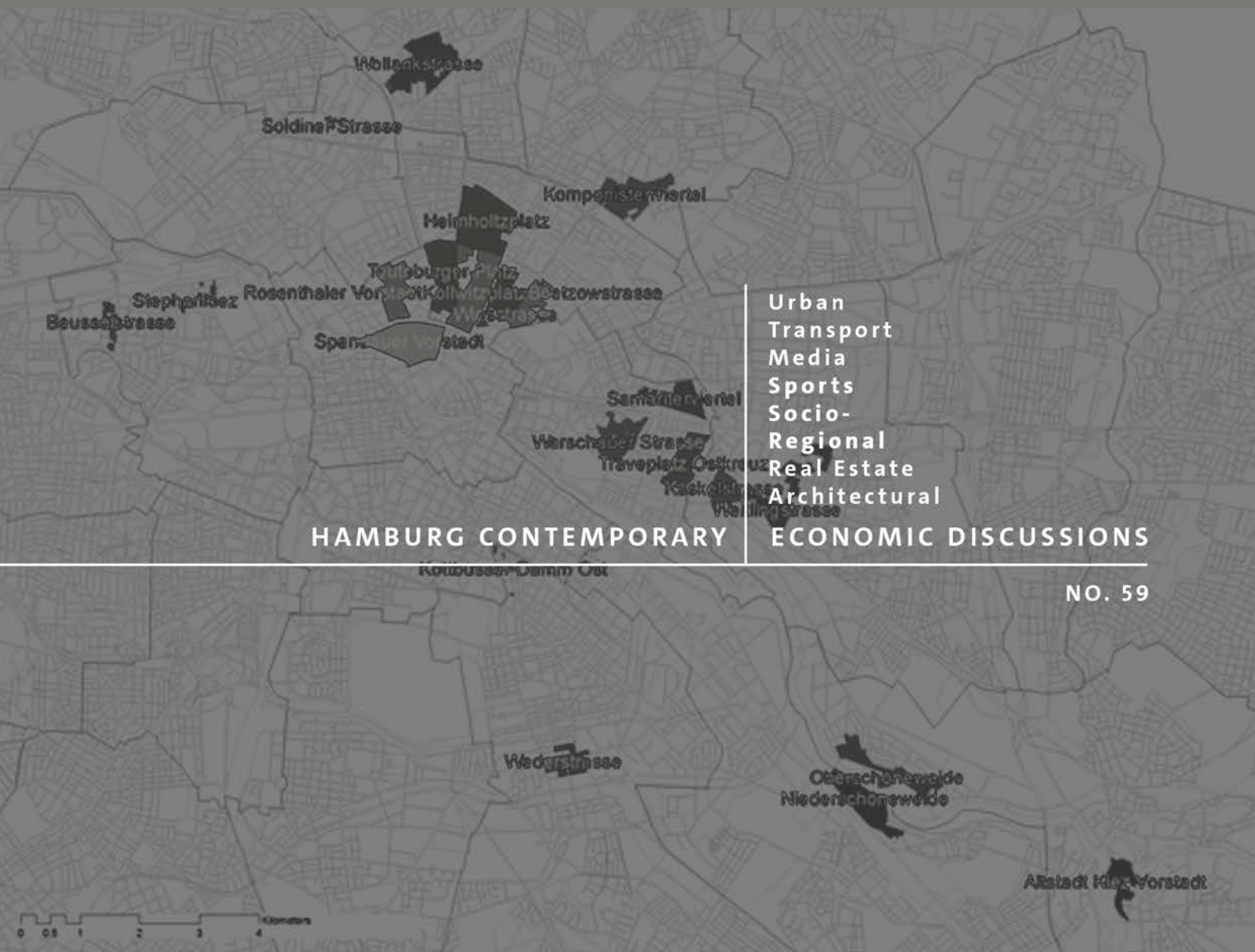
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GABRIEL M. AHLFELDT / WOLFGANG MAENNIG / FELIX J. RICHTER

# ZONING IN REUNIFIED BERLIN



**Hamburg Contemporary Economic Discussions**

University of Hamburg  
Faculty of Business, Economics and Social Sciences  
Chair for Economic Policy  
Von-Melle-Park 5  
D-20146 Hamburg | Germany  
Tel +49 40 42838 - 4622  
Fax +49 40 42838 – 6251  
<https://www.wiso.uni-hamburg.de/en/fachbereich-vwl/professuren/maennig/home.html>  
Editor: Wolfgang Maennig

Gabriel M. Ahlfeldt  
London School of Economics (LSE)  
Department of Geography and Environment & Spatial  
Economics Research Centre (SERC)  
Houghton Street  
London WC2A 2AE | UK  
Tel +44 (0)20 78523785  
Fax +44 (0)20 7955 7412  
[g.ahlfeldt@lse.ac.uk](mailto:g.ahlfeldt@lse.ac.uk)

Wolfgang Maennig  
University of Hamburg  
Faculty of Business, Economics and Social Sciences  
Chair for Economic Policy  
Von-Melle-Park 5  
20146 Hamburg | Germany  
Tel +49 40 42838 - 4622  
Fax +49 40 42838 – 6251  
[wolfgang.maennig@wiso.uni-hamburg.de](mailto:wolfgang.maennig@wiso.uni-hamburg.de)

Felix J. Richter  
University of Hamburg  
Faculty of Business, Economics and Social Sciences  
Chair for Economic Policy  
Von-Melle-Park 5  
20146 Hamburg | Germany  
[felix.richter@wiso.uni-hamburg.de](mailto:felix.richter@wiso.uni-hamburg.de)

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Gabriel M. Ahlfeldt, Wolfgang Maennig, Felix J. Richter

## Zoning in reunified Berlin

**Abstract:** While urban renewal programs have become widely used policy measures to target urban development less is known about the reasons why certain areas are more responsive to policy interventions than others. With this study we address some of these issues by analyzing an urban renewal program in Berlin, Germany, with 22 designated renewal zones between 1990 and 2012. We separately estimate the effects of the renewal policy on property prices for each respective redevelopment area by comparing price developments in these areas to a series of runner-up areas and to geographically close transactions. We find a considerable amount of heterogeneity. While some areas profit from the renewal policies, there are several areas which develop quite differently and end up with a decrease in property prices due to the urban renewal policy.

