John Frye, Kathy Tien

Housing Development: Assessing Opportunity Zones in Baltimore, MD

Report Abstract

In West Baltimore's historic Harlem Park neighborhood, where 96.9% of the total population are Black or African American, one out of every three houses are vacant and abandoned.[1] Abandoned residential properties not only depreciate the property value of neighborhoods, but they also pose a serious threat to economic development, safety, and environmental health concerns. To alleviate this issue, Baltimore brought about an initiative that provided private investment into "Opportunity Zones." Our main objective in this report is to identify risk factors of low-income neighborhoods contributing to the issue of housing development, evaluate the effectiveness of Opportunity Zones at mitigating those risk factors, and recommend initiatives to improve the standard of living in Baltimore.

Based on our data analysis, neighborhoods with high percentages of non-White residents are at the highest risk of low household income, poor public infrastructure, and low access to economic progress. The identified risk factors were insufficient in confirming the effectiveness of Opportunity Zones, due to the limitation of data availability on our end. Both city- and neighborhood-level initiatives enacted by the Department of Housing and Community Development must work in tandem to improve the urban development and economic strength of low-income neighborhoods.

PART I: Background Information

Baltimore's History

Although de jure segregation is a thing of the past, the deeply segregated neighborhoods of Baltimore exist as a reminder of the early 1930's redlining practices.[2] After the Great Depression, mortgage loan companies faced the imminent risk of foreclosure or automatic defaults from the majority of their debtors. To identify the safest investment areas within the city's boundaries to refinance outstanding mortgage loans, firms such as the Home Owners Loan Corporation used racial demographics as a major determinant for the tenants' probability of default[3]. Neighborhoods with predominantly low-income Black populations were marked with the "red line" and excluded from the mortgage relief package that would have helped them stay afloat in the aftermath of the Great Depression. The impacts of redlining are still very much present in the city today; Baltimore continues to struggle with improving the housing conditions and economic opportunities of these minority neighborhoods.

The lack of public infrastructure in such neighborhoods is just one of many burdens on low-income populations, alongside rampant drug use, high crime rates, and low social mobility. In 2017, the federal government passed the Tax Cuts and Jobs Act to heavily reduce income

[1] https://health.baltimorecity.gov/sites/default/files/47%20Sandtown.pdf
[2] https://www.npr.org/2018/08/07/632497683/in-baltimore-the-gap-between-white-and-black-homeownership-persists
[3] https://ncrc.org/holc/

taxes and bolster capital flow into the poorest areas of the country.[4] The legislation created the Opportunity Zones initiative.[5] Areas within Baltimore that are in need of commercial investment are designated as an "Opportunity Zone," and investors are guaranteed tax benefits when they funnel their cash into community funds that finance community housing projects and local businesses.

The Importance of Housing Development

Quality housing projects, a key component of Opportunity Zone funding, offers a number of positive economic impacts to a city's residents. Higher valued homes are subject to higher property taxes, which in turn provide more funding to a district's public schools. Housing prices in neighborhoods with no abandoned homes are 7 times higher than those in neighborhoods with abandoned homes.[6] The ability to own a large, appreciating asset like a home is fundamental to building inter-generational wealth. Moreover, students from owner-occupied homes have a 19% higher graduation rate than their peers who live in rental properties.[7]

Quality housing also holds demonstrable importance in regard to public health. Homeowners report lower rates of asthma and other diseases than people living in rental properties.[8] Conversely, neighborhoods suffering from housing abandonment are characterized by higher rates of social disorders and a greater likelihood of pest infestation. Neighborhoods with many abandoned properties exhibit a 19% higher rate of violent crime than occupied neighborhoods.[9] This latter statistic is not merely a symptom of a neighborhood's lack of opportunities; abandoned properties provide havens for illicit activities and are actively targeted for arson attacks that injure over 6,000 firefighters every year.[10]

