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Does densification lead to gentrification?

MSc Thesis

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LIST OF ABBREVIATIONS

Abbreviation	Explanation
e.g.	For example
INW_1524	Population of individuals in the 15-24 age range
M_INKHH	Share of high-income earners
WONING	Amount of housing
WOZWONING	The value of a house that is determined by the municipality.

ABSTRACT

The purpose of this study is to determine the impact of densification on gentrification, in Amsterdam. The study is conducted as the result of recent surges in rents and house prices in Amsterdam which have led to a biting housing shortage. To accomplish its goal, the study employed the single case study method. Data from the Dutch Statistical Bureau is acquired to determine the nature of the relationship between densification and gentrification. Specifically, data on the number of Amsterdam residents aged between 15 and 24, the value of a house that is determined by the municipality and the population of high-income residents was used to determine how, if at all, densification has contributed to gentrification. In addition to concluding a significant relationship between densification and gentrification, the study also revealed that age and the share of affluent individuals in Amsterdam have a statistically significant impact on gentrification. Such extraneous variables such as gender and home ownership by housing corporations were also found to have a notable effect. Given the results obtained, it is recommended that Amsterdam should institute as part of its efforts to minimize the adverse outcomes of gentrification.

INTRODUCTION

1.1. BACKGROUND INFORMATION

One of the key priorities for most governments is to ensure adequate housing for their citizens. It is therefore not surprising that across the globe, authorities are investing huge amounts in delivering housing. However, despite the measures that are being put in place, housing shortages remain a serious and persistent challenge. For example, in the Netherlands, Amsterdam is among the areas where housing is in short supply (De Vries, 2021). Furthermore, across the country, an alarming increase in housing prices is being witnessed with the estimates indicating that between 2020 and 2021, on average, the prices rose by 15% (NL Times, 2021). In fact, experts have already warned that what the Netherlands is experiencing is a crisis that requires urgent solutions (De Vries, 2021). It should be noted that the situation in the Netherlands is not unique. Globally, authorities are grappling with shortages and existing solutions are failing to satisfy the increasing demand for housing (Galster & Lee, 2021). Interventions to address this problem are desperately needed.

The housing problem that Amsterdam and other cities are facing is the result of numerous factors. Densification has been identified as among the drivers of this challenge. Essentially, densification is characterized by a growing urban population that imposes immense pressure on existing housing facilities. According to (Claassens et al., 2020), Amsterdam is one of the cities that have reported explosive growth in the size of their urban populations. This change has not been accompanied by a corresponding investment in more housing. Consequently, Amsterdam is experiencing intense densification as it is forced to house new arrivals into urban centers in existing spaces.

The densification that Amsterdam is witnessing is being accompanied by a change in the city's landscape. Essentially, Amsterdam is undergoing gentrification as the city attempts to address the housing problem (Perry, 2016). As (Perry, 2016) reports, older buildings and neighborhoods are being rapidly replaced by new establishments such as restaurants. Basically, it appears that the authorities in Amsterdam believe that urban renewal through gentrification holds the key to delivering more housing units. It is important to note that the situation in Amsterdam is being replicated in other cities across the globe. For example, in the US, cities like Baltimore have been heavily gentrified as part of efforts by local governments to drive up home values and attract businesses (Meehan, 2019). As Amsterdam continues to experience gentrification, there is a need for the city to pause and consider the causes as well as the outcomes of this process.

1.2. RESEARCH SIGNIFICANCE

The purpose of the present research is to establish if the gentrification being witnessed in Amsterdam bears any significant relationship to the densification that the city has experienced. The study is significant for various reasons. First, the outcomes that the research generates could help to inform how the authorities in Amsterdam respond to the densification problem. Researchers have established that if they implement poorly considered solutions, governments can worsen densification and give rise to such problems as urban sprawl, the emergence of slums, and increase in poverty as well as crime levels (Aerni, 2016; Tacoli et al., 2015). Therefore, this study could provide much-needed guidance to Amsterdam regarding how it should proceed with resolving densification. Secondly, the research is significant because it addresses an issue that has not received much focus from the research community. Researchers have failed to adequately explore the implications that densification presents for gentrification. Thus, the present study will certainly expand existing knowledge and possibly ignite a conversation regarding the impact that densification has on the gentrification process.

1.3. SCOPE

The scope of the present study is rather limited. It focuses mostly on the situation in Amsterdam with regard to the effect that densification has had on gentrification. However, while the study places emphasis on Amsterdam, its implications are far broader. For example, as noted above, it is expected that the study will yield insights that authorities in other parts of the world can leverage when designing programs to address densification and housing shortages. Furthermore, as will become clearer in a later section, the study will be confined to the 2016-2020 period. This time scope is informed by the fact that the most reliable data is only available for this period. More importantly, by focusing attention on the 2016-2020 timeframe, the study will generate insights on the current trends in the Amsterdam housing market.

1.4. RESEARCH OBJECTIVES AND QUESTIONS

As noted earlier, the primary purpose of the study is to determine the association of gentrification and densification in Amsterdam. In particular, the study seeks to answer the question:

Does densification lead to gentrification?

To shed light on this question, the research will pay particular attention to the sub-questions below:

- i. Where does gentrification take place?
- ii. How is gentrification being quantified?