*Keywords:* Urban, renewal, revitalization, area level, hedonic, policy evaluation

*Version:* July 2016

*JEL:* D62, H23, R21, R31

### 1 Introduction

Urban renewal programs have become widely used policy measures to address urban development in many cities. There exists a growing literature providing aggregated ex-post evaluations of such policies. Less is known, however, about the reasons why certain areas are more / less responsive to external stimuli than others, i.e. why certain areas experience large and lasting positive effects due to policy interventions while others do not display effects, or are even worse off after the policy.

With this study we address some of these issues. We analyze an urban renewal program in Berlin, Germany, with 22 designated renewal zones between 1990 and 2012. Renovations / buildings upgrades in these zones were eligible for public funding through tax abatements, subsidies, and other financial support. Additionally, the policy attempted to upgrade public spaces in these areas. This includes the building and renovation of roads and squares, schools, playgrounds, and sanitary improvements.

We separately estimate the effects of the renewal policy on property prices by comparing them to price developments of two kinds of control groups. The first control group consists of so called investigation areas deemed suitable as urban renewal areas, which were ultimately not designated. The second kind of control group is defined by geographical restriction: we compare price developments in the renewal areas to all transactions in a 500m to 3000m buffer around the respective renewal area.

We find a considerable amount of heterogeneity in the effects of the policy. While some areas profit from the renewal policies, there are in both specifications several areas which develop quite differently and end up with a decrease in policy prices due to the urban renewal policy. Graphical analyses show that the strongest price increases occur in the most central areas in the former eastern part of Berlin. These areas were among the most degenerated prior to the policy measure.

The literature evaluating urban revitalization policies is growing. Several studies have investigated the general economic effects of urban revitalization policies in recent years. Ahlfeldt et al. (2016) provide an evaluation of the aggregated impact of same Berlin urban renewal policy package as this study. Using a quasi-experimental research design they track housing prices in Berlin over 20 years and compare transactions in the renewal areas to several control groups. They find that the housing stock condition in the targeted areas improved compared to similar areas, and that transactions in the renewal areas realize a yearly price premium compared to properties not targeted by the policy. They do not find evidence for a causal relation between this price premium and the policy, instead the price increases can be attributed mostly to centrality and endowment with urban amenities.

Rossi-Hansberg et al. (2010) analyze a \$14 Mio urban renewal program in Richmond, Virginia, consisting of four renewal areas. They compare housing prices in the selected areas to a runner up area and find evidence for positive but quickly decreasing housing externalities. Ding et al. (2000) analyze the effects of residential investment policies on surrounding property values in Cleveland, Ohio. They find positive but spillover effects within the distance of one block. Schwartz et al. (2006) find comparable results

investigating the external effects of housing investment in New York City, using a combination of a difference in difference design and hedonic pricing.

Leather & Nevin (2013) look into a housing redevelopment program in the UK designed to target disadvantaged housing markets. Santiago et al. (2001) evaluate the effects of public housing programs on property prices nearby and find that the effects depend on the initial socio-demographic composition of the observed neighborhoods. Larsen et al. (2008) investigate the socioeconomic effects of an urban renewal policy in Copenhagen, Denmark. Galster (2006) look into a revitalization program in Richmond, Virginia, to investigate which amount of an initial investment into a declining neighborhood might suffice to return the area on a positive trajectory.

Recently, several contributions have investigated similar policies and their effects on housing markets outside of the U.S. (i.e. Ahlfeldt and Maennig, 2010 and Lazrak et al., 2010 on heritage policies).

The remainder of the article is organized as follows: Section 2 provides background information about the urban renewal program and the political setting, while section 3 presents the empirical strategy. Section 4 contains the results and the final section summarizes and concludes.

## 2 Background

After the German reunification, large parts of the housing stock in Berlin was fairly degenerated, especially in the eastern part of the city. These issues manifested in an overall bad condition of the building substance of original housing stock and inner city district centers, including massive vacancies, and in an increased need for renovation. As policy makers recognized these issues as pressing for the development of Berlin as a unified city and large scale public policies were fundable after the reunification, they instigated the *First Berlin Renewal Program*.

The program consisted of a group of redevelopment areas eligible for public funding and incentives for owners to renovate their buildings. The selection of these renewal areas can be summarized as follows: After a pre-selection of hotspots of urban decline, so

called ‘investigation areas’ by the Berlin Senate, in depth analyses of the sociodemographic structure and the status of the housing stock were provided by private planning agencies. These analyses include propositions for the exact location and size of the renewal areas. Finally, the Senate of Berlin officially designates the renewal areas. For details on the selection process see Maennig (2012) and Ahlfeldt et al. (2016).

The investigation areas were formed in July 1992 and initially comprised 39 areas. In the following years (1993-1995), the Senate of Berlin designated 22 renewal areas, comprising an overall area of about 8,100 square kilometers, 5,723 plots, and about 81,500 dwelling units, with an average population of 5,000 residents per renewal area (Senat Berlin, 2001).

Table 1 provides an overview and some descriptive statistics over the renewal areas initiated. Figure 1 displays the location of the renewal areas (red) and the investigation areas (blue). Most of the renewal areas are located in the former eastern part of Berlin. The five renewal areas in former West Berlin are much smaller than their eastern counterparts, which reflects that the situation of the housing stock was considerably better in West Berlin.