Neighborhood Vitality and Housing

Local business and job creation are other key elements of neighborhood vitality that Opportunity Zones seek to address. Baltimore's lowest income neighborhoods feature low job density, indicating a lack of local businesses or job opportunities to employ residents.[11] While low job density poses no problem for wealthier individuals who can afford a car to commute to work, low-income residents must depend on public transportation for jobs outside of their neighborhood. If public transportation is slow or inefficient, it can create productivity and wage

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[4] https://taxfoundation.org/final-tax-cuts-and-jobs-act-details-analysis/#:~:text=The%20Tax%20Cuts%20and%20Jobs%20Act%20would%20reform%20the%20individual,and%20simplifying%20the%20tax%20code.

[5] http://baltimoredevelopment.com/opportunity-zones

[6] https://www.interfire.org/features/pdfs/Background%20Paper_2006.pdf

[7] http://www.habitatbuilds.com/wp-content/uploads/2016/04/Benefits-of-Homeownership-Research-Summary.pdf

[8] https://www.urban.org/sites/default/files/publication/89491/2017.04.03_urban_blight_and_public_health_vprn_report_finalized.pdf

[9] https://journalistsresource.org/studies/government/municipal/abandoned-buildings-revitalization/

[10] https://www.firearson.com/uploads/Speaker-Notes-Building-Security.pdf

[11] https://github.com/John-Frye/household_income_and_job_accessibility_in_Baltimore

penalties for workers dependent on it.[12] In regards to housing development, small businesses increase property values by 14% to 30%, while large industrial complexes decrease property value.[13] If industrial development is geared towards public transportation or improved infrastructure, however, it can lead to a 20% to 25% increase in property value.[14]

Increasing property values can prove instrumental in growing property-owners' intergenerational wealth. However, rising mortgage and rent costs can negatively impact lower income residents if improperly managed. Gentrification is thus a possible consequence of urban development, one which has the possibility to diminish neighborhoods' social capital and increase eviction rates among an area's most marginal citizens.[15]

Our Problem Statement

Evidently, the quality of housing infrastructure within Baltimore's neighborhoods is directly connected to the city's ongoing troubles of de facto segregation, wealth disparities, and stagnant economic growth. With this in mind, how can we make an informed decision on policies alleviating the consequences of unstable housing? Specifically, how successful are Opportunity Zones in Baltimore at stimulating economic growth without contributing to gentrification, and what additional risk factors can we focus on to improve the effectiveness of such government initiatives?

PART II: Data Analysis and Findings

Identifying Relevant Data: Using the Multiple Regression Model

The first step to understanding the associated risk factors with housing development is to identify the statistically significant variables. The two open data sources used are Opportunity Insights' Opportunity Atlas and Baltimore Neighborhood Indicators Alliance's Vital Signs Open Data Portal, both of which quantitatively measure indicators of neighborhoods' standard of living and overall well-being.

Below is the list of datasets used (each dataset was categorized by neighborhood):

1. Percent non-White
2. Average household income
3. Percent of vacant and abandoned residential properties
4. Rent affordability index - percentage of households that pay more than 30% of total household income on rent and related expenses
5. Mortgage affordability index - percentage of households that pay more than 30% of total household income on mortgage and housing-related expenses
6. Percent of vacant city-owned properties

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[12] https://www.washingtonpost.com/news/wonk/wp/2016/02/25/how-much-of-your-life-youre-wasting-on-your-commute/

[13] https://homeguides.sfgate.com/effects-commercial-property-residential-value-7923.html

[14] https://www.researchgate.net/publication/227360465_The_Impact_of_Industrial_Sites_on_Residential_Property_Values_A_Hedonic_Pricing_Analysis_from_the_Netherlands

