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# Gentrification through Green Regeneration? Analyzing the Interaction between Inner-City Green Space Development and Neighborhood Change in the Context of Regrowth: The Case of Lene-Voigt-Park in Leipzig, Eastern Germany

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Received: 4 November 2019; Accepted: 13 January 2020; Published: 16 January 2020



**Abstract:** Green regeneration has become a common strategy for improving quality of life in disadvantaged neighborhoods in shrinking cities. The role and function of new green spaces may change, however, when cities experience new growth. Set against this context, this paper analyzes a case study, the Lene-Voigt-Park in Leipzig, which was established on a former brownfield site. Using a combination of methods which include an analysis of housing advertisements and interviews, the paper explores the changing role of the park in the context of urban regeneration after the city's turn from shrinkage towards new growth. It discusses whether the concept of green gentrification may help to explain this role. As a result of our analysis, we argue that Lene-Voigt-Park has indeed operated as a trigger for structural, social, and symbolic upgrades in the growing city of Leipzig, but only in combination with real estate market developments, which are the main drivers of change. The concept of green gentrification does help to better understand the role of different factors—first and foremost that of green space. We also discovered some specifics of our case that may enrich the green gentrification debate. Leipzig serves as an example for a number of regrowing cities across Europe where green gentrification might represent a challenge.

**Keywords:** green gentrification; regeneration; urban green space; neighborhood change; housing market; regrowth; Leipzig

## 1. Introduction

Following a period of massive shrinkage in the 1990s and having faced a subsequent outflow of people and housing vacancies, larger cities in eastern Germany (e.g., Leipzig, Dresden, Potsdam) have seen new growth since around the year 2000. In the period of shrinkage, including the first years after shrinkage had stopped, several regeneration measures aimed at improving quality of life [1] had been introduced and financed by large-scale state funding programs such as Stadtumbau Ost (Urban Restructuring East). Since 2001, Leipzig has witnessed the physical regeneration of housing areas, improvement of streetscapes and urban green spaces, as well as the reuse of vacant lots [2]. In this context, the reuse of urban brownfields and demolished former industrial and residential buildings made the expansion of urban greenery a key measure in sustainable urban and neighborhood planning [3].

The city of Leipzig is an outstanding example for urban regrowth. In the last ten years, Leipzig has been hyped as a great place to work, study, and live, and the city was even nicknamed “Hypezig”. New growth can be observed throughout the city, but especially in districts with Wilhelminian-style buildings<sup>1</sup> which were previously rundown and unrenovated, and where urban development funding plays an important role [4,5]. Presently, these districts are characterized by a housing market saturation, exclusive building projects, and rising apartment rents. Reudnitz-Thonberg, one such district in the eastern part of the city, is home to the Lene-Voigt-Park (hereinafter abbreviated as LVP). The park was created on a former railway industrial area during the post-shrinkage period around the year 2000, when housing vacancy was high. The aim was to encourage residents not to move away and to improve the quality of life in the neighborhood. Since then population growth, socio-structural dynamics within and between districts, rising apartment rents, and the city’s improved image have made gentrification an increasingly hot topic in Leipzig.

Neighborhoods experiencing such structural, social, and symbolic upgrading, which results in residents being forced to move away, are referred to as gentrified [6]. Yet the fundamental determinants that cause or trigger gentrification have not yet been identified, hence gentrification is considered a process that can take various forms. The green gentrification<sup>2</sup> discourse, which emerged more recently, analyzes the link between sustainable urban planning and “green urban developments”, and their effects on the housing market as well as their social implications (renovations, rising rents, displacement, segregation). Urban upgrading by establishing new green or blue qualities (e.g., a high-quality, planned green space or waterfront) leads to the displacement of low-income residents, because richer households move to these newly developed areas (for an initial study see [7]).

The aim of this paper is to examine the role of urban green spaces for gentrification in the context of new growth after shrinkage and urban regeneration, using Lene-Voigt-Park (LVP) in Leipzig as a case study. We discuss whether LVP might have operated as a trigger of residential change and displacement under the new conditions of growth since 2010 and if, consequently, evidence for green gentrification can be found. Moreover, we examine the extent to which this approach can be used to analyze similar cases. Our pivotal question is: What role does green space development play in a context of urban regeneration, when a city is experiencing new growth after shrinkage? Can the concept of green gentrification help to explain this role?

The paper is structured as follows: After the introduction, Section 2 expands on the debates about greening, regeneration, and green gentrification in the specific context of shrinking and regrowing cities. Section 3 introduces Leipzig and particularly Leipzig’s inner east and LVP as a case study, and describes the methods used for the study. Section 4 presents the key results, which are discussed in Section 5 in relation to the research question and the debates introduced in Section 2. We finish with some concluding remarks in Section 6.

## 2. Interrogating Debates: Greening, Regeneration, and Green Gentrification in the Context of Urban Shrinkage and Regrowth

In this section, we cross-reference debates on urban regeneration, greening (policies) and green gentrification. The first part briefly describes urban development in eastern Germany since the early 1990s with special attention to the role of greening (policies) and the general debate on gentrification. In the second part, we introduce the arguments of the green gentrification debate that look critically at interactions between “green regeneration” and the (re)production of socio-spatial inequalities and inequities. We focus on processes in cities that have turned shrinkage towards regrowth.

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<sup>1</sup> Wilhelminian-style building stock means buildings erected in the period between the 1870 and 1914.

<sup>2</sup> In this study, which focuses on greening (strategies) and urban green spaces, we find the term “green gentrification” to be the most appropriate, but use it in line with other terms such as eco-/ecological gentrification and environmental gentrification.

### 2.1. Greening Strategies in the Context of Shrinkage and Regrowth

Many cities in eastern Germany experienced a period of shrinkage after the fall of the Berlin Wall and German Reunification in 1989/90. Large cities like Dresden and Leipzig were characterized by unemployment, out-migration, decay, and vacancy of buildings. Particularly inner-city neighborhoods with Wilhelminian architecture suffered a loss of function and value [8]. Following a huge wave of out-migration to western German cities, suburbanization became the second major reason for people to leave eastern cities in 1996/97, as the suburbs promised a better quality of life for many families.

City authorities were faced with the challenge of successfully transforming brownfields and derelict areas into green spaces with a positive appearance and social functions, given that vacancy and abandoned spaces can easily be associated with decline and a lack of prospects. Integrating the development of urban green areas into the comprehensive set of urban development support and funding programs (from municipality to EU level), cities took the opportunity to restructure neighborhoods and promote less dense residential areas with newly designed green spaces (cf. e.g., [9,10]). However, due to modernization, new building projects and persistent suburbanization, the vacancy rates often still exceeded 20% in the city centers (cf. e.g., [11]).

In around 2000, urban shrinkage changed (first moderately, from 2010 onwards more dynamically) to urban regrowth with the beginning of a new population influx to inner-city districts prompted by attractive, newly renovated housing stock and increased green space. This has pushed forward revitalization processes also in the areas with high vacancy rates [12]. Reurbanization describes the renewed in-migration of various household types and their lifestyles to the city centers, including their intention to stay (cf. [2,13,14]). Green spaces have played an important role in this process, as they have contributed to the revaluation of many neighborhoods. Projects on a local scale that are aimed at improving the living conditions in disadvantaged neighborhoods are particularly useful for improving the image of residential areas, if not entire districts (cf. e.g., [15–17]). In Leipzig, the long-term establishment of green spaces is considered a key measure in the regeneration process, as building stock redevelopment increased at the edges of large and attractive green spaces [16].

The benefits humans derive from urban green spaces are well documented and beyond question (cf. e.g., [18–20]), as access to and use of urban green spaces is crucial for people's wellbeing and both physical and mental health [21,22]. Consequently, greening has become increasingly important as a strategy to improve quality of life and sustainability of cities throughout the last decades. Hence, in the real estate sector, green spaces act as a soft location factor, potentially increasing the value of nearby properties. While establishing new green spaces during urban shrinkage can help cities avoid total decline, in times of regrowth, green spaces can contribute to gentrification processes. Starting with the in-migration of so-called "pioneers"—mostly artists and students taking advantage of available and cheap space—such neighborhoods soon develop further, showing the typical features of a gentrification process, such as changes of building stock, apartment rents, and residents, as well as a functional and image change (cf. [23,24]).