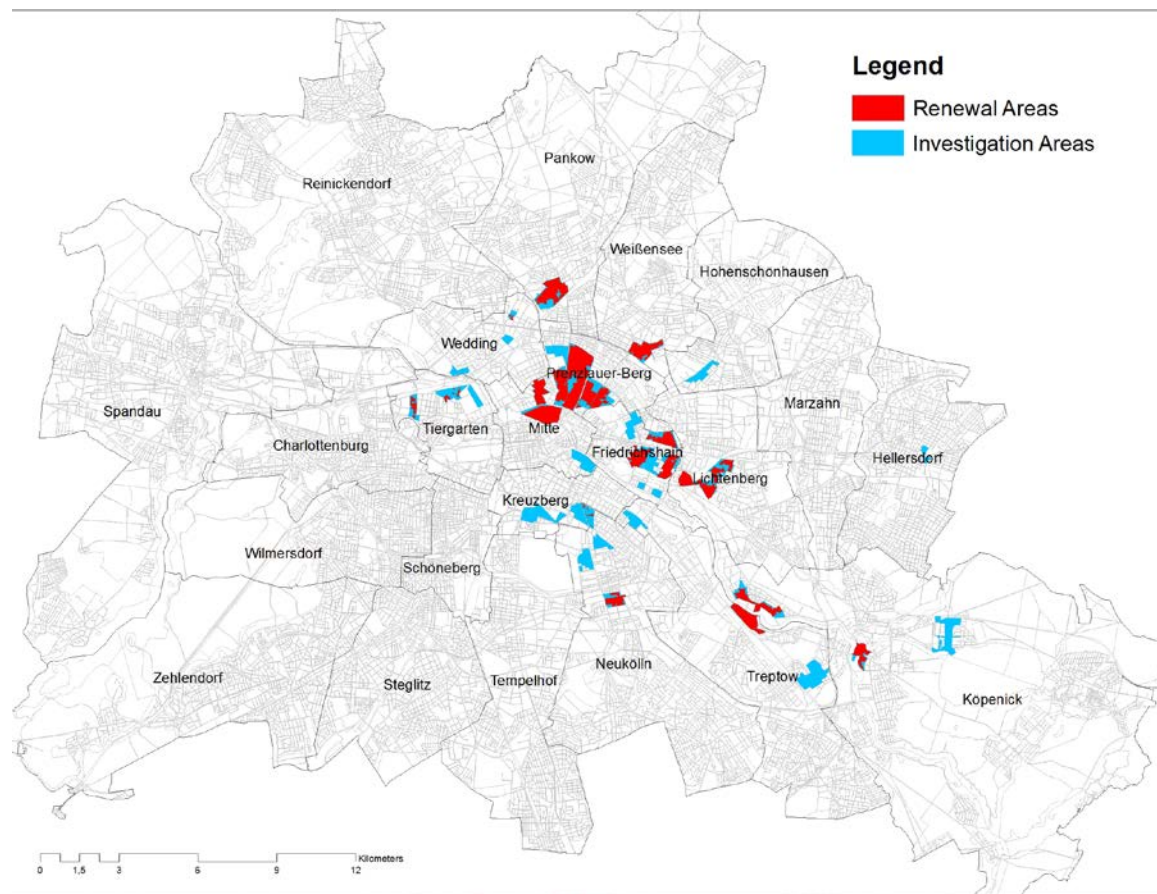
**Table 1 Renewal Area Spillover Effects**

Name	start	end	area (km <sup>2</sup> )	properties	dwelling units	residents
Samariterviertel	09.10.1993	10.02.2008	0.339	263	5302	8324
Warschauer Strasse	04.12.1994	28.04.2011	0.381	227	5110	8599
Traveplatz Ostkreuz	04.12.1994	11.07.2010	0.351	204	4380	6964
Kaskelstrasse	04.12.1994	10.02.2008	0.221	248	1665	3394
Weitlingstrasse	04.12.1994	28.01.2009	0.503	331	4214	5337
Spandauer Vorstadt	09.10.1993	10.02.2008	0.671	632	5809	8771
Beusselstrasse	04.12.1994	21.02.2007	0.106	93	2314	3045
Rosenthaler Vorstadt	04.12.1994	28.01.2009	0.376	373	4809	6794
Stephankiez	10.11.1995	21.02.2007	0.063	54	1288	1860
Soldiner Strasse	10.11.1995	21.02.2007	0.019	11	447	661
Wederstrasse	10.11.1995	11.07.2010	0.246	233	1341	2079
Kottbusser Damm Ost	10.11.1995	21.02.2007	0.025	21	380	522
Kollwitzplatz	09.10.1993	28.01.2009	0.607	476	6519	11412
Helmholtzplatz	09.10.1993		0.819	560	13338	21211
Winsstrasse	04.12.1994	28.04.2011	0.348	219	4850	8568
Wollankstrasse	04.12.1994	28.04.2011	0.685	338	3386	7719
Teutoburger Platz	04.12.1994	12.02.2013	0.498	316	4432	7950
Komponistenviertel	04.12.1994	11.07.2010	0.339	477	3443	7400
Boetzowstrasse	10.11.1995	28.04.2011	0.381	191	3072	6211
Altstadt Kiez Vorstadt	09.10.1993	21.02.2007	0.351	225	1105	2115
Niederschöne weide	04.12.1994		0.221	97	799	1368
Oberschöne weide	10.11.1995	11.07.2010	0.503	255	3465	5375

Notes: The data for area, properties, dwelling units, and residents are from the Berlin administrative unit for urban development and environment (Senatsverwaltung für Stadtentwicklung und Umwelt, 2007). The Renewal Area “Teutoburger Platz” was deregulated after the end of our observation period (August 2012). The data for the areas “Komponistenviertel” and “Niederschöne weide” are from 2010.



**Figure 1 Renewal Geography**



Notes: Notes: Own illustration based on the urban and environmental information system (Senatsverwaltung für Stadtentwicklung Berlin, 2006). Red (blue) areas indicate renewal (investigation) areas.

The Berlin program can be divided in two main phases: in the first half (roughly 1993-2002) vacancies and bad building substance were the main drivers of the renewal program. The incentives for private investments in the building stock included tax reductions, loans, cash advances and further financial support. By 2000, already more than 50 % of the housing units in the renewal areas had been modernized (Berlin, 2005). In the post-2002 phase, due to the progress made during the post-unification phase and an increasingly tight public budget, the focus changed: It was restricted to improvements of the social infrastructure and living quality of the neighborhood.