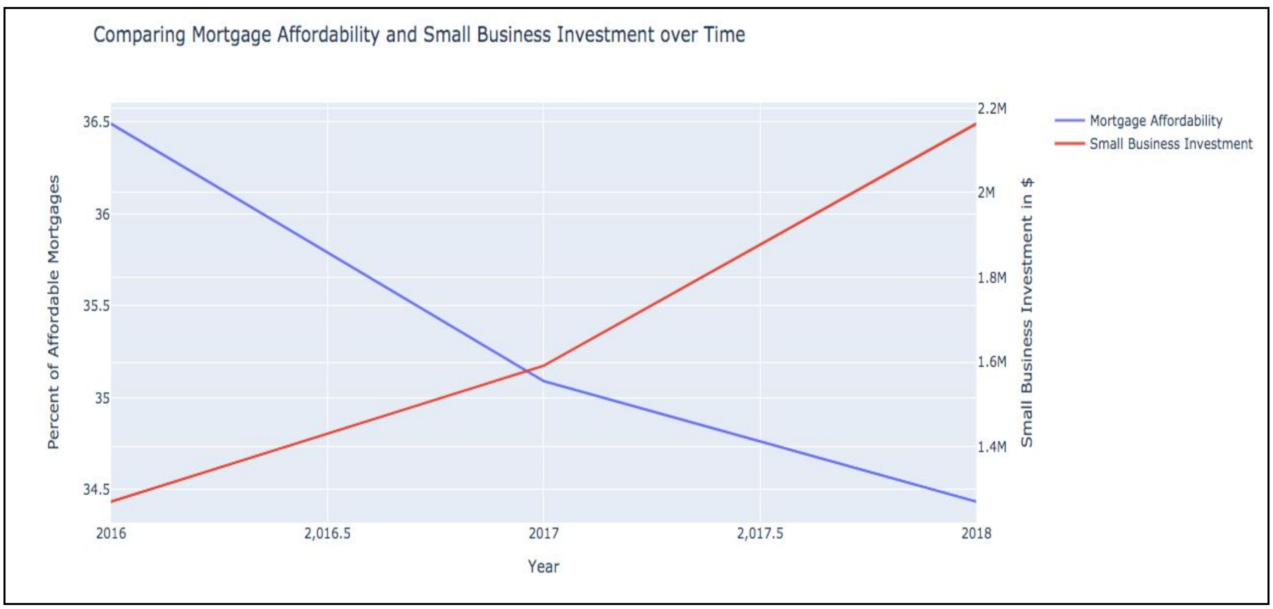
[15] https://www.cdc.gov/healthyplaces/healthtopics/gentrification.htm

7. Median price of homes sold
8. Percent of owner-occupied housing units
9. Rate of housing vouchers per 1,000 rental units - percentage of tenants in private rental market that are on housing voucher holders
10. Total number of commercial properties
11. Population growth/decline
12. Number of banks per 1,000 residents
13. Total dollar amount invested in small business (per 50 businesses)
14. Percent of employed population with travel time to work of 0-14 minutes
15. Unemployment rate

Of the 15 datasets, with "Percent non-White" as the predicted variable in the multiple regression model, 4 variables were statistically significant, designated by a p-value less than 0.05: household income, mortgage affordability, percent of owner-occupied housing units, and percent of employed population with travel time to work of 0-14 minutes. Statistical significance of these variables indicate that they are reliable determinants of neighborhood standard of living, and they should be variables of interest as we move forward with data analysis.

Explaining Correlation Trends

While many of the data analysis' variables are not statistically significant when compared to race, the metric used to gauge neighborhoods in the black butterfly, many of the variables are statistically significant and correlated when compared directly to one another. Mortgage Affordability and Average Small Business Investment share a correlation of -0.27, meaning that mortgage affordability decreases on average when small business investment increases. This correlation is statistically significant, having a p-value of 0.007. The relationship between mortgage affordability and small business investment in Baltimore is modeled below:



The negative correlation between small business investment and mortgage affordability highlights how gentrification could present an issue for the Opportunity Zones' development track. Notably, mortgage affordability has a correlation of 0.6 with percent non-white, meaning that non-white neighborhoods in their current state have more affordable mortgages. This finding supports long-held beliefs that Baltimore's redlining practices segregated largely black populations into areas that, consequently, experienced low real estate values. Mortgage affordability is interestingly more prevalent in lower income neighborhoods. Again, this fact highlights that low income, black populations are vulnerable to gentrification's sudden price rises.