Such developments can be observed in regrowing eastern German cities. There are a few main differences to the gentrification that has taken place in steadily growing western German cities, like Munich or Hamburg. In the east, home ownership has not increased very much, rental costs long stayed at a relatively low level, and people have still had relatively great freedom of choice while looking for their preferred neighborhood [25]. The displacement of residents has not been a typical characteristic of this development [26], implying that in-migration to neighborhoods has been driven by housing preferences and the image of the different areas rather than by rental costs (ibid.). However, since around 2010, dynamic growth has been taking place in some large East German cities—upgrading now includes high-end renovations and new upmarket constructions as well [27]. At the same time, the concept of gentrification attracted more attention in public debate and scientific discourse [28], and led to the eastern German development being called "new-build gentrification" (i.e., a process that contributes to a small but distinctive segment of the housing market [29]). It is also referred to as "soft gentrification", which emphasizes the slow speed of the development process [30].

Ongoing in-migration during a housing shortage results in competing land use claims. Consequently, green spaces often have to make space for new construction and building density increases again. Diminishing urban green increases the value of remaining or newly developed individual green spaces. As a result, this leads to an extra boost in value for the residential areas near those spaces, which in turn leads to higher rental costs.

According to Marcuse [31], exclusionary displacement is the consequence of high rents that do not allow poorer households to move to a certain area. This indirect displacement, combined with direct displacement (when residents are forced to move out), results in (higher) segregation within the city. This segregation is partly a reflection of the (lack of) high-quality green space: While better-off households often live in areas with a good provision of urban green spaces, poorer households more often live in densely built areas with a worse or even under-provision of urban green (cf. e.g., [32,33]). Due to this insufficient supply, the accessibility and quality of remaining green spaces are of major importance. Generally, a spatially uneven distribution of green spaces is an effect of limited development regulations, and the basis for the question of environmental justice.

## *2.2. Green Gentrification: A Critical Perspective on the Impacts of Green Urban Regeneration*

Greening under market conditions may cause negative effects on housing costs and lead to a (re)production of inequalities and injustices. The value-adding impact of green spaces on real estate objects is provable in an economic sense, as shown by several studies (cf. e.g., [34,35]). Depending on their function and amenities, green spaces may increase the standard ground value up to 20% [34]. Generally, the awareness of this interaction between greening and real estate development, and resulting social injustices, has slowly been increasing within recent years (e.g., [36–38]). This is supported by a recent study by Rigolon and Németh [39] that investigated predictors for gentrification using the example of parks in US cities: It has shown that both function and location of parks are good predictors, whereas size is not.

In this vein, the concept of green gentrification emerged in the scientific discourse; this approach is used to critically assess the impacts of neighborhood upgrading due to urban green, which results in the displacement of economically vulnerable people as stated by one of the inaugural papers by Dooling in 2009 [7]. Later works also describe green gentrification as a strategy to upgrade neighborhoods and taking into account displacement if not intending it (cf. e.g., [40]). Generally, green spaces can operate as triggers for gentrification in different ways. Either they unintentionally lead to an increase in property prices and housing costs, because property owners and real estate agents regard them as a factor that increases property value, or they are intentionally implemented for economic gains that benefit high-income households, regardless of the consequence that low-income residents are excluded from the advantages of newly designed greenery (cf. e.g., [7,41,42]). Checker ([43], p. 212) explains this targeted strategy as follows: “Operating under the seemingly a-political rubric of sustainability, environmental gentrification builds on the material and discursive successes of the urban environmental justice movement and appropriates them to serve high-end redevelopment that displaces low-income residents”. This means that the development is technically profit-oriented and disregards the social dimension of sustainability, (re)producing social inequality (cf. e.g., [44–46]).

Green gentrification is regarded as related to greening strategies in the context of urban renewal and sustainability initiatives in the neoliberal era [47], or to the revitalization of old industrial brownfield sites [48,49] which is especially important for (post)industrial cities such as Leipzig. Expressions such as “cleaning up and clearing out” [50] and “from toxic wreck to crunchy chic” [51] highlight the exclusive character of the newly developed green spaces and the surrounding residential areas. Gould and Lewis [40] describe it as the transformation of a low-value environmental site with potential into a high-value environmental site, which is followed by a population shift. Curran and Hamilton [45], as well as Wolch et al. [52], ask when a neighborhood is “just green enough” to mitigate or avoid effects like rising housing costs and displacement, but still provide good quality of life. “Just green enough”-approaches represent a means in which to tackle the seemingly

omnipresent logics of improvement of residential quality (here: through greening) and the unavoidable concurrent increase in prices and rents and related social consequences (here: direct or indirect displacement) [42,46,53]. Especially endangered by potential gentrification are neighborhoods in good location with multi-functional green spaces—caused by either greening or by the conditions of context change (e.g., through a change from supply to demand-driven housing markets) as is the case in many regrowing cities.

Different solutions have been proposed to address the negative outcomes of greening strategies. They have a clear focus on incentives designed to regulate housing market dynamics. Profit-oriented development is to be restricted, for instance by means of social housing programs or rent control (cf. e.g., [43,54]). Another approach appeals to the residents, who are encouraged to oppose high-end redevelopment and enforce small-scale greening initiatives in the form of a bottom-up or grassroots movement (cf. e.g., [55,56]). Urban gardening is one example of such a “just green enough” strategy that involves civic participation, thus accounting for the real needs of the residents [57], although other scholars question whether bottom-up greening strategies can actually prevent gentrification as long as they happen under market conditions [40]. Other studies analyze the conflicting interests of local actors when it comes to greening with an unequal distribution of benefits and losses at the neighborhood scale [58]. There are a growing number of studies dealing with marginalization and exclusion related to greening projects, including strategies aimed at contesting or resisting gentrification (cf. e.g., [59,60]). However, studies that look at greening from the perspective of housing market development and gentrification theory are so far exceptions (e.g., Holm [53] who calls green gentrification the “ecology of upgrading”).

### 3. Case Study, Materials, and Methods

#### 3.1. Leipzig: The Shift from Shrinkage Towards New Growth

We have chosen to focus on the German city of Leipzig as it is one of the most prominent examples of urban shrinkage and regrowth across Germany and Europe, and exemplifies a larger group of cities with similar development pathways and features. Leipzig was recently dubbed a “city of extremes” [28], as the city went from massive shrinkage towards dynamic regrowth in only 20 years [61].

The city’s period of severe shrinkage started in the 1960s but saw its most dramatic phase in the 1990s when the city lost about 20% of its inhabitants (approximately 100,000 people) in only 10 years [62]. At that time, this exodus not only led to massive job losses and high unemployment rates, but also to high rates of vacant housing and a lot of abandoned space throughout the city. Greening these places to improve the quality of life in the residential areas, therefore, became a key strategy for counteracting shrinkage [1]. Greening strategies operated together with the demolition of surplus housing. They included the creation of new green spaces such as parks and urban gardens and the expansion of existing ones, interim greening (particularly in those areas that were unlikely to be rebuilt in the near future), new street greenery, and the refurbishment of urban waterways [1,63]. At the same time, Leipzig’s housing market was characterized by high vacancy rates, which were highest in built-up, inner-city areas with Wilhelminian architecture; the socio-spatial segregation patterns re-configured after the first half of the 1990s [64].