Private modernizations were no longer co-financed through public investments, but significant tax abatements remained as an implicit subsidy.<sup>1</sup>

Until 2009, the expenses comprised more than 1.8 billion € (2.3 billion US\$) of public investments, amounting to about 880 million € (1.13 billion US\$) for modernization and reinstatement, and about 546 million € (730 million US\$) for expenses in infra-structure and social environment. The remaining disbursements consist of preparation costs (€75 Mio. / \$97 Mio.), allowances (€115 Mio. / \$150 Mio.), other regulatory measures including compensations (€181 Mio. / \$235 Mio.), and other building measures (€63 Mio. / \$81 Mio.).<sup>2</sup> The average expenses per renewal area amounted to about 80 million € (102 million US\$), translating into per capita expenses of €16,000 (\$20,600) distributed within a period of some 15 years.

### 3 Data and Empirical Strategy

#### 3.1 Empirical Strategy

We use an established combination of hedonic (Rosen, 1974) and differences-in-differences (Card and Krueger, 1994) methods to estimate the effect of the policy measure discussed above. Specifically, we separately estimate the cumulated effect on property prices after 15 years (=average runtime of the renewable policy) for each respective renewal area. The rationale of the quasi-experimental approach is to compare the areas exposed to the policy (the treatment) with areas as similar to the treatment areas as possible, but not exposed to the policy (the control group). Additionally, we only compare these two groups after the treatment has started.

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<sup>1</sup> Generally, modernization costs for own use or renting can be deducted from taxable income over a runtime of 10 to 12 years. A detailed explanation is provided in § 154 and 177 in the code of building law (BauGB), and § 7h, 10f, and 11a of the code of income tax law (EStG).

<sup>2</sup> Compare (Berlin, 2010), where the local administration (Senatsverwaltung Berlin) provides detailed budget accounting information for the different time periods. More up-to-date figures are not yet available to the best of our knowledge.

We include a set of observable property and location characteristics discussed in the data section. We also control for otherwise not observed time-invariant location characteristics via a fixed effects defined for 323 traffic cells.<sup>3</sup> Standard errors are clustered on the same level. Macroeconomic factors that are assumed to be invariant across the treatment and control groups are captured by year fixed effects. We control for time varying effects by adding distance to CBD (interacted with a post treatment indicator).

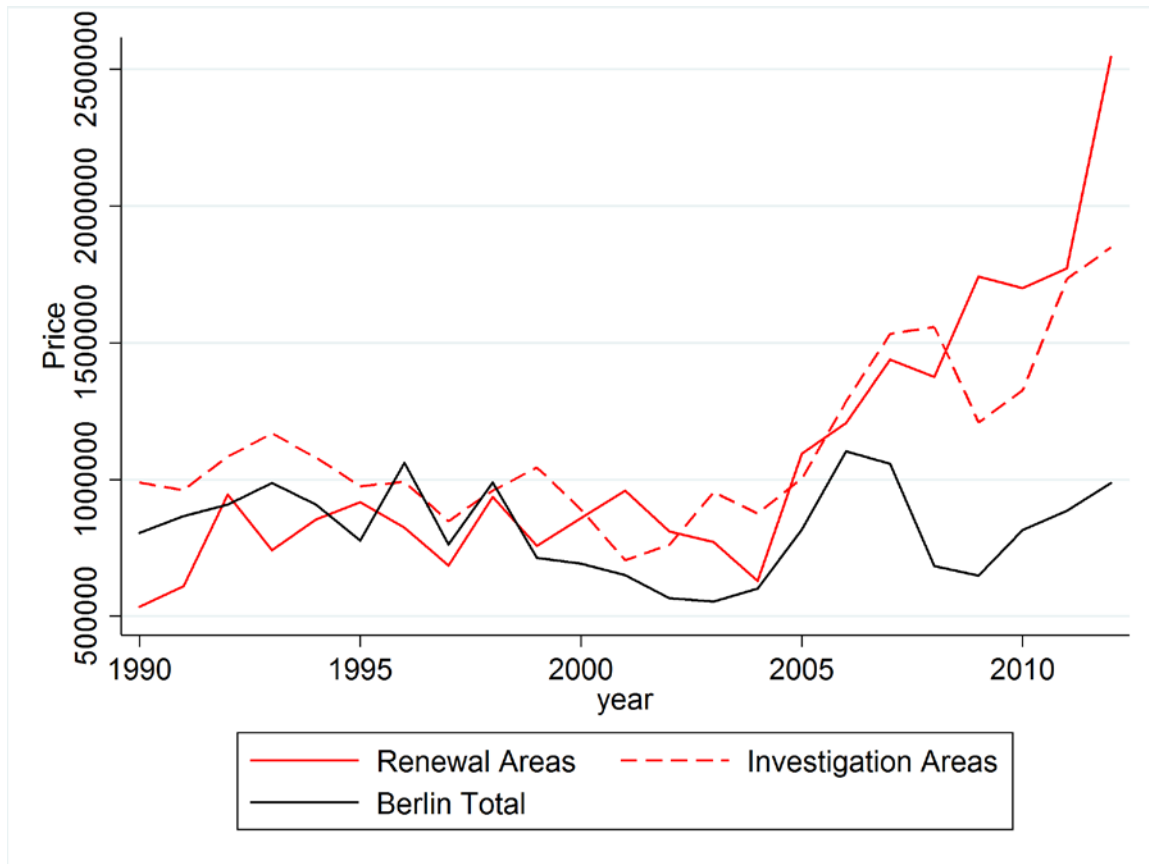
### 3.2 Control Groups

Figure 2 displays the development of nominal property prices in the renewal areas, the investigation areas, and the rest of Berlin. The figure illustrates how important it is to select appropriate control groups when carrying out thorough policy evaluations. We use two separate control groups, the investigation areas which were considered but ultimately not designated as renewal areas, and a geographical control group based on distance to the renewal area.

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<sup>3</sup> Traffic Cells (Verkehrszellen) are statistical areas originally used by the local administration to analyze traffic. There exist 323 traffic cells in Berlin, the average size is 2.7 square kilometers (1,05 square miles).

**Figure 2 Property Price Trends in Berlin**



Notes: Own illustration.

The first control group are the investigation areas. These areas have been considered eligible to become designated renewal areas, but have ultimately not been selected. We argue that these areas share many of the building substance and socio-demographic structure with the renewal areas. Table 3 in the data section displays some descriptive statistics comparing the renewal areas and the investigation areas.