Furthermore, fast commute times are negatively correlated at -0.3 with percent non-white, meaning that predominantly non-white neighborhoods experience longer commute times. Given the -0.5 correlation between percent non-white and household income in Baltimore, this finding aligns with previous analysis on the link between long commute times and lower household income.

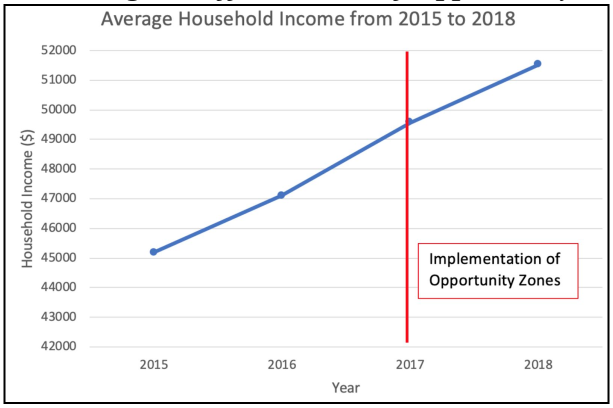
Graphical Representation of At-Risk Neighborhoods: Cluster and Geospatial Analysis

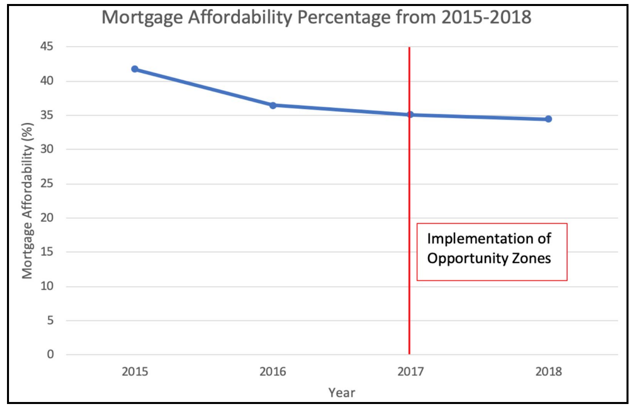
1	low non-white, high household income, high mortgage affordability, high owner-occupied housing, low commute time
2	high non-white, low household income, high mortgage affordability, low owner-occupied housing, low commute time
3	high non-white, low household income, high mortgage affordability, high owner-occupied housing, high commute time

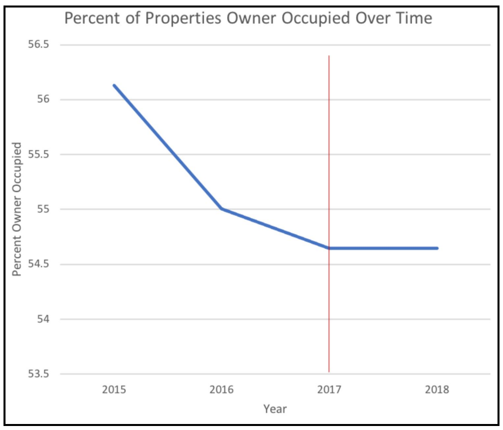
This map of neighborhoods organized by risk factors provides a visual representation of the areas within the city that are in dire need of resources for economic growth. Neighborhoods in cluster 3 are at the highest risk of poor infrastructure - low-income residents struggle with secure housing and high commute times attributed to the lack of economic opportunity in their vicinity. Cluster 3 neighborhoods, as shown in the map, is located in the "Black Butterfly," which encompasses the disadvantaged areas of West and East Baltimore. Poor infrastructure is directly tied to the public health of the area: Downtown also happens to have the lowest average life expectancy (66 years) in the city. In comparison, Roland Park, the city's wealthiest neighborhood, has an average life expectancy of 84 years.