When shrinkage came to a halt around the year 2000, Leipzig had approximately 70,000 vacant apartments and 3000 brownfield sites [62]. During the 2000s, Leipzig experienced reurbanization [13], mostly in the inner city, decreasing vacancy rates and modest annual gains in population numbers (2000–4000 people). From 2010 onwards, the city entered a new phase of dynamic regrowth, leading to a population increase of almost 100,000 by 2018 with growth rates of more than 2% per year [5]. This growth was facilitated by new, large-scale investments by major corporations such as the Deutsche Post DHL Group, BMW, and Porsche, and the creation of over 70,000 new jobs in the industrial and service sector since the mid-2000s. Investment in housing renovations, new construction, and urban land in good locations increased. This has not only encouraged (young) people to come to Leipzig,

but also to stay and to start families. Unemployment rates have fallen from 18% in 2003 to 6% in 2018. As a consequence, housing vacancies quickly decreased to less than 4% overall and 2% of the housing available on the market by the end of 2016 [27]. Both the number of transactions and the amounts of turnover in the real estate market have been continuously increasing since 2010; the same applies to real estate prices and rents for new buildings and existing stock [65]. The supply of low-cost housing has dramatically decreased and does not correspond with the rising demand (ibid.). Given this context, housing construction, which was marginal before 2010, has experienced a new boom, and the pressure on vacant land has been increasing. Inner-city areas have seen a dynamic re-densification, and urban land prices have skyrocketed in some areas [27]. Patterns of segregation reported for the 2000s have consolidated, but the levels have considerably increased [27,61]. Between 2013 and 2017, the average net rent increased by 10.6% in Leipzig—with rents of new contracts increasing up to 25%. Looking at flat sales, the market for owner-occupied housing is dominated by purchases of renovated built-up flats [66]. While 29% of those flats had been sold in first sale, 71% had been sold in resale. Ninety-five percent of those having been sold in first sale were purchased by people coming from outside Leipzig [67].

In line with the “shift in thinking from shrinkage to growth”, the city adapted its development strategies to the new conditions of growth, and new green space strategies were set up [5,68]). City authorities focused on the construction of housing and infrastructure, and on questions of how to maintain existing green spaces and to create new ones under the prevailing conditions. The issues of socially responsible living and housing conditions and social cohesion have also received increased attention. In reality, green and open spaces in inner-city areas have been under increasing pressure; some have already disappeared and been replaced by new constructions. This is not only true for private properties, but also for public properties that had been developed as interim green spaces or abandoned after 1989.

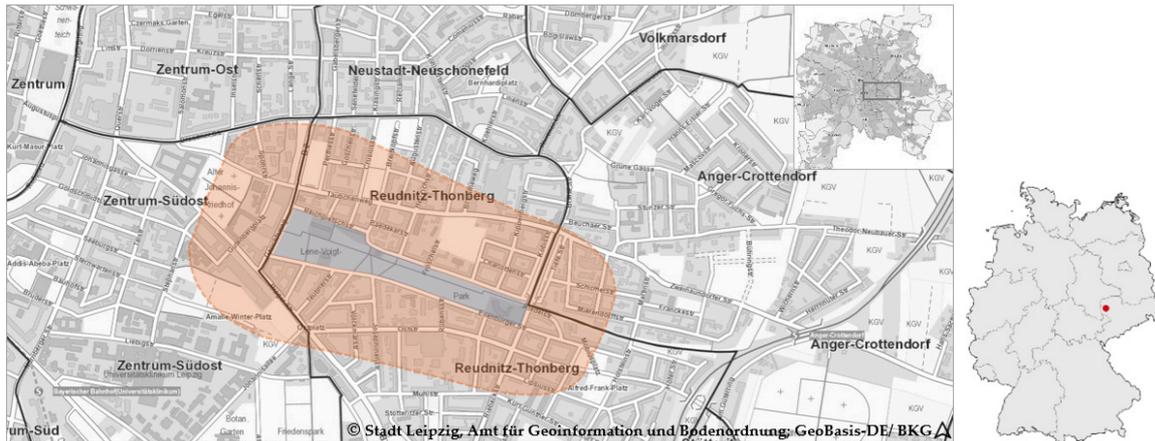
### 3.2. *Lene-Voigt-Park in Leipzig*

After 1990, Leipzig’s eastern districts of Reudnitz-Thonberg and Anger-Crottendorf (cf. Figure 1) were not very popular among residents, as they were known for having urban development deficiencies, highly polluted residential areas, housing vacancies, traditionally weak social structures, and a lack of attractive open spaces. Consequently, the districts remained focus areas of urban development funding in the 2000s [69]. This situation has changed: With the inner-city reurbanization in the 2000s and the dynamic overall growth in the 2010s, the repopulation of Leipzig’s inner east recently turned into dynamic yearly growth. At the beginning of the 2000s, when LVP was being established, the area experienced a coexistence of vacancies, cheap rents, refurbished buildings, and flows of incoming and outgoing residents. In other words: Leipzig’s inner east faced a lot of challenges, but also experienced an incipient upswing and grew in popularity as a destination for mostly younger households ([13,70]).

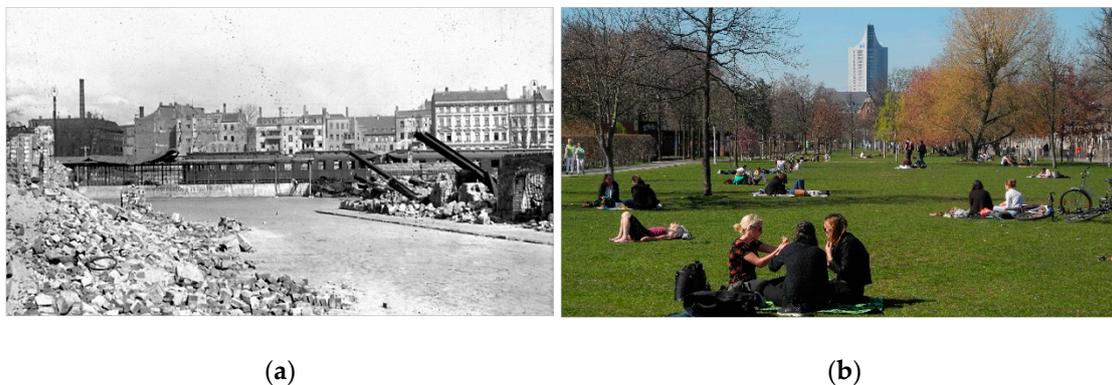
The overlapping of multiple measures for urban renewal, and structural funding aimed at combatting economic, ecological, climatic, demographic, and social disadvantages in those neighborhoods, has significantly contributed to this upward trend. In the formally defined Leipzig-Reudnitz redevelopment area (Sanierungsgebiet), 79% of the public spaces were being rehabilitated and 73% of the properties were either completely new or modernized [71]. The creation of LVP in the former Eilenburger Bahnhof area (cf. Figure 2) was one of the first development goals completed in the eastern districts. Due to these kinds of successes, the redevelopment area is now set to be repealed.

After a long participatory process, LVP was inaugurated in 2001 and its establishment finalized in 2004. Due to its varied usage structure with sport and relaxation areas, the park is able to meet the different needs of its visitors. At 800 m in length and 80 to 130 m wide, the park is located in the middle of Reudnitz (see Figure 1), but also forms a green axis from the city center into the landscape of the city’s surrounding area. This connecting function will become even more important once LVP is further developed as part of the Parkbogen Ost concept: An approximately five-kilometer-long

pedestrian and bicycle path is to be created along former railway lines through green spaces that connect the city districts. The path will lead from the central station through eastern Leipzig and back to the city center. The project is intended to provide further impetus for the revaluation of the residential and business districts of Leipzig East and is part of the district-based regeneration strategy STEK LeO 2013 [70] and the city-wide masterplans (SEKo 2009 [4], INSEK 2018 [5]), as well as other municipal concepts [73]. In 2017, the masterplan for Parkbogen Ost was approved by the city council. The original idea for Parkbogen Ost was driven by civic engagement and the project is also being developed with public participation.



**Figure 1.** Study area Lene-Voigt-Park (LVP; blue) with its surroundings as focus area (orange), district Reudnitz-Thonberg (City of Leipzig, Germany).



**Figure 2.** (a) The railway industrial area in Reudnitz [72] has been transformed into (b) the Lene-Voigt-Park (LVP) (Photo: Annegret Haase).