The second control group is based on proximity. It encompasses all transactions within a 500m to 3000m distance to the renewal area, excluding all other renewal areas (and their 500m buffers). The rationale is that geographically close transactions should be more similar to the treated transactions. To avoid confounding effects of the renewal policy and the control group, the 500m buffer around the renewal areas is omitted.

### 3.3 Data and descriptive statistics

Berlin, Germany, in 2012 counted some 3.3 Mio inhabitants and about 1.9 Mio dwelling units. About 14% of the population are non-German citizens, and the unemployment rate was at about 13%. The overall area amount to some 892 square kilometers (344 square miles). The center is densely populated, the overall building structure is a mix of historic building (aged about 100-130 years), buildings put up after World War II to substitute for the destroyed building stock (age about 60 years) and newer buildings.

We observe all transactions of developed land that took place between January 1990 and August 2012, about 70,000 transactions. The data set includes price, transaction date, location, and a set of parameters describing building / plot characteristics and is obtained from the Committee of Valuation Experts Berlin 2012 (Gutachterausschuss Berlin). The building characteristics include floor space, plot area, surface area, land use, and location within a block of houses, among other variables. Additionally, we merge a set of distance measure including the distance of the transactions to the nearest public transport station, school, public park, lake or river, the central business district, and the nearest main street.

One of the potential bias of our results could be induced by gentrification, as this could lead to an upgrade of certain neighborhood, but should not be attributed to the policy. We thus control for proximity to urban consumption amenities by estimating a kernel density smoothed surface based on the location of bars, restaurants, and bars in 2012 with a kernel radius of 2,000m and a quadratic kernel function (Silverman, 1986). The data stems from the open street map project.<sup>4</sup> The resulting kernel density smoothed surface is displayed in Figure 1.

The boundaries of the renewal have been integrated into a GIS framework based on maps obtained from the Berlin Senate Department. The 22 renewal areas have an average size of about 0.37 square kilometers (median 0.35), while the investigation areas have an average area of 0.43 square kilometers (median 0.36).

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<sup>4</sup> [www.openstreetmap.org](http://www.openstreetmap.org)

Table 2 displays descriptive statistics comparing the renewal areas, the investigation areas, and the rest of Berlin. While the former are relatively similar, the structural differences to the latter are substantial. This reflects the importance of the appropriate control group selection.

**Table 2 Comparative Statistics**

	Renewal areas	Invest. areas	Berlin (total)
Price [€, CPI adjusted]	1,166,478.7 (1,614,568)	1,320,897.2 (1,553,772.5) [-9.564]	994,908.1 (2,711,511.8) [10.626]
Building age	100.8 (21.9)	95.29 (25.77) [25.160]	63.19 (36.64) [171.735]
Condition good [%]	10.3 (30.4)	8.24 (27.5) [6.776]	21.8 (41.3) [-37.829]
Condition bad [%]	42 (49.4)	28.2 (45) [27.935]	14.7 (35.4) [55.263]
Floor space index (floor space / lot size)	2.664 (0.998)	2.707 (1.238) [-4.309]	1.214 (1.292) [145.291]
Lot size	863.7 (923.8)	919.4 (978.8) [-6.029]	1040.1 (2746.7) [-19.095]
Share of non-German population [%]	13.7 (7.21)	20.6 (15.1) [-95.700]	10.7 (12.1) [41.609]
Single family home [%]	0.387 (6.21)	3.16 (17.5) [-44.654]	46.5 (49.9) [-742.560]
Apartment building [%]	33.9 (47.3)	40.5 (49.1) [-13.953]	20.2 (40.2) [28.964]
Mixed use building [%]	59.1 (49.2)	48.7 (50) [21.138]	20.4 (40.3) [78.659]
Commercial use building [%]	2.81 (16.5)	1.76 (13.2) [6.364]	1.65 (12.7) [7.030]

Notes: Prices are in 2012 Euros. Standard deviations in parentheses. The percentage standardized bias [in brackets] is the difference between the means of the treated group and a control group normalized by the standard deviation of the treated group.

## 4 Results

Table 3 summarizes the results of a series of regressions estimating the effect of the urban renewal policy on property prices separately per area. The effects compare the

price increase in the respective renewal area with the price development in the investigation areas. To avoid confounding effects, all transaction inside other renewal areas have been omitted from the estimation.

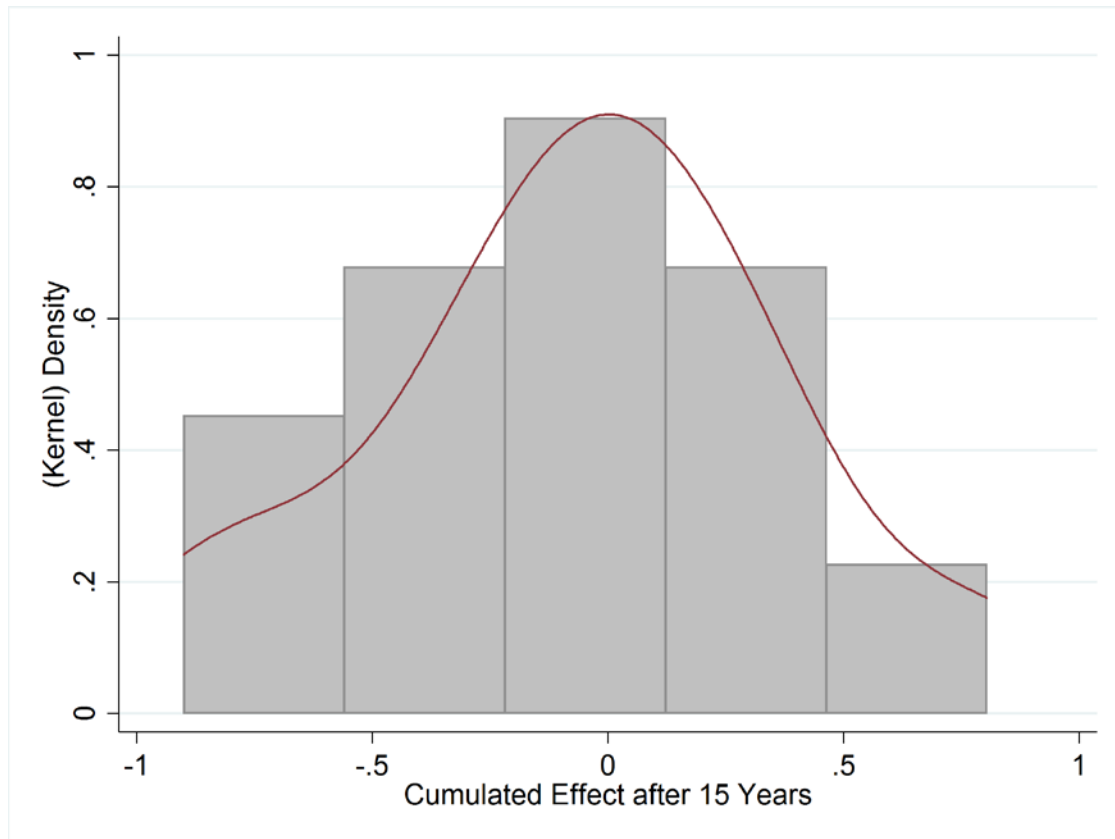
To keep the presentation short we restrict ourselves to the cumulated level shift after 15 years. Additionally, we report the implied yearly appreciation rate, the point estimate, the t-statistic, as well as the size of the employed subsample. The results display considerable treatment heterogeneity. While many of the estimates show a substantial price increase, there are several areas which report price decreases due to the policy. Figure 3 illustrates the distribution of the effects. While the effect is centered on zero, the treatment heterogeneity is clearly visible.