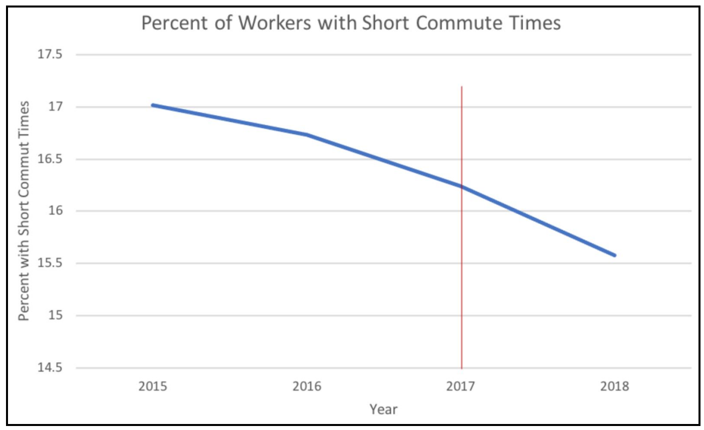
Geospatial analysis was limited by the availability of open data for most of Baltimore's neighborhoods. Complete datasets for all neighborhoods would have provided a more accurate and comprehensive analysis of which neighborhoods would benefit most from economic stimulus initiatives.

Evaluating the Effectiveness of Opportunity Zones









The multiple regression model and cluster analysis confirmed the statistical significance and validity of the datasets relevant to housing and community development. To evaluate the effectiveness of Opportunity Zones, we can look at data trends of each variable before and after the implementation of the program in 2017 to determine whether or not the increase in private investment in these Zones are fueling economic growth.

The steady upward trendline for average household income is a promising indicator of growing capital flow and business opportunities within Opportunity Zones.

Mortgage affordability decreased by roughly 0.5% after the implementation of opportunity zones. Because this decrease follows a trend of decreasing affordability over time, we cannot derive any conclusions as to whether or not Opportunity Zones themselves are responsible for the trend. As mentioned, mortgage affordability is negatively correlated to small business investment. Declining mortgage affordability is certainly a risk created by opportunity zones, but we cannot conclude if opportunity zones' investment packages have made a significant impact on mortgage as of yet.

In recent years, the percentage of owner-occupied houses in Baltimore has been decreasing. After the implementation of Opportunity Zones, the percentage has plateaued. We therefore cannot derive any conclusions from this finding, as there is no clear indication that Opportunity Zones have stabilized the number of homeowners living in their own properties.

The percentage of workers with low commute times has also decreased in Baltimore since 2018. The consistent decrease in the percentage of low commute times prior to 2017 indicates that the Opportunity Zones are not likely responsible for a rise in commute length. However, they have not stabilized or reversed the trend of lengthening commute times.

Data before and after the Opportunity Zones initiative is inconclusive on whether private investment in these areas contributed to the improvement in housing and neighborhood vitality. Although we observe a steady increase in average household income, there are no consistent trendlines for the remaining variables. A possible explanation for this, and an important point to note, is that efforts in community development programs need to be sustained over long periods of time for us to observe a substantial change in data trends. Baltimore's poorest neighborhoods struggle with crime, drug use, inadequate healthcare, etc., and all of these issues are connected to the city's failing infrastructure.

In addition, the variables of interest in our data analysis not capturing the successes or shortcomings of Opportunity Zones is most likely due to the limited open datasets available for analysis. Datasets examining rates of commercial lending, mortgage loans, and private investments in each neighborhood would have given more insight into economic activity and cash inflows.

Of note, none of our identified target areas in Cluster 3 overlapped with any Opportunity Zones, despite their low standards of living.

Comparing Baltimore's OZs to D.C.