According to the Federal Office for Building and Regional Planning, “Leipzig East receives a new attraction through the transformation of the former railway station, which gives the district a new identity and a positive appearance. The project is an exemplary response to structural changes in the city” [74]. In fact, since LPV opened, new types of residents have been moving into the area, the housing market offers have evolved and Reudnitz is spoken about as a trendy district. Whereas in 2003 students and creatives were the most important newcomers, today especially the Lene-Voigt-Quartier north of LVP is dominated by economically and socially established households (mostly young families with average to above-average incomes). The building stock has been almost completely renovated and the vacancy rate fell to below 2% by as early as 2010. New construction projects are being implemented on an ongoing basis and increased ownership of property can also be observed [75].

### 3.3. Methods

The empirical analysis consists of complementary methods, each contributing to the characterization of the LVP neighborhood and the description of its development. As gentrification is a manifold process, and the effects of the LVP green space might only be one of its influencing factors, the case study required a thorough analysis of different variables in order to identify the role of LVP in this framework. Such factors might be changes of the residential population, the housing market and the neighborhood's image, as well as their interdependencies and mutual reinforcement. The methods and the variables are listed in Table 1, which also outlines the sources/ approaches and the rationale for using each particular method. The approach was exploratory and focused on the advantages of combining quantitative and qualitative methods (see Table 1). As this paper grew out of a bachelor's thesis submitted in 2017, it must be noted that some of the results were obtained in 2016/17. This refers to the interviews, the site visit, and the analysis of the housing advertisements in particular. Despite being slightly older, these results remain relevant as they simply reflect another stage in the gentrification process. We also included more recent data in the statistical analysis and elsewhere.

The LVP neighborhood in Reudnitz was our focus area, but the districts Reudnitz-Thonberg and Anger-Crottendorf were included as well, particularly because the latter is likely to gain relevance through the development of Parkbogen Ost. The statistical data (available at the district level only) were analyzed from the year 2000 onwards in order to identify whether the opening of LVP in 2004 influenced the development of the analyzed variables. The annual growth rate was therefore calculated for two periods, from 2000 to 2004 and from 2004 to 2017/18. The years had to be selected according to the given data base, so the periods were not always consistent. Applicable data from before 2000 was not available.

The interviews with key stakeholders (in the following marked by "Int." and the respective number) were conducted in January and February 2017. By asking people working in different fields (green space development, housing market, neighborhood development and civic society) we tried to draw a comprehensive picture of our case study. All interviewees had or still have extensive professional or stakeholder involvement with the development of LVP and its neighborhood, the respective political processes, as well as many years of insight into the social structure of the district Reudnitz-Thonberg. Each interview comprised around ten questions and took approximately 30 mi. First, all interviewees were asked to describe the neighborhood and its general development, later on with explicit reference to the establishment of LVP. The following questions referred to each interviewee's special field of expertise (cf. Table 1), focusing on (1) strategies and measures regarding urban regeneration, greening, and development goals, as well as conflicts from the municipality's perspective; (2) the planning process, functions and role of LVP in neighborhood changes; and (3) urban development across scales and the question of whether the (green) gentrification concept helps to explain the recent development in LVP's neighborhood. During the interviews, neither the questions nor the order of the questions were mandatory. This allowed to gain further insights into how the experts assess the role of LVP. In Section 4 some interview statements are cited in order to illustrate the narrative and to reflect the different perspectives. The interviews were very valuable, as the gentrification process can be very small-scale and/or start with a change in the way a neighborhood is perceived. In such cases, developments that are part of the process might only be visible in the statistical data later on. This highlights the importance of using complementary methods.

**Table 1.** Overview of the methods used in the case study (<sup>1</sup> Leipzig Informationssystem LIS: <https://statistik.leipzig.de/statdist/index.aspx>).

Method	Main Emphasis	Source/Approach	Rationale
<b>Literature and document analysis</b> (qualitative)	Revitalization, reurbanization, green gentrification	Technical literature	General understanding of the debates and their interlinkages
	Urban/neighborhood development, green space development, population development, housing market	City policy and planning documents (e.g., concepts which include development challenges, goals)	Evaluation of documents on strategies and developments in the city/ LVP area (e.g., renovations, upgrading, densification and greening), and their meaning in the context of the research question
	Urban growth, “Hypezig”, gentrification as addressed by society and the media	Newspaper and magazine archives	Media coverage of the debates and societal awareness; recognizing (future) challenges
<b>Secondary analysis of statistical data</b> (quantitative)	Total population, population movement, average age, unemployment, housing market, income and rent	Data from the Leipzig Office for Statistics and Elections (city and district data <sup>1</sup> , reports, citizen surveys): Calculation of total growth rates and average annual growth rates	Identification and evaluation of trends (before vs. after LVP opening) and interrelations of variables such as population movement/characteristics or rental prices and comparison to gentrification theory
	Rental price development	Online real estate portals, rent index	Analyzing housing market data in order to detect price trends and to assess and interpret the results of the housing advertisement analysis
<b>Analysis of housing advertisements</b> (quantitative, qualitative)	Price development and the role of LVP/urban green	GIS-based analysis of rental housing market advertisements on the online portal ImmobilienScout24 (300 m buffer around LVP, cf. Figure 1)	Evaluation of the role of green spaces/LVP for the value of apartments and its impact on rental prices and thus also for the gentrification process in general
<b>Site visit</b> (qualitative)	Characterization and image of the neighborhood	(Photo) documentation of the building stock quality, type of residents, gastronomy facilities (300 m buffer around LVP, cf. Figure 1)	Identification and exploration of structural, social and symbolic upgrading as signs for gentrification around LVP and comparison to such signs in the wider area
<b>Semi-structured interviews with experts</b> (qualitative)	Guidelines with focus on: 1. Urban planning/development 2. Park design and function 3. Urban research/impact analysis	Interviewees: Int.1 landscape architect, Int.2 city official (urban renewal and housing), Int.3 city official (urban green and water), Int.4 scientist (environmental economy), Int.5 scientist (urban sociology), Int.6 and Int.7 civic associations/locals	Interviews allow for in-depth exploration and an understanding of participants’ experiences and perceptions which is of major importance given the topic of gentrification and the role LVP plays in it. Interviewees were selected so as to cover a wide range of perspectives and expertise across different working fields.

The analysis of housing advertisements was limited to an area of no more than 300 m from the park boundaries, which is a figure commonly used to evaluate the area of pedestrian recreation around inner-city green spaces (cf. e.g., [3,76,77]). Online advertisements were viewed daily between 16 November and 16 December 2016. The analysis documented both the base rents (later given in average per m<sup>2</sup>) and any references to urban green or specifically to LVP as a significant benefit of the residential area. The rents were then compared to those listed on the real estate portal for Reudnitz-Thonberg, Anger-Crottendorf, and all of Leipzig. The analysis focused on rents (and not property prices), because the percentage of home ownership in the city is as low as 14% (Reudnitz-Thonberg: 5%; 2017) [78].

The results need to be handled with caution since the sample of the housing advertisements was rather limited in both the size and the time period of documentation. Nevertheless, it is a promising approach to identify the effects of green spaces on rental values, and to assess the role of green spaces, such as LVP, as a part of the gentrification process in the respective neighborhoods. The analysis of our sample showed a significant result (see Section 4.4), but it cannot simply be generalized. The same applies to the site visit and the analysis of statistical data, due to its limited availability in some cases. Considering the limitations of the single methods as well as the complexity of gentrification processes, the focus of our methodological approach was put on combining different, independent methods which support each other (method triangulation). Only this allowed for a thorough analysis (e.g., identifying the forms and causes of urban regeneration and upgrading by creating an overall picture of the case study), interpretation and validation of the results. The following section presents the key findings of the analyses.