THEORETICAL FRAMEWORK

2.1 DRIVERS OF URBAN DENSIFICATION

To understand the theoretical relationship between gentrification and densification, it is important to begin with a review of the factors that underlie the latter. Research has established that densification is the result of numerous factors. Measured in terms of the number of people residing within a given unit of a particular area, densification is partly caused by increases in migration into urban centers (Lyu et al., 2019). Essentially, as more people move from rural areas to urban centers in search for such opportunities as employment, they exert immense pressure on the limited housing stock, thereby resulting in higher urban density. Other factors that have been linked to urban densification include improvements in infrastructure as well as changes in zoning laws. Essentially, as authorities enhance such infrastructure as roads and communication networks, they attract more people who add to the density of urban centers (Maddan & Gutman, 2020). Furthermore, more cities are scrapping exclusive single-family dwelling zones in favor of new urban planning regimes that allow for the construction of multi-family dwellings as well as mixed-use developments (Manville et al., 2020). The ultimate result is that areas that previously housed a small number of people are now hosting larger populations. Essentially, densification is the outcome of pull factors that attract people to urban centers which do not seem to be adequately prepared in terms of the available of housing units to meet the needs of the massive waves of new arrivals. The drivers igniting densification in urban area are shown in figure 1.

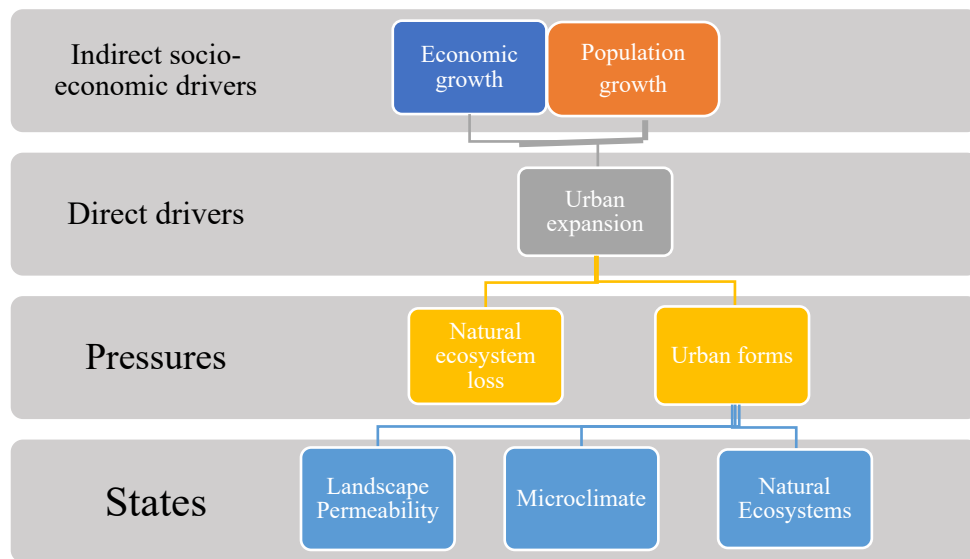


Figure 1: Drivers of Density

2.2 IMPACTS OF DENSIFICATION

Now that it is clear that densification is caused by factors like reforms in zoning regulations and rural-urban migration, the stage is set for an examination of the consequences of densification. Some experts have determined that densification can lead to positive outcomes. For example, according to (Wang et al., 2019), densification offers authorities the opportunity to enhance the efficiency of land use. Essentially, as urban centers become denser, available resources are extracted and utilized more responsibly. However, it should be noted that a majority of scholars have established that on the whole, the impacts of urban densification have been adverse. For example, (Debrunner and Hartmann, 2020) identified densification as one of the factors responsible for the housing shortages that many cities across the globe are currently grappling with. In particular, according to (Debrunner and Hartmann, 2020), densification has made it difficult for city authorities to deliver affordable housing to their residents. (Lin et al., 2018) also determined that the housing crises that many cities are experiencing as well as the unsustainable spikes in housing prices are the direct result of densification. Essentially,

densification has given rise to negative outcomes that are forcing urban centers to rethink their approach to the provision of housing and urban development that are shown in the figure 2.