State-level evaluation (conducted by the Urban Institute Metropolitan Housing and Communities Policy Center) of socioeconomic progress within designated Opportunity Zones saw a 6.0% improvement in Maryland OZs, compared to a 32.2% increase in the D.C. area.[16] Unlike Maryland programs, the Opportunity Zones' strategies in D.C. are catered specifically to the selected neighborhoods. During project formulation, the Office of Planning and Economic Development gathers public opinion from residents, stakeholders, and other government officials about the needs of each area.[17] In the implementation phase, advisory neighborhood commissioners are established within each neighborhood to supervise local projects in building renovation, sewage and zoning improvements, sanitation services, and economic improvement. These preemptive measures to target programs at the most immediate concerns of each area contribute to the overall success of D.C.'s OZs. The fact that Baltimore's Opportunity Zones were not targeted at high risk Cluster 3 neighborhoods evidences the city's improper targeting of benefits.

PART III: Final Recommendations

16 https://www.urban.org/sites/default/files/publication/98445/did_states_maximize_their_opportunity_zone_selections_7.pdf

17 https://dmped.dc.gov/page/how-dc-designated-our-opportunity-zones

The following recommendations are intended for the Baltimore Department of Housing and Community Development. The department's mission statement is: "The Baltimore City Department and Housing and Community Development (DHCD) works to improve the quality of life for all Baltimore City residents by revitalizing and redeveloping communities and promoting access to quality affordable housing opportunities in safe, livable neighborhoods."

Important Note: These efforts, both on the city-wide and neighborhood level, need to be sustained over several years to observe tangible effects. To evaluate the effectiveness of implemented programs, the Department of Housing and Community Development must actively collect data on variables such as average household income, percent of renovated residential properties, rate of commercial lending and/or private investment to observe trends in overall neighborhood improvement.

Improvements on Housing Initiatives

As Opportunity Zones' economic development aspect could contribute to gentrification, it is important for the program to enact anti-gentrification measures going forward. In particular, Baltimore City Government should invest in three housing policy initiatives.

Firstly, the Department of Housing and Community Development should fund independent community land trusts. A community land trust is a non-profit corporation that owns property and rents or sells it to low-income individuals for a low price. Community land trusts could provide relief for Baltimore's lowest income residents who do not have enough income for a long-term saving plan. However, community land trusts do not allow homeowners to have an appreciating asset (and thus build intergenerational wealth).[18] Community land trust funding could therefore be targeted at a select number of properties in extremely low-income areas.

One of the easiest aspects of housing development such a strategy could address is Baltimore's prevalent home abandonment. Based on our dataset, Baltimore City already owns an average of 10% of abandoned properties in target areas. Funding the refurbishment and transfer of these homes to community land trusts will provide a select number of low-income housing modules to those in dire need, while also increasing the property values of current homeowners and allowing for the accruement of intergenerational wealth.

To guard against the gentrifying aspect of this growth in value, the Department of Housing and Community Development should also increase its funding to housing vouchers for low-income renters and homeowners to offset their rising living costs. The Department should also expand housing vouchers to be applicable to mortgage payments for low-income individuals in target areas. This policy will allow for house values to appreciate without incurring the risk of current resident displacement or distorting the market value of housing. Funding for this policy should be a greater amount than funds for community land trusts.

Programs to be Implemented at the Neighborhood Level

As we have discussed throughout this report, Baltimore's urban revitalization is intrinsically connected to economic development. The existence of vacant properties is not the singular cause

18 https://www.bloomberg.com/news/articles/2019-04-29/alternative-homeownership-land-trusts-and-co-ops

of crime and low household income, but it certainly exacerbates the risk factors of disadvantaged neighborhoods.[19] The implementation of neighborhood-specific programs, in combination with city-level initiatives mentioned in the previous section, will address the economic and environmental needs of low-income neighborhoods. The following bullet-point discusses potential neighborhood-level policies to be implemented, organized into a hypothetical timeline of action items for the Department of Housing and Community Development to consider (note that most of these initiatives already exist, but not in tandem):