**Table 3 Renewal Area Effects – Investigation Areas**

Area	Cumulated Change (%)	Appreciation Rate (%)	Coefficient	t-statistic	Observations (Subsample)
Helmholtzplatz	62.139%	4.143%	0.483***	2.852	1415
Spandauer Vorstadt	204.567%	13.638%	1.114***	12.904	1349
Kollwitzplatz	88.419%	5.895%	0.634***	5.027	1361
Samariterviertel	35.486%	2.366%	0.304***	3.362	1327
Altstadt Kiez Vorstadt	-21.147%	-1.410%	-0.238***	-3.012	1271
Niederschöne weide	-24.071%	-1.605%	-0.275***	-3.344	1243
Teutoburger Platz	60.527%	4.035%	0.473***	4.044	1343
Winsstrasse	54.196%	3.613%	0.433**	2.539	1369
Warschauer Strasse	18.920%	1.261%	0.173	0.862	1331
Komponistenviertel	20.232%	1.349%	0.184*	1.907	1343
Traveplatz Ostkreuz	65.655%	4.377%	0.505***	5.346	1297
Wollankstrasse	38.122%	2.541%	0.323***	3.493	1319
Beusselstrasse	-46.926%	-3.128%	-0.633***	-8.085	1253
Rosenthaler Vorstadt	108.309%	7.221%	0.734***	13.270	1347
Kaskelstrasse	16.887%	1.126%	0.156**	2.737	1319
Weitlingstrasse	-2.077%	-0.138%	-0.021	-0.126	1343
Wederstrasse	-57.981%	-3.865%	-0.867***	-4.914	1235
Boetzowstrasse	89.174%	5.945%	0.637***	7.376	1331
Oberschöne weide	30.157%	2.010%	0.264***	3.351	1305
Stephankiez	0.188%	0.013%	0.002	0.035	1259
Soldiner Strasse	68.945%	4.596%	0.524***	4.460	1197
Kottbusser Damm Ost	11.165%	0.744%	0.106	0.701	1205
Average	37.313%	2.488%	-	-	1307

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We only report the cumulated level shift after 15 years, usual controls are included. The last column displays the number of observations included in each regression, including treatment and control group.