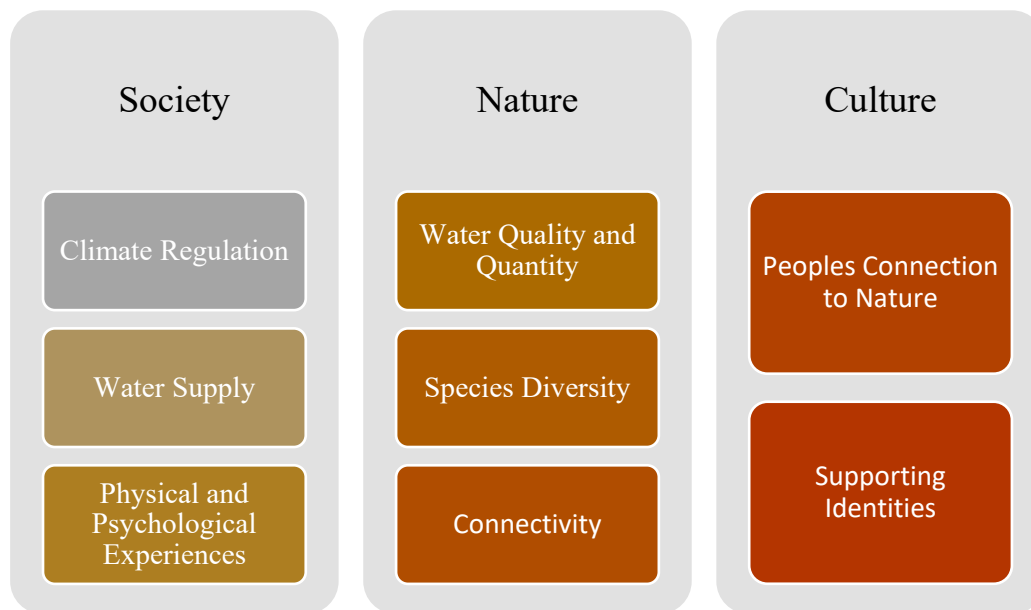


Figure 2: Impact of Densification

2.3 DENSIFICATION AS DRIVER OF GENTRIFICATION

Gentrification has emerged as an attractive, albeit unsustainable, solution to the densification problem discussed above. Experts and researchers have observed that an increasing number of authorities are resorting to gentrification in their bid to ease the pressure that densification is imposing. For example, (Ling et al., 2020) determined that gentrification is rapidly emerging as a solution to urban sprawl and providing governments with opportunities to renew dilapidated and typically poverty-ridden areas by attracting investments and boosting income levels. However, some researchers have noted with great concern that instead of resolving the challenges that urban densification has created, gentrification has actually worsened them. (Hubbard and Brooks, 2021) determined that contrary to such expected outcomes as improved access to affordable housing, gentrification has led to even greater increases in house prices and displaced many communities, especially poor and under-served populations that lack the political power to defend their neighborhoods. While researchers fail

to agree on the net impact of gentrification, it is difficult to deny that governments are adopting gentrification as part of efforts to alleviate the hardships caused by densification.

The discussion above has outlined the relationship between gentrification and densification. It has been shown that densification results from factors like rural-urban migration and increased investment in infrastructure. The discussion has also highlighted how higher urban densities gives rise to problems like housing shortages and surge in housing prices. These outcomes set the conditions necessary for gentrification to occur. The different factors that underlie gentrification and densification serve as the basis for the theoretical framework upon which the present study is based. The theoretical framework is illustrated below:

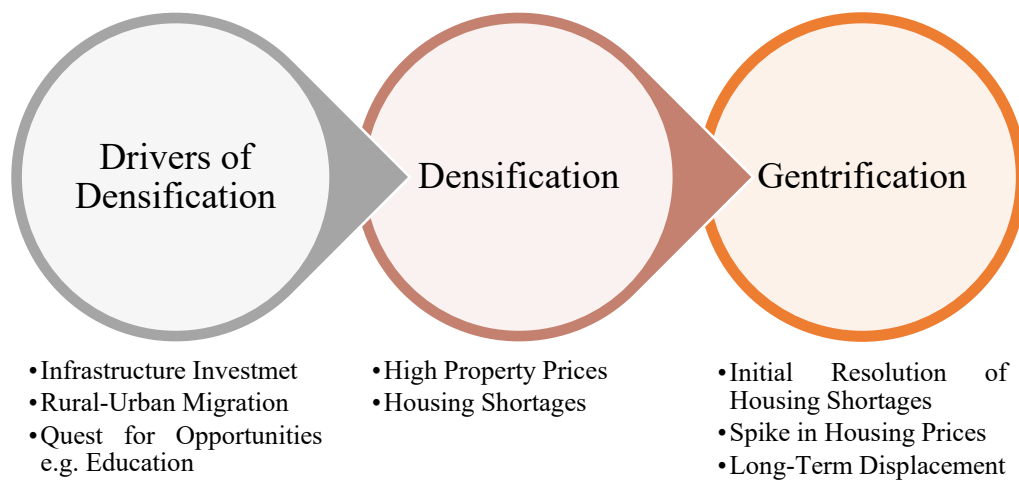


Figure 3: Theoretical Framework

LITERATURE REVIEW

3.1. MEASUREMENT OF DENSIFICATION

The issue of urban densification continues to receive significant attention from scholars. The common definition that the scholars have adopted for this concept is that it is concerned with “the land development that takes place within existing communities, making maximum use of the existing infrastructure instead of building on previously undeveloped land” (European Environmental Agency, 2018). It is worth noting that densification takes numerous forms. According to (Pelczynski and Tomkowicz, 2019), while some cities implement densification by making the best use of already developed areas, other governments build new developments in such areas as former landfills and abandoned facilities. Essentially, the purpose that authorities seek to accomplish when they resort to densification is improving land use efficiency and ensuring sustainable development.

Density is the primary metric that scholars use to measure densification. Essentially, as (Wang et al., 2019) note in their text, density allows one to establish the number of people living within a particular area. However, as (Wang et al., 2019) make clear, densification is a complex concept whose essence cannot be fully captured by population density alone. These scholars note that when seeking to establish the scale of densification, one needs to consider such other factors as the range of economic activities being undertaken in an area, forest cover, and open spaces. According to (Cerin et al., 2020), densification should also be understood in terms of the impact that it has on human health and behaviors. For example, for the study that they conducted, (Cerin et al., 2020) observed that intensely densified areas have an adverse impact on the health of older adults. This observation informed their conclusion that a complete definition of densification needs to account for the implications that densification presents for

wellbeing. (Angel et al., 2021) shed further light on the meaning and measurement of densification. These scholars argue that the expansionary pressures that urban centers experience should be included in how densification is conceptualized. Essentially, they suggest that while it is primarily concerned with population and settlement density, densification also relates to how cities expand beyond their original boundaries into new areas. For the purpose of the present study, densification is defined as population density (the number of houses per square meter of space in Amsterdam).