Strategic Planning: Data Collection and Neighborhood Council Appointments

- *Note: Adopted from D.C.'s Opportunity Zones program - refer to "Comparing Baltimore's OZs to D.C." for details*
- Step 1: Distribute surveys to residents, private investors in OZs, and government divisions to collect public concerns specific to each neighborhood
- Step 2: Prioritize concerns of highest risk to safety and health of neighborhood
    - E.g., deteriorating buildings or sewage systems, prevalence of bankruptcy, homicide rates.
- Appoint local residents and government officials to neighborhood councils responsible for supervision of economic and urban development projects
    - Especially important for the government to collaborate with individuals who experience first-hand the severity and urgency of issues

Phase 1: Economic Stimulus Initiatives

- *Note: An overwhelming portion of minority populations, especially the Black and African American communities, struggle with low household income and reside in the city's low-SES areas. This phase is primarily aimed at encouraging economic activity for individuals in such areas.*
- Incubators for Black-owned businesses: provide facilities and funding for minority groups to jump-start businesses, access educational resources (e.g., gaining financial literacy skills), and sustain businesses in the long-term.
- Collaboration with Baltimore Development Corporation to receive funding

Phase 2: Infrastructure Revitalization

- Partnerships with local non-profits (e.g., Habitat for Humanity, Baltimoreans United in Leadership Development): organize housing renovation projects staffed by volunteers to convert vacant spaces into community-funded housing for low-income residents. This phase will coincide with the refurbishing of abandoned houses described in the housing initiatives section.

Phase 3: Community Education

- Youth education centers: provide educational programs and resources for Baltimore youth to promote psychological, cognitive, and mental health
- Existing programs: Youth Empowered Society, Youth Opportunity Baltimore
- Suggested youth programs to be implemented:
    - Financial literacy
    - STEM-focused courses
    - Career and leadership development
    - Low-cost mental health services
    - General health and life skills

[19] https://www.marketplace.org/2020/07/08/why-cant-baltimore-solve-vacant-housing-problem/

- Fitness and recreational activities

Funding of Neighborhood-Level Programs

The Minimum Projected Budget for our proposal is broken down as follows:

Program Task	Minimum Projected Cost	Completion Time	Number of Repetitions	Total Cost In Year 1
Refurbish Abandoned Houses	$ 4,682,491.20	12 Months	1	$ 4,682,491.20
Community Land Trust Funding	$ 416,666.67	1 Month	12	$ 5,000,000.04
Housing Voucher Funds	$ 1,250,000.00	1 Month	12	$ 15,000,000.00
Government Appointments	$ 150,000.00	1 Month	1	
Black Business Incubator Funding	$2,000,000	1 Month	12	$ 24,000,000.00
Youth Education Center Funding	$1,000,000	9 Months	1	$ 1,000,000.00
Further Data Gathering	$ 500,000.00	6 Months	1	$ 500,000.00
				$ 50,182,491.24

As the Department of Housing and Community Development should apply our recommendations on an initially small scale to troubleshoot their efficacy, we recommend that our stakeholder invests around $4.68 million into refurbishing the 65 abandoned homes already in its possession in target neighborhoods.

A total investment of $20 million should be placed in housing programs identified in the housing initiatives section.

$24 million should be invested in total in the black business incubator, as we project the majority of selected neighborhoods' economic growth and poverty reduction will result from revitalized local businesses.

$1,000,000 in additional funding should be provided to support existing Youth Education programs. $650,000 should be designated for data collection and the appointment of government officials to neighborhood councils in target areas.

There are two main sources of funding for the neighborhood-level programs:

1. Federal assistance: Baltimore City received around $5.44 billion in federal funding during the 2018 fiscal year, with an additional $1.1 billion allocated for housing development.[20]
2. Private investment: Use existing network of stakeholders and community funds within Opportunity Zones programs, and establish connections with real estate investors willing to capitalize on tax benefits.