**Figure 3 Cumulated Areas Specific Effects after 15 Years**

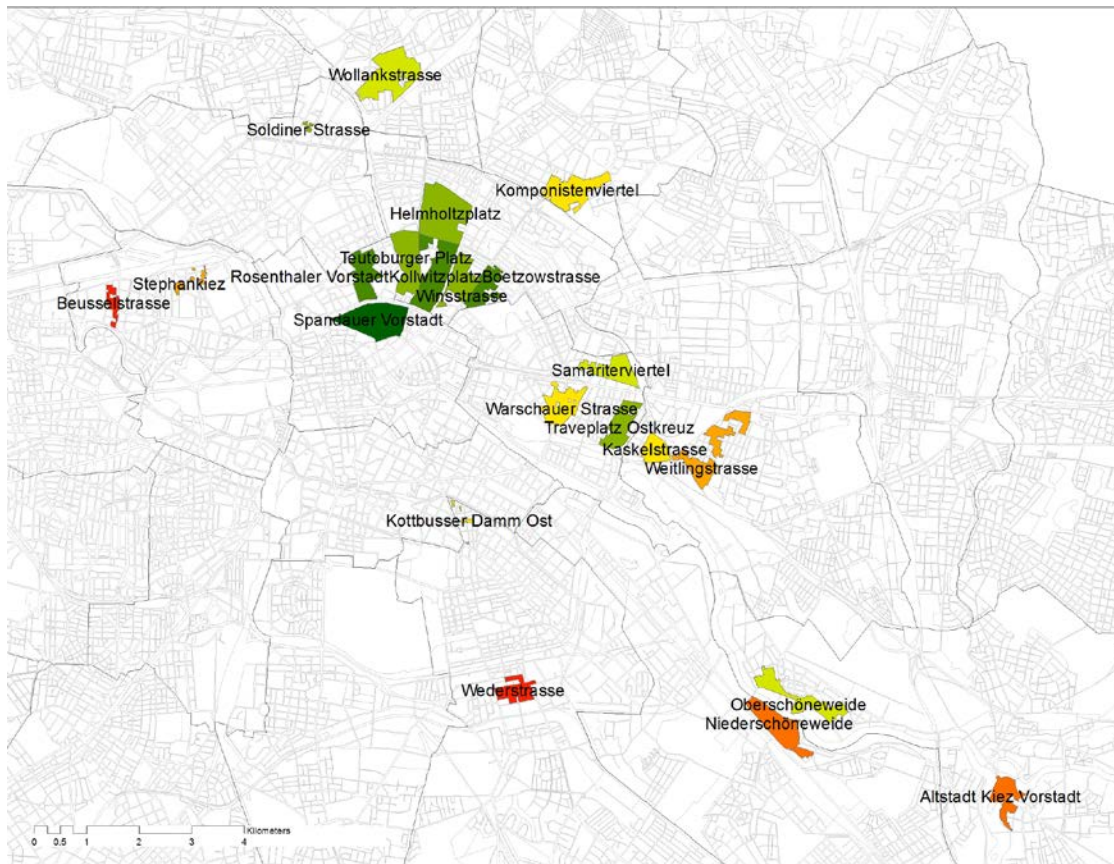


Notes: Graphs show the distribution of cumulated treatment effects by areas. The bars plot the frequency of occurring cumulated effects. The red lines plot the kernel density using a Gaussian kernel.

Figure 4 displays the geography of the effect distribution in Berlin. It displays the magnitude of the estimated effect over the various renewal areas. Areas shaded in green have experienced a strong increase in price levels due to the policy, while areas shaded in red have experienced a decrease. Yellow marks areas where the 15 year cumulated effect has been rather neutral.



**Figure 4 Renewal Winners and Losers, Control Group Excluding 500 Meter Buffer**



Notes: Own illustration based on the urban and environmental information system (Senatsverwaltung für Stadtentwicklung Berlin, 2006). The transition from green over yellow to red reflects the transition from large positive, over neutral, to strong negative price effects.

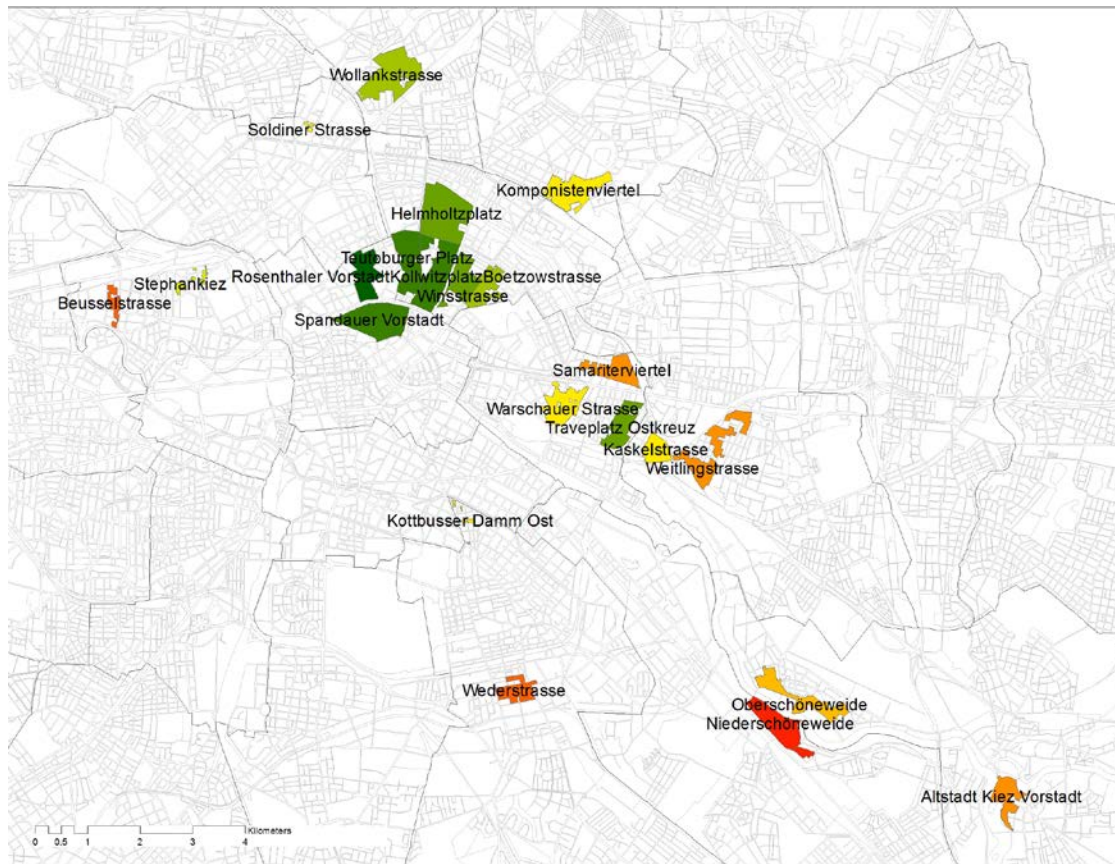
Table 4 and Figure 5 replicate the analysis for the second control group, i.e. transactions in a 500m to 3000m buffer around the respective renewal area. The table displays the effects of separate regressions for every renewal area. As the renewal areas Soldiner Straße and Kottbusser Damm Ost are relatively small, we have only a limited amount of treated observations (after the 15 years & inside the respective renewal area) and have to omit these areas due to lack of degrees of freedom. Generally, the effects from this robustness exercise point into a similar direction as the results from Table 3. This indicates that the investigation areas are indeed an appropriate control group.