3.2. DEFINITION AND MEASUREMENT OF GENTRIFICATION

Gentrification is yet another issue that has fascinated scholars and researchers. According to (Bhavsar et al., 2020), at its core, gentrification refers to a phenomenon where typically poor and dilapidated areas witness an influx of usually wealthy individuals who tend to be college-educated. Essentially, in the definition that they provide, (Bhavsar et al., 2020) identify higher income and educational attainment as among the characteristic indicators of gentrification. (Pearman, 2018) concurred that gentrification often manifests in the form of the movement of affluent and college-educated individuals into poverty-ridden neighborhoods. Age is yet another factor that has been incorporated into the measurement of gentrification. Scholars have observed that usually, the individuals who move into poor neighborhoods that undergo gentrification are young (Hwang & Lin, 2016; McKinnish et al., 2010). In summary, age, income level, and educational attainment are the main metrics for measuring gentrification. These factors informed how gentrification was defined and operationalized in the present study. These variables were selected to inform how this study defines gentrification because research suggests that they are the main factors through which gentrification manifests. Essentially, a neighborhood is regarded as undergoing gentrification when housing prices rise, initially, there is a spike in housing density, and the area witnesses the arrival of young and affluent individuals.

Across the globe, especially the Western world, gentrification is taking place at an accelerated pace. For example, in the US, data shows that gentrification is becoming more common as authorities regard it as a solution to reviving urban centers that are on a decline (Richardson et al., 2019). However, as is the case in other parts of the world, the gentrification taking place in the US continues to hurt certain communities. For example, according to (Shaver, 2019), between 2000 and 2013, at least 200,000 African Americans were pushed out of their homes to make room for gentrification programs. The situation in the US highlights the need to explore gentrification and establish its root causes. The present study seeks to shed light on the origins of gentrification and whether it can be relied upon as a reliable intervention for developing urban centers without hurting vulnerable populations.

3.3. OUTCOMES OF GENTRIFICATION

Earlier, it was noted that one of the goals that authorities wish to accomplish through gentrification is to resolve housing shortages. However, research has determined that instead of enhancing access to decent and affordable housing, gentrification actually creates such outcomes as displacement and higher property prices. For instance, (Zuk et al., 2018) cautioned authorities about being too quick to gentrify neighborhoods, after observing that this process pushes poor families out of their homes as they are unable to afford the rents that rise in response to gentrification. (Elliott-Cooper et al., 2019) also raised concerns regarding the damaging effect that gentrification has on marginalized and low-income communities. Presenting gentrification as a social justice issue, (Elliott-Cooper et al., 2019) decry the harmful effects of gentrification, giving special attention to how this process causes poor and vulnerable populations to be evicted from their homes. Basically, there appears to be agreement among scholars that gentrification exacerbates housing inequalities instead of helping urban areas to boost access to decent housing for their people.

While it is true that gentrification causes displacement of populations, it should be noted that this process has also been associated with numerous benefits. First, research has established that gentrified neighborhoods tend to experience significant increases in property values (Bockarjova et al., 2020). While the higher property prices drive out the poor, they also make neighborhoods more attractive to businesses and investors. Another positive effect of gentrification is that it helps to boost the economy. As new businesses enter a neighborhood to meet the needs of its more affluent residents, the area experiences an immediate and sustained improvement in economic output and performance (Dragan et al., 2019). However, it should be understood that this benefit is only enjoyed by wealthier individuals at the expense of poorer populations that are forced to move to more affordable areas. Other advantages of gentrification include improved safety and investment in such facilities as parks and other recreational resources (Dragan et al., 2019). Basically, gentrification gives rise to wealthier, more economically successful, and vibrant communities. However, these benefits occur at the expense of the displacement of poor populations. On the whole, it appears that the advantages of gentrification outweigh its drawbacks. It is therefore little wonder that an increasing number of authorities are using gentrification as a tool for enhancing the economies and the aesthetic appeal of neighborhoods.

3.4. DENSIFICATION AND GENTRIFICATION IN NETHERLANDS

Netherlands is among the nations where gentrification is taking place on a significant scale. (Doucet and Koenders, 2018) are among the scholars who have recognized the impact that gentrification is having on the urban landscape in the Netherlands. Paying special attention to Rotterdam, (Doucet and Koenders, 2018) observe that the national government has initiated programs designed to renew neighborhoods that are in decline and face the threat of total collapse. According to (Doucet and Koenders, 2018), the government intervention was designed to redeem Afrikaanderwijk from its history as a ghetto by creating conditions that

would drive mostly white and affluent individuals into this area. While (Doucet and Koenders, 2018) agree that gentrification led to massive improvements, they lament that the authorities failed to consider other approaches to urban renewal. They conclude that gentrification should be adopted as a last resort and when implemented, authorities should consult and consider the needs of the communities already domiciled in the area to be transformed. In Rotterdam, concerns have been raised about the risk of displacement for the thousands of poor households living in the city. In fact, according to (Doucet et al., 2016), a movement calling for the plans to further gentrify the city to be scrapped has emerged. This movement decries how gentrification is compounding economic inequalities. (Sakızlıoğlu and Lees, 2020) also noted that the gentrification taking place in the Netherlands is failing to deliver the benefits for which it is designed. According to these scholars, in cities like Amsterdam, gentrification has imposed economic hardships upon ethnic communities living in gentrified neighborhoods. In essence, it appears that while they recognize some of the benefits that gentrification has generated, scholars agree that on the whole, this process continues to harm communities.

METHODOLOGY

In this chapter, an outline of the procedures used to conduct the study is provided. The purpose of the chapter is to demonstrate that the study is rigorous and was performed in full compliance with all applicable research standards.