#### 4. Results: Green Gentrification in the Context of Regrowth? The Case of Lene-Voigt-Park

##### 4.1. Population Growth and Population Change

Since 2002 there has been a continuous increase in the number of residents in Reudnitz-Thonberg. From the opening of LVP in 2004 to the year 2018, the average annual growth rate was 2.9%, whereas from 2000 to 2004 it was still as low as 0.1%. Looking at the migration dynamics only, it can be shown that from 2006 onwards, there is a clear upward trend of people moving to the district from outside Leipzig. The number of people in-migrating increased most between 2007 and 2012. In general, there is a noticeable trend of population growth caused by people moving to Leipzig from other cities, as well as an increase in the number of those people moving to the districts Reudnitz-Thonberg and Anger-Crottendorf. Reudnitz-Thonberg had a higher growth rate (157% from 2000 to 2017) than Anger-Crottendorf (127%) and Leipzig as a whole (70%)<sup>3</sup>. Leipzig's inner east had started to profit from migration as the last of all the areas with old building stock featuring Wilhelminian architecture in Leipzig, Int.5 says<sup>4</sup>. But the LVP neighborhood already profited from migration in the early and mid-2000s, when the park opened (ibid.).

This trend is accompanied by a significant decrease in the average age of the residents (from 41 years in 2000 to 37 years in 2018) and the unemployment rate (14.3% to 4.8%). During the same time, the average age across the whole city went from 43 years to 42 years and Leipzig's unemployment rate dropped from 12.4% to 5.4%. When considering the park opening in 2004, the trend for unemployment rates is particularly striking: From 2004 to 2017 the rates decreased by 10.1%, whereas from 2000 to 2004 it had still increased by 2.0%. For the whole period (2000–2017) this equates to a total decrease in unemployment of 66%. Two factors played an important role in attracting students to the area: The previously moderate rents and the fact that the park serves as a meeting point. Once the students have moved in, more and more of their friends follow, and that leads to changes in the community (Int.3). The site visit showed that besides the growing number of students, many young families can

<sup>3</sup> For the data sources used for these and all other calculations see Leipzig Informationssystem LIS: <https://statistik.leipzig.de/statdist/index.aspx> (see also chapter methods, Table 1).

<sup>4</sup> All interview quotes are translated by the authors.

be found in and around the LVP area and meeting in cafés after walking through the park. Areas in Leipzig East that are close to the city center have become more relevant for families in search of an apartment, because the housing markets in popular districts, such as the Südvorstadt, have already been saturated. Combined with the new park, this market saturation has caused a shift in migration dynamics (Int.4).

#### 4.2. Housing Market and Income

Vacancy rates have always been lower in the LVP area compared to those in adjacent neighborhoods, and the buildings were already renovated around the year 2000 (Int.5). Today, a growing number of construction projects can be allocated to a more costly housing segment (Int.4, Int.5). In Anger-Crottendorf, new loft apartments and prestigious urban villas are planned as opportunities for profitable investments. Such projects address a very specific type of clientele that is willing to invest in housing after luxury renovations have been completed (Int.4, Int.5, Int.7). The city of Leipzig highlights that the LVP area is important for the generation of home ownership and increasing the value of residential areas, as well as for competitiveness in terms of location advantages [10]. Another building project has been completed by a company from outside Leipzig, just one street south of LVP in Josephinenstraße (Figure 3). Its marketing strategy framed the apartment complex as an intelligent financial investment in an excellent location [79].



**Figure 3.** Billboard in Josephinenstraße: “We’re building 82 iQ apartments for students” (Photo: Lena Ali).

In sharp contrast to Figure 3 is Figure 4, both photos taken in February 2017 during the site visit. In 2016, a banner was hung on the former engine shed of the Eilenburger Bahnhof inside the LVP area, which read: “What happens when rents are rising, but wages are not?” (Figure 4). According to Int.3, new construction projects are usually accompanied by a rent increase, which is not something remarkable in a market economy. The real estate section of the magazine Capital [80] notes that the marketing period for apartments in Reudnitz-Thonberg has considerably shortened: Advertisements are usually only online for a few days. The magazine also reports that rental apartments in existing stock are offered for around €6.34/m<sup>2</sup> (2019: 6.93), while new apartments cost €10.73/m<sup>2</sup> (2019: 14.22). Newly renovated building complexes and newly built apartments are driving up average prices in the district (Int.5, [81]). The Immaxi Immobilien agency [82] forecasts that property prices for rented apartments and condominiums will rise significantly in the medium term. The 2019 prognosis adds that there are hardly any apartments for low-income earners on the free market at present. The only apartments available for this housing segment are those offered by municipal real estate companies and housing cooperatives [83]. According to real estate portals, rents in Reudnitz-Thonberg are rising due to a shortage of supply (cf. e.g., [80,84]). Int.6, who lives in the district, points out that from 2014 to 2016, he was asked twice to pay a rent increase. The 2017 municipal citizen survey indicates that 44% of all households living in the district have had a rent increase during the last four years [85].



**Figure 4.** Protest banner inside Lene-Voigt-Park (LVP): “What happens when rents are rising, but wages are not?” (Photo: Lena Ali).

Table 2 shows the development of both rent and income between 2008 and 2017. While in Reudnitz-Thonberg the average net household income has increased by 55%, in Leipzig it has only risen by 28%. In contrast, rental prices have risen by 13% (total rent: 8%)<sup>5</sup> in the district, and 13% (12%) in Leipzig<sup>6</sup>. Those numbers support the general supposition that gentrification is occurring in Reudnitz-Thonberg, as the increase in rent cannot be explained by a general raised level of income. Well-educated young people are gentrifiers settling there, states Int.4, hence supporting this conclusion as well. At some point in this process, rents simply rise too fast and once a certain tipping point is reached, people can no longer afford their housing, he says. But so far, displacement of residents has occurred almost exclusively in the form of indirect displacement (Int.5, Int.6). When people moved there in the early 2000s, vacancy rates were still high. They were the first ones to move in after renovations and did not directly displace others. This is specific to urban regrowth situations (Int.5).

**Table 2.** Income and rent development in Reudnitz-Thonberg and Leipzig (Data sources: [86]).

	Reudnitz-Thonberg			Leipzig		
	2008	2017	Growth Rate	2008	2017	Growth Rate
<b>Net household income (median, €/month)</b>	1317.00	2038.00	54.75%	1379.00	1767.00	28.14%
<b>Base rent (median, €/m<sup>2</sup>/month)</b>	4.98	5.61	12.65%	4.98	5.62	12.85%
<b>Total rent (median, €/m<sup>2</sup>/month)</b>	6.93	7.49	8.08%	6.92	7.77	12.28%

#### 4.3. Neighborhood Change

Leipzig’s new image has been discussed in local, national, and foreign newspapers, often in relation to gentrification, for example: “Hypezig-Leipzig instead of Berlin” [87], “From Leipzig to Hypezig-hipster’s eye new playground” [88]. Such media coverage refers to the districts close to the city center in the west and south, as well as in Leipzig East. Reudnitz-Thonberg now ranks among the city’s most popular districts and LVP is known citywide for its rich cultural life, thanks to its diverse usage that includes social events (Int.4, Int.6). Being frequently used throughout all the year, LVP suffers especially in summer from overuse (Int.1–Int.7). This is connected to the fact that it is the only green space in the area where people meet and like to spend time, and where there is a cultural

<sup>5</sup> The base rent is the net rent for an apartment without additional costs such as heating or water, whereas total rent includes these additional costs.

<sup>6</sup> The housing advertisement analysis provides rent data on a smaller scale, but as they explicitly aim to point out the role of LVP in the neighborhood development, they are not shown here but in Section 4.4.

exchange because of the different people who gather there, Int.6 says and adds that other green spaces in the area are less inviting for spending longer periods of time, because they are located close to streets, partly covered by bushes, or “occupied” by groups such as people with dogs or homeless people.

The LVP neighborhood has developed a new urban flair that is expressed through new businesses, such as the vegan-vegetarian restaurant and espresso bar across the street from the park, which both opened in 2015. In the wider area, there is now a wholefood store and several Spätis (late-night corner shops), which are especially popular among students. With the shift in supply and services, the character of a neighborhood changes, in some cases leading to an identification loss with one’s surroundings. Such neighborhood changes have made certain residents even more aware of gentrification, especially when attention is drawn to income on the one hand, and to rents on the other hand (Int.6), as is reflected by the protest banner (Figure 4).