**Table 4 Renewal Area Effects – 500m to 3000m Buffer**

Area	Cumulated Change (%)	Appreciation Rate (%)	Coefficient	t-statistic	Observations (Subsample)
Helmholtzplatz	40.32%	2.688%	0.339	0.909	521
Spandauer Vorstadt	121.36%	8.091%	0.795***	4.968	609
Kollwitzplatz	74.84%	4.989%	0.559***	2.773	588
Samariterviertel	-11.96%	-0.797%	-0.127	-0.504	483
Altstadt Kiez Vorstadt	-12.70%	-0.847%	-0.136	-1.407	603
Niederschöneweide	-55.24%	-3.683%	-0.804***	-4.918	503
Teutoburger Platz	81.80%	5.453%	0.598	1.250	584
Winsstrasse	56.27%	3.751%	0.446***	2.796	414
Warschauer Strasse	2.40%	0.160%	0.024	0.108	548
Komponistenviertel	0.12%	0.008%	0.001	0.006	552
Traveplatz Ostkreuz	44.00%	2.933%	0.365**	2.503	484
Wollankstrasse	27.09%	1.806%	0.240*	1.826	709
Beusselstrasse	-27.12%	-1.808%	-0.316**	-2.704	453
Rosenthaler Vorstadt	359.54%	23.969%	1.525***	5.501	575
Kaskelstrasse	3.97%	0.265%	0.039	0.362	413
Weitlingstrasse	-17.77%	-1.185%	-0.196	-1.680	462
Wederstrasse	-40.02%	-2.668%	-0.511*	-1.934	591
Boetzowstrasse	25.81%	1.721%	0.230*	1.766	374
Oberschöneweide	-6.49%	-0.433%	-0.067	-0.300	546
Stephankiez	23.58%	1.572%	0.212**	2.340	477
Soldiner Strasse	-	-	-	-	-
Kottbusser Damm Ost	-	-	-	-	-
Average	34.490%	2.299%	-	-	524

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We only report the cumulated level shift after 15 years, usual controls are included. The last column displays the number of observations included in each regression, including treatment and control group. Due to lack of treated observations, we exclude the renewal areas 21 and 22.

**Figure 5 Renewal Winners and Losers, Control Group Excluding 3000 Meter Buffer**



Notes: Own illustration based on the urban and environmental information system (Senatsverwaltung für Stadtentwicklung Berlin, 2006). The transition from green over yellow to red reflects the transition from large positive, over neutral, to strong negative price effects..

Our findings are less favourable than the findings of some other studies, for example the study of Richmond, USA (Rossi-Hansberg et al., 2010). A first difference may be found in the target of the two programs. Typically, the population in Berlin, consisting (consisting of some 85% tenants) is shy against revaluations. Any Berlin renewal policy thus faces a trade-off between renewing and limiting price increases. Second, in most renewal Berlin areas landlords are absent inducing them to spend less on maintenance than owner-occupiers (Galster, 1983). Similarly, owner-occupiers have been demonstrated to invest more in social capital (DiPasquale and Glaeser, 1999; Hilber, 2010) and tend to use neighborhood policies as a framework to coordinate their behavior to internalize externalities, as such, they may also be more receptive to renovation subsidies. Also the Richmond program was based more on community

volunteering and local nonprofit organizations, while Berlin adopted a top-down approach implemented by official state authorities. A within-neighborhood contagion effect (Towe and Lawley, 2013) in renovation activity is, thus, less likely in Berlin. Finally, the program of Richmond was a much smaller size, of some \$14 Mio; the large discrepancy in the findings for Richmond and Berlin may be explained by the law of diminishing returns.

Our results are in line with other previous analyses that have found moderate and ambiguous effects of similar renewal policies (Ding et al., 2000; Santiago et al., 2001), suggesting that the very positive policy effect found by Rossi-Hansberg et al. are likely specific to the case of Richmond, Virginia.

Concerning the heterogeneity of the renewal effects on wealth among the renewal areas, it is apparent that – although the small number of renewal areas in the former west of Berlin complicates a comparison – the renewal areas in the east tend to show larger price impacts. This may be due the different starting (price) levels between east and west. The eastern areas were among the most degenerated prior to the policy measure and were essentially cutoff prior to the reunification. It may be possible that we also witness a gentrification or catching-up effect which we cannot separate completely from potential policy effects.

Second, most of the areas with positive price impacts lie within or in direct proximity to the district Mitte. This area comprises the historical, political, scientific, and cultural city center. Also it is one of the primary recreational centers. Furthermore, the district is naturally well connected to the transit network and was adjacent to the inner German border. The area is, therefore, a suitable candidate for gentrification. The fact that the response to the policy was particularly large in these areas indicates that renewal policies were particularly successful in areas with attractive fundamental location factors (e.g. accessibility, natural or cultural amenities), and less so in areas that are structurally disadvantaged. Third, the heterogeneity may be due the different ambitions and qualities of the local population as well as the responsible local managers of the different renewal areas.

## 5 Conclusion

Urban renewal programs have become widely used policy measures to address urban development. There exist quite a few ex-post studies which aim to evaluate the aggregated effects of such policies on the target areas. Less is known, however, about the reasons why certain areas are more / less responsive to external stimuli.

With this study we address some of these issues. We analyze an urban renewal program in Berlin, Germany, with 22 designated renewal zones between 1990 and 2012. Renovations / buildings upgrades in these zones were eligible for public funding through tax abatements, subsidies, and other financial support. Additionally, the public space in these areas was substantially upgraded. This includes the building of roads and squares, schools, playgrounds, and sanitary improvements.

We separately estimate the effects of the renewal policy on property prices for each respective redevelopment area by comparing price developments in these areas to two control groups. The first control group consists of so areas deemed suitable as urban renewal areas, which were ultimately not designated. The second control group is a straight forward geographical restriction: we compare price developments in the renewal areas to all transactions in a 500m to 3000m buffer around the respective renewal area.

We find a considerable amount of treatment heterogeneity. While for some renewal areas the assessment in this evaluation is positive, there are in both specifications several areas which develop quite differently and end up with a decrease in policy prices due to the urban renewal policy. Graphical analyses show, that the strongest price increases occur in the most central areas in the former eastern part of Berlin. As these areas were among the most degenerated prior to the policy measure, it is possible that the policy was most effective in these areas. However, as these areas were essentially cutoff prior to the reunification, we could also witness a gentrification or catching-up effect which we cannot separate completely from potential policy effects.

To obtain a deeper understanding of the reasons for this heterogeneity in responsiveness to the policy, an even more concentrated qualitative approach would be

necessary. It is, however, safe to say, that a one-fits-all solution seems not appropriate for a policy topic which includes such a complex mix of incentives and socio-demographic structures as urban redevelopment. Until we have a better understanding why certain areas underperform so drastically compared to the average, a careful individual assessment of the policy targets and involved stakeholders seems necessary.

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