4.1. RESEARCH DESIGN

For the study, the case study design was adopted. Essentially, this design involves rigorously examining a phenomenon by focusing attention on an area, individual, or other object where it manifests. The case study approach was adopted for various reasons. First, it is a convenient method that allowed for an in-depth understanding of the dynamics of densification and gentrification to be acquired. By narrowing the focus onto the situation in Amsterdam, the study made it possible for the relationship between the two factors to be established. Another advantage of the case study method is that it is inexpensive and fairly simple to implement (Vissak, 2010). As opposed to other approaches that would have required such processes as sampling and collection of data from human participants, the case study strategy is more convenient. Perhaps the most important advantage of this approach is that it can be formatted to suit the needs and goals of different research exercises (Vissak, 2010). Given these benefits, the case study design is indeed appropriate.

The study is quantitative. Among the key advantages that informed the selection of the quantitative approach is that it enhances research accuracy, reliability, and objectivity. Unlike qualitative research which is prone to bias, the quantitative method creates opportunities for researchers to eliminate errors and prejudices that would otherwise undermine the quality of their research. Another reason for the choice of the quantitative approach is that it is best

aligned with the main objective of the study. As noted earlier, the key goal of the research is to determine whether gentrification in Amsterdam is the result of densification. To achieve this goal, it was necessary to conduct rigorous statistical and mathematical analyses.

4.2. DATA COLLECTION

Data used in the study was obtained from the Dutch Statistical Bureau. Given that the data is rather extensive as it contains information on a wide range of statistics related to the housing and socioeconomic situation in Amsterdam, filtering was undertaken to yield data that was most relevant to the study. In particular, only data concerning amount of housing in Amsterdam (WONING), the population of individuals in the 15-24 age range (INW_1524), housing prices (WOZWONING), and the share of high-income earners (M_INKHH) were analyzed for the study. On the one hand, the WONING served as a representation of the densification variable whereas INW_1524, M_INKHH, and WOZNOWING are the key factors that constitute the gentrification variable.

The data acquired from the Dutch Statistical Bureau was for the 2016-2020 period. This timeframe has the most complete data. Another issue that informed the decision to confine the study to the 2016-2020 period is that for other timeframes, the Dutch Statistical Bureau does not provide detailed and complete information. For example, for years before 2016, some of the data for the variables needed to estimate the association between gentrification and densification is lacking. Additionally, this period offers insights into the recent trends being witnessed in Amsterdam. As a result, it is expected that the conclusions that the study generates will reflect the true and current situation in the city. For some of the years, data for particular variables was unavailable. For example, the Dutch Statistical Bureau does not provide INW_1524 for the 2016-2018 period. To account for this, M_INKHH data was used as a substitute. It is true that the gaps in the data could undermine the accuracy and credibility of

the study. However, the huge volume of data combined with the extensive analysis that was undertaken helps to cement the study's reliability and quality.

Variable Definitions and Computations

As is clear this far, gentrification and densification are the primary variables that the study examined. On the one hand, for the purpose of the study, gentrification was defined as the arithmetic mean of WOZWONING, INW_1524, and M_INKHH. These three factors were expressed in indices with values ranging from 0 to 1. These values were computed using the formula below:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

The gentrification index is calculated using the following formula:

$$\text{Gentrification} = 1/3 (\text{WOZWONING}_{[0,1]g} + \text{INW}_{1524[0,1]g} + \text{M}_{\text{INKHH}}_{[0,1]g})$$

Whereby, the subscript *g* refers to the growth of the index over time, and subscript [0, 1] indicates that the index is rescaled between 0 and 1 to ensure that qualitatively different dimensions are comparable.

On the other hand, for the study, densification was defined as the change in WONING over the 2016-2020 period as illustrated in the formula below:

$$\text{Densification} = \frac{(\text{WONING}_1 - \text{WONING}_0)}{\text{WONING}_0}$$

Where WONING_1 is the value of *WONING* in the last year, and WONING_0 is the value of *WONING* in the base period.

4.3. DATA ANALYSIS

For the analysis of data described above, it was assumed that there is a bivariate association between gentrification and densification. The Pearson correlation coefficient was used to

establish this relationship. Regression analysis was then undertaken to establish the effect that densification has on gentrification, as illustrated in the relation below:

$$Gentrification = \beta_0 + \beta_1 Densification + \beta_2 \mathbf{X}^g + \epsilon$$

where \mathbf{X}^g refers to the set of control variables and ϵ is an error term.

RESEARCH FINDINGS AND ANALYSIS

This chapter present results and discussions obtained by following the methodology outlined in the previous chapters. Summary statistics, Pearson correlation, Regression analysis are discussed in detail.

5.1. SUMMARY STATISTICS

One of the components of the data analysis involved generating summary statistics that offered insights into basic descriptive elements of the data. These statistics are shown in the following table:

Table 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
gentrificationp3	6772	.104	.021	.041	.407
dp_woning	10787	.044	.414	-.95	16
dp_wozwoning	10196	.587	.257	-.585	8.987
dp_inw	7078	.091	.57	-.949	15
dp_minkhh	9768	.056	.357	-.889	7
dp_man	11277	.081	.58	-.955	22
dp_vrouw	11202	.062	.494	-.933	24
dp_pnlachtg	11049	-.051	.202	-1	5
dp_pwemiga	7705	.154	.437	-1	3
dp_pnwemiga	7637	.142	.401	-1	3
dp_wonhcorp	4295	-.002	.372	-.962	12.5

While all the different factors represented in the raw data were included in the analysis, focus remained on the specific factors that relate to gentrification and densification.