Table 3 summarizes how the LVP neighborhood has developed in different aspects and draws a parallel to the depiction of the transformation process in gentrification studies. The next chapter highlights the role of LVP for this development.

**Table 3.** Overview of the Lene-Voigt-Park (LVP) neighborhood development since 1990, based on the empirical findings.

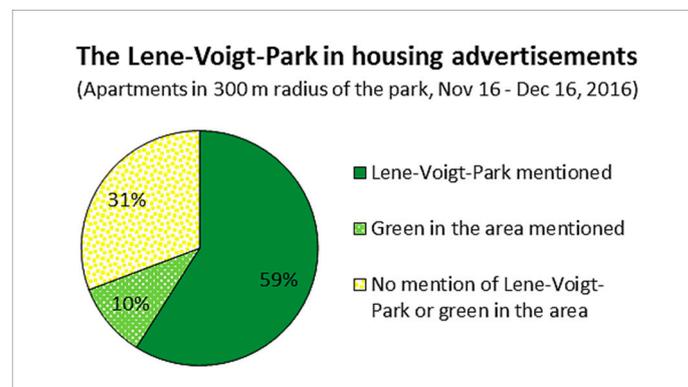
In the 1990s/Beginning of the 2000s	Starting from the Mid 2000s
Population loss: Decline in the birth rate and emigration	Population growth: Increase in the birth rate and immigration; most immigration from outside Leipzig
Vacancy (rate up to 20%) and decay of buildings; first renovations in the area surrounding the park	Renovated building stock (vacancy rate of less than 2% since 2010); new construction projects; growing and target group-oriented gastronomic offers
Low rents (around €4.50/m <sup>2</sup> base rent in 2002, new rentals)	Moderate but rising rents (around €7.50/m <sup>2</sup> base rent in 2018, new rentals) and increased home ownership
Former industrial working-class district with high population density; low-income households	Socially mixed population, but with increasing average income; rejuvenation and studentification
Many brownfield sites, only a few designed green spaces	Brownfield redevelopment: Creation of interim green areas, urban gardening, new parks, Parkbogen Ost green belt concept, new construction sites
Rather unknown, unpopular neighborhood	Attractive residential area with vastly improved image (particularly close to the park); especially popular among students and young families

#### 4.4. The Role of Lene-Voigt-Park for the Neighborhood Development and Opinions on Future Challenges and Opportunities

In all Leipzig residential areas where urban green has been created or improved—particularly in those neighborhoods with Wilhelminian architecture—renovation and in-migration have followed at about the same time. The real estate industry openly inquires in advance about when new areas will be developed, or how long certain construction measures will take, and for private investors “green” is always a must (Int.3). The interviewees agree on the role LVP has played in the development of its surroundings and argue that the park has been the central regeneration element in the district. It has even had an impact far beyond this area, as it functions as a pedestrian and bicycle pathway (Int.3) as well as having additional spill-over effects (Int.5). This means that the park is perceived as a high-quality amenity and it is likely that it has impacted gentrification dynamics: With respect to residential changes (cf. also Section 4.1), the park sped up the process by which the neighborhood became more desirable, as families moved to the area since the park offers good playing opportunities for kids (Int.7). Beyond that, the park has triggered upgrading, as its creation marks the beginning of an entire (re)development process; buildings right next to LVP were the first to be renovated (Int.2).

The statistics shows that the dynamics of all analyzed variables magnifies from 2004 onwards, implying that the influence of the park can be demonstrated on the temporal scale.

Its influence can be observed on the spatial scale as well: There are still some vacant buildings and construction sites in the area two or three streets away from LVP. Sometimes the area known as the LVP neighborhood only extends one street away from the park (Int.4). Since in the wider area some spots have not experienced any upgrading, the park has a high local impact. According to Int.3, there is a difference between people saying “I live in Leipzig East” and people saying “I live close to LVP”. When people said the latter, the words sounded very deliberately chosen, so as to emphasize their neighborhood’s good reputation. The view that LVP serves as a positive location factor is supported by the advertisement analysis. Within a radius of 300 m of the park boundaries, LVP is mentioned in 59% of 39 advertisements for rental apartments that were on the internet within a one-month period (see Figure 5). The description of the neighborhood usually stated that the nearby LVP offers tranquility and relaxation, leisure activities, walking and cycling opportunities. 10% of the advertisements do not mention the park by its name, but refer to urban green in the area. In some cases both LVP and the Friedenspark are mentioned, while four advertisements only refer to the Friedenspark, and none of the advertisements mention any other green spaces.



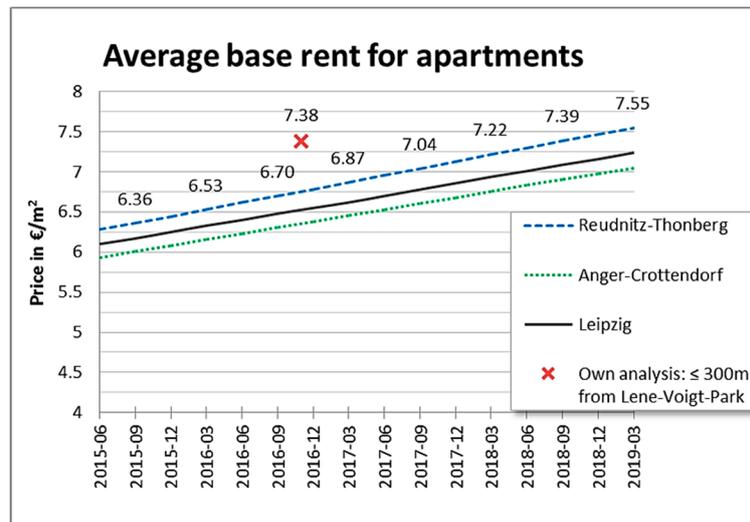
**Figure 5.** Mentioning of the Lene-Voigt-Park (LVP) in housing advertisements (data sources: [89]).

Figure 6 shows the rents (base rent) listed for the advertised apartments mentioned above and compares them to district and city prices. The prices on online portals are for new rental contracts and are therefore higher than the rents for existing rental contracts as shown in Table 2<sup>7</sup>. Based on our advertisement analysis, the average price within 300 m of LVP is €7.38/m<sup>2</sup> (with a standard deviation of 1.77; sample ranging from €5.49/m<sup>2</sup> to €12.86/m<sup>2</sup>). In contrast, the average price in Reudnitz-Thonberg (as well as in Anger-Crottendorf and Leipzig) in the same time period did not exceed €7.00/m<sup>2</sup>. This is true for the prices in Reudnitz-Thonberg published by Capital [80] and PWIB Wohnungs-Infobörse [90] as well: €6.34/m<sup>2</sup> and €6.83/m<sup>2</sup>, respectively (Immobilien Scout, Figure 6: 6.76). In the first quarter of 2019, the average price increased to around €7.50/m<sup>2</sup> (Figure 6).

Considering the future development of LVP as part of Parkbogen Ost, the city will have to face the challenges resulting from property being increasingly in private hands—especially when it comes to big, sometimes foreign, real estate companies (as is already the case in parts of the eastern districts) (Int.2, Int.6). In Leipzig, a large group of people is still very vulnerable to rising rents, but the social mix is mostly in danger due to indirect displacement. As low-income residents become increasingly restricted in their choice of residence, they will be pushed further to the outskirts (Int.5). Many properties adjacent to the future Parkbogen Ost will “awaken from a deep sleep” by catching the attention of

<sup>7</sup> Given rents across the article sections may also vary according to the data sources and their survey method (e.g., data from the Leipzig Office for Statistics and Elections vs. data from real estate portals).

investors (Int.2). The city's intention is to attract companies and stimulate new employment, using Parkbogen Ost as a brand for city marketing and tourism [73].



**Figure 6.** Rental prices for advertised apartments at the city, district, and neighborhood levels. (Data labels shown for Reudnitz-Thonberg and neighborhood level only; data sources: [89,91]).