For the housing initiatives, funding will be derived both from the $1.1 billion allocation and a proposed $20 million contract for community land trust investment that Baltimore City is set to enact by 2023.[21] We recommend re-allocating these funds towards our project, with $5 million going towards community land trust investments, and the remaining $15 million going towards housing vouchers for low-income residents.

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[20] https://foxbaltimore.com/news/local/baltimore-city-gets-billions-in-federal-aid-annually

[21] https://www.baltimoresun.com/business/real-estate/bs-md-housing-trust-20180810-story.html

The Future of Development in Baltimore

We recommend that the Baltimore Department of Housing and Community Development begin our proposed program in January of 2023. The following timeline documents the deadlines the Department must abide by for the following year.

- **February 2023**
    - Allocate the first installment of payments to selected Community Land Trusts and Housing Voucher recipients
    - Appoint government officers to neighborhood councils
    - Allocate first installment of payments to black business incubators
        - *Payment allocations will be made monthly for the following year, and for a potentially indefinite period if the Department intends to upkeep the program over time
- **June 2023**
    - Conclude survey period and data collection/analysis
- **September 2023**
    - Complete payment of additional funding to youth education centers
- **December 2023**
    - Finish refurbishment of government-owned abandoned properties and transfer properties to community land trusts for use as extremely low-income housing

The current minimum budget of $50.1 million is designed only to accommodate a small-scale test of our development proposal in select neighborhoods. If the program can raise household incomes without significantly displacing local residents, then the Department of Housing and Community Development can scale it up to all of the city's Opportunity Zones. Such an increase in scope would necessitate a proportional increase in the amount of funding required. Furthermore, elements of the program, such as funding for land trusts, housing vouchers, business incubators, and youth education centers will need to be funded on an ongoing basis beyond the initial trial period's first year. Annually, the Department will also need to gather data on standard of living indicators and community feedback to ensure that the program is meeting its intended goals of raising incomes and stabilizing residents' living costs.

PART IV: Appendix

Section 1: Excel Data Analysis Steps

Raw Dataset Parameters: Refer to "Identifying Relevant Data: Using the Multiple Regression Model" section of report for list of datasets and data sources

For each dataset:

1. Reorganize Data: reorder and filter tracts by neighborhoods within city boundaries (using Text-to-Column, Sort-and-Filter)
2. Pivot Table: insert reorganized data into Pivot Table – filtered by neighborhood, values averaged to account for neighborhoods with multiple data points, expressed in percentage (%) or dollar value ($)
3. Filter Data: filter neighborhoods with available data points for all datasets (neighborhoods with incomplete datasets were excluded from data analysis)

Data Analysis:

1. Multiple linear regression: 15 datasets using Data Analysis Toolkit, with “Percent Non-White” as y-value for regression model.
2. Correlation function: used “CORREL” Excel function to compare statistically significant variables from multiple regression model with “Percent Non-White”
3. Cluster Analysis: run cluster analysis with Solver using statistically significant variables, categorize neighborhoods by three clusters
4. Geospatial Analysis (refer to Google Colaboratory Notebook for data analysis steps):
    a. Import relevant libraries
    b. Import cluster dataset of “Neighborhood Name” and “Cluster Number”
    c. Import geospatial data of Baltimore City map from Baltimore Neighborhood Indicators Alliance portal
    d. Merge geospatial polygon shape data onto cluster dataset
    e. Create static choropleth map using geoJSON format
5. Data Trends Before and After 2017:
    a. For all variables, average data points for 2015 -2018
    b. Pivot Table: insert data into Pivot Table filtered by neighborhood and values
    c. Create Pivot Chart

Section 2: Google Colaboratory Notebook Link

https://colab.research.google.com/drive/1jX_hMxFjl_cFCt1_DOU5E9e8WHgiSDN2?usp=sharing

Section 3: Github Repository Link

https://github.com/John-Frye/housing_development_in_baltimore