5.2. PEARSON CORRELATION

The analysis of the data went beyond merely obtaining the summary statistics. It also involved the Pearson correlation which was intended to establish the degree to which densification drives gentrification in the Amsterdam area. The following table summarizes the main results that were obtained.

Table 2: Pearson Correlation

Variables	Gentrification	WOZWONING	INW_1524	M_INKHH	Densification
Gentrification	1.000				
WOZWONING	0.442***	1.000			
INW_1524	0.515***	-0.039***	1.000		
M_INKHH	0.738***	0.120***	-0.063***	1.000	
Densification	0.232***	-0.015	0.193***	0.129***	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

There are a number of important issues that the results in the table above reveal. First, as the gentrification index shows, a positive and statistically significant relationship between gentrification and densification was established. Essentially, this observation supports the hypothesis that gentrification is a direct outcome of densification in Amsterdam. Secondly, the results also indicate that the three factors that make up densification have varying levels of influence on gentrification in the city. On the one hand, INW_1524 and M_INKHH positively affect gentrification. The implication of this finding is that the influx of young individuals into Amsterdam coupled with high incomes contributed to the city's gentrification. On the other hand, WOZWONING which represents the mean housing prices had a minimal effect on the gentrification process.

5.3. REGRESSION ANALYSIS

The regression analysis confirmed the results of the Pearson correlation. In particular, the analysis showed that gentrification is positively and significantly associated with densification, further reinforcing the hypothesis that Amsterdam's process of urban renewal has been fueled by densification. As the regression analysis illustrated, in the city, a 1% increase in densification triggers a 1.9% rise in the rate of the gentrification process.

To ensure the validity of the conclusions reached, controls for extraneous variables were instituted. As is clear from the table below, rental homes, housing corporations, racial composition, and gender are the specific variables for which appropriate controls were made. Different models were used to filter out these variables and as the results of the regression analysis shows, different findings emerged. For instance, as model (2) indicates, increases in rental prices generate a 0.3% decline in the scale of gentrification. However, when the rental homes variable is controlled, it was observed that a 1% decline in densification resulted in a 2.3% growth in gentrification.

Model (3) represents the implications that homes owned by housing corporations present for gentrification in Amsterdam. On the one hand, when the impact of the housing corporation homeownership is considered, a visible, yet statistically insignificant decline in gentrification is observed. On the other hand, controlling for this variable shows that a 1% rise in densification causes gentrification to increase threefold.

The racial composition of the residents of Amsterdam is another factor whose impact on gentrification was examined. When this factor is considered, it does not appear to have any significant effect on gentrification. Similarly, controlling for this factor does not reveal a significant impact either. Whereas race does not appear to play a role in the gentrification process, the regression analysis revealed that gender is among the forces influencing how

Amsterdam is being gentrified. On the one hand, as model (5) demonstrates, a 1% rise in the proportion of males in the city generates a 1.4% boost in the rate of gentrification. On the other hand, women appear to have an even greater effect on gentrification. A 1% increase in their share of the city's population causes a 2.1% spike in gentrification. However, it should be noted that with the level of significance set at 5%, as a result of the impact of the female gender, the association between densification and gentrification becomes inconsequential.

Table 3: Regression Analysis

	Densificatio n	Rental homes	Housing corporations	Racial composition	Gender	
Models	(1)	(2)	(3)	(4)	(5)	(6)
Gentrification						
dp_woning	0.0194*** (5.20)	0.0229*** (4.04)	0.0325*** (4.81)	0.0230*** (4.95)	0.00947* (2.24)	0.00798 (1.92)
dp_phuurwon		-0.00397* (-2.12)				
dp_wonhcorp			-0.00210 (-1.28)			
dp_pnlachtg				0.000336 (0.14)		
dp_pwemiga				-0.000720 (-0.77)		
dp_pnwmiga				-0.000722 (-0.68)		
dp_man					0.0145*** (4.56)	
dp_vrouw						0.0214*** (5.29)
_cons	0.103*** (429.12)	0.104*** (370.80)	0.104*** (320.24)	0.104*** (315.05)	0.103*** (443.48)	0.103*** (450.07)
N	6772	5372	3601	5158	6772	6772
r2	0.0540	0.0451	0.0661	0.0553	0.0806	0.0857
r2_a	0.0539	0.0447	0.0656	0.0545	0.0803	0.0855
F	27.09	9.092	14.36	6.542	34.58	40.71

In summary, the robust and rigorous data analysis protocols that were adopted for the study yielded a number of important insights. First, as established above, densification emerged as one of the key factors behind the gentrification that Amsterdam has experienced in recent years. Secondly, the study has shown that the factors that constitute densification have varying levels of impact on gentrification. Thirdly, the analysis also demonstrated that issues like gender and homeownership by housing corporations significantly influence the gentrification process. All these findings are crucial as they confirm that the gentrification that has been witnessed in Amsterdam is a complex phenomenon that is underlain by a number of factors.

For the most part, this study remains valid and the conclusions that it has yielded can be accepted with confidence. However, there are some drawbacks that are worth acknowledging. One of the main shortcomings is that the study is not necessarily exhaustive. For example, gentrification was defined in terms of age, income, and house prices. While the three factors capture the essence of gentrification, they do not fully reflect the dynamics of the process. Therefore, the study omits numerous other factors that form part of gentrification. Despite this limitation, the study remains reliable and the findings that it has generated are indeed valid.