The interviewees are rather skeptical about green gentrification and the new role of the park within the context of Leipzig East's changing neighborhood character, even though they do not deny the general impact of the park as a "catalyst" or "ingredient" of change or gentrification. More specifically, the interviewees said that LVP is having an impact, but not developing urban green is no solution either. If there was no park, one would still notice an increase in prices in areas with nice cafés and other amenities (Int.4). Social and milieu cohesion must also be seen as key factors, rather than green spaces alone (ibid.). A new park or a new pedestrian and bicycle path might only tip the scales in some cases (Int.3). Consequently, the interviewees declared that other factors (such as real estate sales, speculation etc.; Int.3) and parallel developments (such as renovations and in-migration; Int.5) are also decisive for upgrading and residential change. LVP only serves as a trigger for change in combination with these other factors and developments, which suggests that there is no simple cause-effect relationship between urban green and the social structure (Int.5).

However, social inclusion through affordable housing and sustainable green space development for everybody remain the two main challenges (Int.1, Int.3, Int.4, Int.6). Up until now, LVP has been important for social cohesion as well as for environmental justice in Leipzig East, but this is threatened by the pressure on open spaces and diverging local interests. The wishes of the population concerning urban renewal no longer match the availability of land or the city's financial resources (Int.3, Int.5). Land prices have risen drastically, which limits the city's ability to buy plots of land in order to preserve urban green, for example (Int.3). In the future, the city will require policy instruments for regulating the housing market and defending urban green against financially more profitable land use. Int.6 argues that a key measure would be to limit the privatization of real estate, so that more properties and apartments are owned by the city and not by big real estate companies.

While there is no doubt that developments like Parkbogen Ost are desirable, people must, nonetheless, demand respect for their rights if they are negatively affected by the consequences of such developments. For instance, residents should question the legitimacy of rent increases and oppose illegal increases imposed by their landlords (Int.1, Int.6). One idea proposed by the interviewees to prevent (even if only to a limited extent) further upgrading of the LVP neighborhood is to open a beer garden inside the former engine shed instead of an art gallery or high-class restaurant, as these would only target a specific clientele (Int.1, Int.3). Public participation in the planning phase is also not necessarily a solution, as the LVP case shows: Gentrification was not mitigated by taking into account

the opinion of different groups of residents, among them children and stereotypical working class men discussing the plans with a beer bottle in their hands (Int.1).

## 5. Discussion

In this chapter we come back to the research questions posed at the beginning of this paper about the role of green space development in the context of urban regeneration and new growth, and discuss whether or not the concept of green gentrification is applicable to the results of the case study.

### 5.1. *The role of Green Spaces in the Context of Urban Regeneration and Urban Regrowth*

The results of the case study point first and foremost to the fact that the context for the development of the LVP neighborhood has changed considerably since the opening of the park, due to the shift from urban shrinkage to urban regrowth. Furthermore, in the course of these developments the role of the park has changed as well. Under the conditions of shrinkage, green spaces or greening strategies had been used to stabilize urban neighborhoods by cleaning up and reusing brownfields. The interviewees highlighted that the revitalization of the former train station area by the creation of LVP has been a decisive factor in the regeneration of the entire inner east of Leipzig. Its design and effective integration into the neighborhood's road infrastructure make LVP a valuable inner-city park. However, we can assume that LVP was only able to have such a strong effect on the influx of residents because the entire city of Leipzig had seen considerable in-migration, new growth, and reurbanization due to its rising attractiveness after 2000. Only within this context did the role of LVP change to become a trigger or catalyst for further residential change and upgrading.

LVP was created at a time when urban regeneration was promoted by a bundle of factors such as the municipal prioritization of housing and streetscape renovations, the creation of new jobs, and the influx of young people to Leipzig. In the 2000s, however, Leipzig's inner east was still not among the attractive areas that benefitted most from new residents and jobs, although reurbanization and rejuvenation could also be observed there [13]. For LVP it can be stated that there is no simple causality between the opening of the park on the one hand, and the changes in the residential milieu, housing market, and neighborhood image on the other hand (cf. also Int.5). The park, after its establishment, did have an impact on the development of residential composition, in- and outflows of residents, the development of housing costs, the housing market and housing vacancies, as well as the area's reputation. This assumption is supported by the development around LVP since 2004 and its comparison to respective tendencies on a Leipzig East or a whole city scale (see particularly the statistical data on the population, renovations and the interview quotations, e.g., on the neighborhood's image). Yet we can only hypothesize about the extent to which this impact is direct or mediated, and about the precise ways in which the green space operated as a trigger, catalyst or accelerating factor for an ongoing process.

Without any doubt, the housing market development has fundamentally changed through reurbanization and regrowth since 2000 and especially since 2010. Initially, only the streets directly around LVP developed a reputation as a "prestigious residential area" and were affected by in-migration and investment in the building stock. Since the rental prices are correspondingly higher there (cf. Figure 6), we can assume that the existence of and vicinity to LVP had an additional "trigger function" for local upgrading, although real estate and housing market processes certainly play the most important role. Even if we cannot prove any "statistical" causality, this impact of LVP is clearly detectable (e.g., by the development of rents, the analysis of housing advertisements, and the interviews' results as well). For our case study and the whole debate on interactions between green(ing) and upgrading, it is crucial to show this context-dependent catalyst function under changed supply-demand and cost development conditions. The study thus provides good evidence to suggest that the trigger function of green spaces is one element within a complex and multifaceted transformation process, which has been too often neglected or not looked at in theoretical works on gentrification in German cities (see, for example, [23] or [24]) or at neighborhood scale. In our perspective, this result seems to

be much more striking than the proof of any causality, especially in situations where context conditions change as we described for Leipzig, a city which can be taken as an example for many regrowing cities across Europe.

The role of LVP for urban and neighborhood development can be divided into three phases. Firstly, as an urban regeneration project, the park had a major influence on the revival of the neighborhood at a time when Leipzig was suffering from shrinkage, high out-migration, and housing vacancies. Secondly, the newly created park triggered an influx of new residents and operated as a factor for attractiveness, accelerated residential change, and decreasing vacancies. Thirdly, in the context of new growth from 2010 onwards, LVP is referred to as a location factor providing exclusive quality in an inner-city area that is becoming more densely populated, and can be regarded as a driver of rising rents and further residential change, including exclusionary displacement.

Given the context of dynamic growth in Leipzig since 2010, green space development might play a larger role in upgrading and gentrification over the next few years, particularly given that the Parkbogen Ost green belt project will be fully realized during that time. If newly built housing or upmarket renovations concentrate along the green belt, the expected revenues through rents will be potentially even much higher than at present (fall 2019) when population growth and growing demand for housing continue within the next years. Today, decisions about new housing and home ownership are already strongly influenced by the planned Parkbogen Ost (Int.3, based on respective inquiries from the real estate industry). The municipality has limited capacity to prevent increases in housing costs in areas close to the existing and planned green spaces, given that financial austerity and market forces are the main drivers of housing and real estate market development in Leipzig (cf. Int.3).

We can assume that LVP represents a typical “change of function” of green spaces in inner-city areas that are experiencing new growth after decline, and conclude: In times of decline, green spaces are established or operate as elements to encourage people to stay, and to make neighborhoods more attractive. So, while they initially act as a stabilizing factor in shrinking cities, green spaces contribute to selective upgrading and the localization of “better” residential areas within the framework of reurbanization or growth.

### 5.2. *Lene-Voigt-Park in Leipzig: A Case of Green Gentrification?*

In the concept of green gentrification, the role of urban green or blue structures is, in some cases, clearly defined (particularly in early studies on the subject). Such structures represent exquisite quality developed within the sustainability paradigm, they facilitate the upgrading of neighborhoods and consequently cause gentrification as stated by the green gentrification literature introduced above (cf. for example [43,49,51]). The interviewees’ narratives provide strong evidence that the park is an outstanding amenity with a high local impact, and it clearly indicates that gentrification is a concern in the neighborhood. The LVP case study can, subsequently, be evaluated using this concept. In the course of its redevelopment into a high-quality park, the former brownfield site was able, due to its location and form, to successfully add value to its surroundings and act as a trigger for upgrading. In this sense, our study is in line with the findings of Rigolon and Németh (see above; [39]). The opening of LVP was followed by the in-migration of better-off households, while the increase in rents put more and more pressure on lower-income households and increasingly excluded them from entering the area. Residents living close to the park now belong to social milieus such as the “urban young professionals” or environmentally conscious “middle-class professionals” [92], who value and demand good quality of life and can afford rising property prices and rents. The LVP case can consequently be integrated into the green gentrification scheme developed by Gould and Lewis [40], as well as the pathway described by Kern [51] (p. 70): “industry—pollution—disinvestment—cleanup—reinvestment—gentrification—displacement”; even though the last step is currently still limited to indirect displacement (cf. Int.5, Int.6).