CONCLUSION AND RECOMMENDATIONS

4.1 SUMMARY AND CONCLUSIONS

The primary objective that this study sought to accomplish was to shed light on whether Amsterdam's gentrification is an outcome of the densification that the city has undergone. As established in the previous chapter, densification has indeed played an important role in the gentrification process. Given that the study considered various components of densification, it is the first of its kind since there does not appear to be other research that have explored how the different aspects of densification have contributed to the gentrification in Amsterdam. Few scholars like (Hochstenbach et al. 2014) have made some effort in determining the association between the densification factors and gentrification. In particular, (Hochstenbach et al. 2014) explored how income and age influence the urban transformation that is being witnessed in Amsterdam. They noted that the influx of young and affluent individuals into the city has significantly accelerated the gentrification. In addition to building on the little research that has examined the situation in Amsterdam, this study also creates new knowledge by demonstrating that gentrification in the city is a product of densification.

Earlier, it was noted that gentrification exacerbates the housing shortage problem by driving up house prices and rents. This is certainly the case in the Amsterdam area. During the analysis of the data, it was observed that over the 2016-2020 period, mean house prices in the city rose significantly. This finding is largely in line with what other scholars and experts have observed. For example, news reports indicate that in 2020, across the Netherlands, house prices rose by as much as 12% with the rate for Amsterdam being estimated at 3.4% (Dutch News, 2021). The spike in these prices have resulted in higher demand for housing in rural areas as

more people abandon the gentrified Amsterdam in favor of regions that offer more space for lower prices (Dutch News, 2021). Furthermore, as (Van der Zee, 2016) reports, the rise of platforms like Airbnb has added to the shortage of houses as well as the steep surges in price. Essentially, according to (Van der Zee, 2016), Amsterdam has proven to be an attractive destination for such groups as tourists and young, affluent, and well-educated individuals. While the arrival of these populations augurs well for the city's economy, it causes serious harm to locals who are pushed out and forced to seek accommodation elsewhere. Essentially, the trends being witnessed today confirm the findings of the study. The study has clearly shown that as a result of densification, Amsterdam is experiencing gentrification that is characterized by soaring house prices as well as significant changes in the demographic profile of the city's residents. There is no question that the current situation is unsustainable. Eventually, the city authorities will be unable to maintain the house price increases and will need to institute appropriate interventions.

Another issue that helps to validate the outcomes of this study is the sentiments expressed by the residents of Amsterdam with regard to gentrification. As (Pinkster and Boterman, 2017) observed, a majority of the residents are displeased with the changes that are taking place. What is most surprising is that wealthy individuals who should benefit from gentrification have been most vocal in their opposition to this process. According to (Pinkster and Boterman, 2017), driven partly by tourism, gentrification has created a sense of discontent among Amsterdam's residents. Basically, gentrification has erased the atmosphere of community and belonging that defined Amsterdam in previous years. Instead, it has led residents to fear that the city is being invaded by tourists and outsiders who have left them powerless and unable to take any action to protect their neighborhoods from further transformation (Pinkster & Boterman, 2017). Clearly, while gentrification delivered immense benefits to Amsterdam initially, the long-term effects have been unpleasant as illustrated by

the perspectives of current residents. There is a need for the Amsterdam government to respond to the plight of communities which worry that as the city is gentrified further, it will lose its identity.

To acquire an even clearer understanding of the implications of the study's findings, it is important to explore the theoretical framework upon which the study was established. As noted in a previous chapter, the framework draws connections between the root causes of densification, and how this process gives rise to gentrification. It was shown that a combination of rising house prices and housing shortages are the main factors that link gentrification and densification. The results of the study have raised questions about the validity of the framework. Earlier, it was shown that housing prices have a minimal effect on gentrification. Instead, high incomes and young age are the key factors that appear to connect densification to gentrification. The situation in Amsterdam is indeed unique. Across the world, the cost of housing is among the key factors that have been shown to fuel the gentrification process (Guerrieri et al., 2010). In Amsterdam, as the study showed, this is not necessarily the case. The different situation in Amsterdam underscores the need for further research. In particular, scholars should consider investigating why despite experiencing rising rents and housing prices, these factors do not appear to have a statistically significant influence on gentrification.

It is true that the framework does not fully account for the findings that the study yielded. However, the framework helps to explain some of the recent developments witnessed in Amsterdam. This model predicts that as a city undergoes gentrification, the initial improvement in conditions eventually gives way to unsustainable property price increases that drive residents to other areas that provide cheaper housing. This is the case in Amsterdam today. According to (Proper, 2019), the housing prices in Amsterdam have been so high that the national Dutch government intervened by introducing rent caps. Essentially, the Dutch authorities recognized that in order to maintain Amsterdam's status as a thriving metropolis

that welcomes all, limits on rents and house prices needed to be imposed. The government's action helps to illustrate the relationship between densification and gentrification. Initially, as a city opens its doors to wealthier and more educated young individuals, it witnessed a tremendous explosion in its economic activity as well as the wellbeing of its residents. However, over time, as gentrification becomes properly entrenched, such problems as displacement and disparities in access to housing emerge. Basically, the current state of affairs in Amsterdam validates both the theoretical framework and the entire study by illustrating the damaging long-term effects that emerge as urban centers move from simple densification to gentrification.

The results of the study were mostly expected as they confirm what other researchers have established. However, there are some findings that are surprising. For example, it was noted that the racial composition of the population of Amsterdam has no significant impact on the gentrification that the city is witnessing. This finding is despite the fact that today, Amsterdam is home to a larger number of ethnic minorities, most of whom are foreign-born. For instance, according to (Uitenbroek, 2015), in the recent past, Amsterdam has welcomed more migrants who are drawn to the city's culture of acceptance. Various scholars have observed that positive migration accelerates gentrification and that gentrified neighborhoods witness significant changes in their demographic profile as communities of color are pushed out by high house prices and rents (Diem et al., 2019; Vigneswaran, 2019). Amsterdam appears to be an outlier whose gentrification process has been insulated from the effects of migration. This issue warrants further investigation. A call is issued to scholars to undertake rigorous studies with the goal of determining why and how Amsterdam has managed to minimize the impact of racial diversity and composition on its gentrification. This question was not addressed as part of the present study because it is beyond the original scope of the research.

The discussion has established that densification has contributed significantly to the gentrification of Amsterdam. However, it is important to note that this study is not exhaustive. There is a possibility that the situation being experienced in Amsterdam today is the result of some extraneous factors that the study did not examine. For example, one cannot rule out the likelihood that the increase in the housing prices in the city is the result of the active and intensely competitive housing market in the Netherlands. Therefore, the conclusions reached in the study should be approached with some caution.

In closing, as indicated in a previous section, this study has some shortcomings that could erode its quality and appeal. One of the main drawbacks of the study is that it relies on secondary data provided by the Dutch Statistical Bureau. Any errors or inaccuracies in this data would certainly undermine the study. While this problem is indeed concerning, it is assumed that before releasing data, the Dutch Statistical Bureau undertakes rigorous quality assessments to ensure accuracy. Therefore, the risk that the data could weaken the study is low. Another possible deficiency lies in the use of the single case study design. While this approach allowed for a comprehensive examination of the situation in Amsterdam to be undertaken, it does not necessarily generate generalizable conclusions. Basically, the observations made relate only to Amsterdam and it would therefore be difficult to extend them to other cities that are experiencing gentrification. Even with these flaws, the study still offers crucial insights that could inform how Amsterdam and other urban areas with similar characteristics respond to the issues that arise from gentrification. More importantly, the study's shortcomings create opportunities for further inquiry. Among other things, scholars can adopt multiple case study designs to investigate the root causes of gentrification in other cities to determine whether Amsterdam is truly isolated or its situation is replicated across the globe.

4.2 RECOMMENDATIONS

It is clear that Amsterdam faces a crisis that has been caused by the gentrification of its neighborhoods. Among the key challenges that the city needs to address urgently is the housing shortage that is pushing many to relocate to other areas. Fortunately, there are numerous case studies that offer lessons regarding how Amsterdam can increase the supply of housing while keeping rents at reasonable and manageable levels. According to (Bender and Lander, 2019), in the US, Brooklyn and Minneapolis are among the cities that have taken steps toward resolving the housing shortage challenge. Among the solutions that these areas have adopted include introducing rent ceilings, enacting legislation that safeguards the rights of tenants, especially vulnerable ones from minority communities, and partnering with private entities for the construction of new affordable housing units (Bender and Lander, 2019). As a direct result of these solutions, Brooklyn and Minneapolis have made tremendous gains toward guaranteeing decent and affordable housing for all. Amsterdam can certainly replicate the measures that these cities have implemented. For example, the city's authorities should join the national government in adopting rent regulation protocols as part of efforts to protect the residents against the high rents and the adverse impact of platforms like Airbnb which are pushing the residents out of their neighborhoods.

Another solution that Amsterdam should consider adopting is doing away with gentrification and experimenting with new approaches to urban renewal. Already, there are some cities that have achieved enviable success in shunning gentrification and instead undergoing transformation through more sustainable solutions. For example, according to (Tol, 2019), in cities across states like Washington, instead of gentrification, authorities introduced such solutions as offering residents the opportunity to purchase the homes they live in, protecting such at-risk groups as the elderly and communities of color, partnering with the

private sector for the creation of employment opportunities, and expanding public housing programs. Essentially, these interventions allow cities to experience the same benefits that gentrification delivers without the adverse outcomes that this process produces. Therefore, even as Amsterdam continues to welcome, young and affluent individuals into neighborhoods where rents and house prices are on the rise, the city should take steps to cushion existing tenants and homeowners.

In addition to the proposals outlined above, the Amsterdam authorities are also strongly encouraged to examine the environmental impact of gentrification. It is true that this study did not concern itself with the environmental damage that results as cities undergo gentrification. However, it is difficult to ignore this issue especially during the present moment when concerns are being raised about the harm that the planet continues to suffer due to destructive practices such as unrestrained exploitation of natural resources and industrialization. In general, research has determined that gentrification actually benefits the environment through such initiatives as greening efforts (Maantay & Maroko, 2018). However, other scholars have noted with great concern that the environmental protection measures that accompany gentrification actually pose serious threats to the health and socioeconomic wellbeing of poor populations (Anguelovski et al., 2019). If it is truly committed to social justice and equality, Amsterdam should endeavor to protect its poorest against the environmental harms that emanate from gentrification.

Perhaps the most important recommendation is reserved for the research community. As this study has demonstrated, there are numerous components of gentrification in the Amsterdam area that remain poorly understood. For example, this study has not provided clear answers on why racial composition has no significant influence on gentrification in Amsterdam. The onus is on other researchers to explore this and other questions that the study has raised. It is proposed that researchers should work towards expanding existing knowledge

on the implications and outcomes of gentrification. Among the specific questions that they can attempt to answer include the changes that Amsterdam should expect to experience if it fails to take action to curb the damaging effects of gentrification as well as the tailored solutions that the city can implement to ensure that even as it gentrifies further, the wellbeing of the city's most vulnerable communities are not threatened.

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