However, our study also deviates from the original concept of green gentrification in some respects: The main incentive for transforming the brownfield site into LVP was to “save” the neighborhood from

social and structural decay, or to end the “downward spiral” of existing deficiencies (cf. Int.2, [93]). Having been constructed in a bottom-up, integrative process with a very small budget, it resembles a robust design rather than a “bourgeois aesthetic” (as called in the inaugural study by Dooling; cf. [7]). The focus on urban regeneration through greening in Leipzig’s inner east was largely initiated by civic engagement for sustainable, socio-ecological urban development. Consequently, the planning and realization of LVP did not involve capital accumulation through eco-branding (cf. [42]), or through stakeholders operating under a “seemingly a-political rubric of sustainability”, as Checker [43] (p. 212) puts it. LVP represents a case where gentrification follows the dynamics of the overall urban development context, of which the park is an intrinsic part. This shows that it is not green space development per se that should be questioned, but primarily the broader political and economic context which encourages rather than confronts inequality. A clear distinction between these two different green gentrification pathways (gentrification triggered either intentionally or unintentionally; cf. also [94]) has not been discussed much in the literature, though it is important for evaluating upgrading, rising costs and (the threat of) displacement as a result of green(ing).

To date, LVP has significantly improved livability in the neighborhood and provided important impetus for the development of eastern Leipzig. While the positive effects must be emphasized, it is also vital to question how long the status quo will prevail. Retracing the transformation of the LVP neighborhood from the 2000s onwards (cf. Table 3) revealed that gentrification dynamics are intensifying. Even though rental prices in the area are still moderate (for an inner-city district), long-term residents are increasingly under pressure to defend their homes—including those who were involved in creating LVP (cf. for example Int.1, Int.6). This results from the rent expenditures, which are high when incomes are low, a situation that is typical for Leipzig’s inner east (cf. [95]). In addition, it can already be observed that not all people have equal access to the apartments surrounding the park; better-off households dominate this market. The large-scale Parkbogen Ost green belt project is likely to further fuel such processes. This means that positive effects, including social and environmental justice implications, are increasingly threatened. In order to avoid the tipping point, which is reached when environmental improvement no longer benefits the residents living there, it is crucial for the different sectors influencing urban development to work hand in hand.

Solutions for avoiding social inequities fostered by green space development need to be assessed in-depth, while accounting for case-related differences. As the LVP case shows, gentrification cannot be prevented simply by including public participation in the planning phase and implementing a bottom-up process (cf. [40]). The LVP project strongly emphasized a design shaped by community concerns and needs (cf. Int.1), instead of being an upmarket prestige project. The conditions in Leipzig and in this case study are different to those in “hot spot cities” of gentrification, where “just green enough” strategies are discussed and proposed as solutions (cf. [45,52]). Consequently, different kinds of solutions are required. They must account for the specific urban context, including its broader political and economic processes, which are vital for assessing whether green spaces may increase the risk of displacement in either form. This is important, as a situation may shift from shrinkage to growth in just a few years, and possibly cause green spaces to affect social issues in a completely different way.

Green gentrification is important to discuss, as it puts a clear emphasis on equity and fairness. These aspects must be given more attention in the debate and practice of green space and urban planning, and regeneration. Incentives aimed at enhancing the quantity and quality of green spaces must still be pursued, while the exclusion of people from the resulting benefits must be avoided. These issues deserve more attention, particularly in the large number of European cities experiencing new growth after shrinkage, because post-shrinkage is often considered to be a context where pressure on urban land and densification are supposed to be minor challenges, and where brownfield site redevelopment is considered to represent a way of improving neighborhoods without larger social costs. The example of Leipzig shows that this is not the case. With this example we may add an atypical case to the debate on green gentrification through brownfield redevelopment, which, up to now, is based majorly on cases from continuously growing cities with contested housing markets [49–51].

Cities with large amounts of unused land and vacancies may, in only a few years, turn into places where urban land and housing markets become more contested. If this is the case, regulations are needed in order to not undermine the social dimension of sustainability and to ensure that all residents equally benefit from urban greening.

Rather than focusing solely on the concept of green gentrification, our results suggest it is worth considering green spaces as a parameter within the gentrification framework, which consists of different impacting factors, without putting too much weight on this single factor. While environmental improvements can serve as legitimation for developments such as rising rents, other amenities do that as well (for example, gentrification also occurs in areas with many good cafés, cf. Int.4). Looking at the LVP case, it is possible to clearly see how different factors must be considered when trying to explain gentrification processes, as well as urban transformation processes in general. It is insufficient to merely focus on the impact of green spaces, because green gentrification is a multifaceted, dynamic and symbiotic process [96]. But it is also true that “the urban natural environment plays an important and understudied role in shaping gentrification processes” [46] (p. 578). Or to put it differently: These debates have not been sufficiently related to one another. In the case study presented, the park has contributed to and accelerated upgrading and residential change, and has increased the likelihood of direct and indirect displacement—but it did not cause those processes. When discussing issues of regeneration and undesired consequences such as displacement and segregation, the debate should, therefore, consider greening and green spaces as an additional factor and investigate the way in which they interact with real estate and housing market forces.

## 6. Conclusions

Based on the results of the LVP case study, our discussion and the relevant literature, we have come up with three main conclusions.

Firstly, there are no clearly determined or predictable effects of green space development in urban development processes that allow for any ‘one size fits all’ solutions. Such solutions would not do justice to the importance of the respective urban or neighborhood development context, which can vary widely. As such, green space development can be a stabilizing factor in times of shrinkage, yet contributes to upgrading in times of (re)growth.

Secondly, although green space development can contribute to or act as a trigger for gentrification, the concept of green gentrification and its applicability in specific cases should be handled with care—as it might imply that urban green itself may lead to or trigger gentrification and displacement. In our study, we instead observed an interlinkage of different factors. First and foremost, it was market forces in urban real estate that sped up gentrification dynamics, proving that urban green is not a causal but a catalyst or accelerating factor.

Thirdly, the case of Leipzig shows that it can take only a few years for an urban context to fundamentally change. Cities experiencing a shift from shrinkage to regrowth can face situations whereby green spaces have completely different—positive or negative—socio-spatial and socio-economic effects. This is probably the main lesson urban policymakers and (green space, housing) planners can learn from our case study.

Last but not least, we have to emphasize that our conclusions are based on one case study and cannot be simply applied to other cases, even if we assume that Leipzig is representative of a large number of regrowing European cities and our study might, therefore, be helpful for understanding the dynamics of green space and urban development in cities with a similar trajectory to Leipzig or regrowing cities in general. Despite a growing body of green gentrification literature, urban green is still understudied in gentrification theory. The debates need to be more closely interlinked, and further research and practical experience is needed in order to effectively evaluate the potential effects of greening in a specific housing market, and to avoid unintended negative social side-effects of urban green space development.

**Author Contributions:** Conceptualization, L.A., A.H. and S.H.; data curation, L.A.; formal analysis, L.A.; investigation, L.A. and A.H.; methodology, L.A., A.H. and S.H.; project administration, L.A.; supervision, A.H. and S.H.; visualization, L.A.; writing—original draft, L.A. and A.H.; writing—review and editing, L.A., A.H. and S.H. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Acknowledgments:** The authors would like to thank the interviewees for their contribution, which was essential for this study. We acknowledge support by the German Research Foundation and the Open Access Publication Funds of TU Berlin for publishing this paper.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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