Abuja Journal of Economics & Allied Fields, Vol. 12, No. 5, December, 2023.
Print ISSN: 2672-4375 Online: 2672-4324

# Analysis of the Effects of Road Provision Budgetary Allocations on Property Investment Returns in Selected Areas of Abuja, Nigeria

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***Abstract***

*The Nigerian government faces infrastructure funding challenges. Consequently, interested in knowing the possible areas that spending will be of more effects in order to ascertain government's benefits derivable from such effects in terms of increased revenue generation through tax. This is for the purpose of gaining the capacity to provide or maintain new or existing infrastructure respectively. Therefore, this paper analysed the effects of budgetary allocations (budgetary expenditures) on property investment returns in Abuja Nigeria. It aims at determining the level of impact of government road provision budgetary expenditures on property investment returns. In order to achieve the aim of the study, quantitative method research design was adopted for data collection. The data obtained was analysed quantitatively. Regression analysis was used to determine the increase in property values (rental and sales) as a result of budgetary expenditure on road provision. Findings show that budgetary expenditures (road reconstruction)lead to increase in property values in the areas thereby, having positive effect on property investment returns. This serves as the basis of guidance to government decisions on the allocation of more funds inroad provision budgets. The potential for capturing the rise in returns of real estate investments due to budgetary expenditures on road provision that serves as an alternative funding source through property tax is estimated.*

***Keywords:*** *Analysis, effect, road budgetary allocations, property, investment returns.*

## Introduction

Metropolises according to Yen et al., (2018) and Yakubu et al., (2022) are hubs of commercial and economic activities. There is therefore, the need for convenient access towards delivery of goods and services for the sustainability of the commercial and economic activities.

The selected areas which are five (5) in numbers are Wuse, Jabi, Central Area, Area 1 and Utako. They serve as the geographical scope of this paper and this is for the fact that they are parts of the Abuja commercial Activities concentration centres. These areas naturally by their characteristics need the adequate and good accessibility for the convenient delivery of goods and services. These areas predominantly comprise of commercial properties. Search for positive effect infrastructure on almost all sectors of human endeavour is the present order (Gibbons et al., 2019). Lieske et al. (2018) cite a good illustration of the effect of road provision on property investment. However, providing this infrastructure requires a lot of capital that needs additional source of revenue generation to help in funding the capital intensive project (Hess And McDonough, 2018).

The major source of funding road provision in

Nigeria has been through government budgets, and the demands of this funding source are several (Adebosin et al., 2019). The government as a result of this explores the need to devise a method for deciding where to make capital expenditures that will provide it access to other funding sources for road provision such as value capture (Roukouni et al., 2018). Value capture, according to Porter and Kramer (2019), is the process of identifying and documenting the rise in property values brought on by specific public capital investments in a constrained benefit region.

Resultant increased property values due to road provision that leads to higher investment returns, have positive impact on real estate sector of the economy (Jedwab and Storeygard, 2019; Yang et al., 2019). Property taxes from value addition to property can be used to partially or fully finance public capital investments as a substitute source of funding for road provision (Noring, 2019; Grover and Walacik, 2019). Simply put, value capture refers to the rise in value of properties close by that appear to have profited from increased accessibility that comes along with public capital investments (Yakubu et al, 2020 and Yakubu, 2023).

Governments globally have continued to recognize the significance of value capture as a result of value uplift, even though literature has disclosed numerous case study locations and illustrated the outcomes of infrastructure-dependent property value uplift (Yakubu et al., 2020). A typical example is the Government of New South Wales altered the term "value capture" to "value sharing" (Yen et al., 2018). As a result, the government will benefit from a portion of the value increase and be able to raise more money to support public projects (Yakubu et al., 2020). Except, for the recent times that few researches on the effect of road infrastructure on property values that focuses on commercial properties are coming up (Yakubu, 2023), numerous studies in the past, focused mostly on residential Properties (Wang et al., 2019; Seo et al., 2019; Yang et al., 2019; Baker and Lee, 2019; Li, Chen, and Zhao, 2019). Researches on the impact of road provision on property investment returns are still very much unexplored especially in the study areas of this paper.

In order to determine the effect of the road budgetary expenditures on the returns from property investments, this paper analyses road provision expenditures and property investment returns in the study areas. The pattern of property investment returns before-and-after budgetary expenditures is used in the research to detect an increase in property values (rental and sales) as measured by the before-and-after case technique and analysed using regression.

**Literature Review**

The land theory, developed by Alonso and Muth in 1964 and 1969, provides the theoretical foundation for increases in property values caused by greater accessibility. In essence, increased accessibility raises land rents since it gives landowners more accessibility options in terms of travel. Although this theory according to Yen et al., 2018 only applies to unimproved land, it provides the foundation for the general idea that public capital investments in accessibility-relatedtransportation infrastructures, such as road and rail, will result in an upward trend in property prices near the project. According to McAllister (2019), governments all over the world have some types of land taxation in place that provide for indirect benefits from an increase in the property value. This means that in practice, a specific tax is not always necessary for value uplift to be captured for revenue generation purposes.

Value capture from increased accessibility project is one of the ways that governments can create more revenue to help pay for public capital expenditures, but despite this indirect benefit, they are increasingly looking for methods to capture property value increases and support public capital investments. Given that road provision requires a lot of capital

investment, it is typically focused on achieving a particular policy of interest. It serves as a tool for value capture policies (Kyriacou et al., 2019).

Projects like the London Cross Rail and Hong Kong's Metro Rail (MTR) are examples of successful value capture implementations (Mathur, 2019; Mangioni, 2019). The upgraded rail property model refers to the method used by Hong Kong's MTR to finance rail development through the development of real estate along the above stations. The Cross Rail project in London received business rate supplement money from nearby companies. In particular, joint development schemes in India (Mathur, 2019) or London (Sovacool and Yazdi, 2019) have been the focus of an expanding body of literature on value uplift capturing, which also covers new financing schemes and methods such as stamp duty land tax, capital gains tax, business rates, and council tax. With the additional instruments that have been employed in the Indian setting (Funding of Delhi Metro), Mathur (2019) expanded the list.

However, if there is no uplift to be recorded, establishing a value uplift capture measure will be not necessary (McAllister, 2019). For efficient determination of the effect of road provision on property investment returns, this paper focuses on how crucial it is to determine property value uplift. According to Yen et al. (2019), identifying value uplift and capturing it has been a prominent area of attention for numerous studies all over the world. Researchers in the field of land use policy have worked very hard to identify and describe the characteristics of value uplift in order to determine it (Yen et al., 2019).

With the use of geo-spatial property sets of data, which enable an empirical examination of contours in urban land rents, the current researches significantly departs from those of the late 1990s in terms of methodology. Early researchers (McDonald and Osuji, 1995; Cervero and Duncan, 2002; McMillen and McDonald, 2004, Du and Mulley, 2007) started revealing various and, in most cases, positive uplifts of value within heavy and light rail investments by starting with simple pairs or spatial regression techniques in hedonic pricing studies. However, these models were unable to account for the differences in location with respect to neighbourhood. It led to the development of complex models that are based on Lancaster's theory of consumer demand. According to this theory, rather than viewing the commodities as discrete objects, the qualities of the goods have an impact on consumer wants (Lancaster, 1966). Rosen (1974) also offered the theoretical foundation for determining the market clearing prices of items based on those features.

This encouraged the presentation of bid rent concepts as a set of implicit prices in the hedonic model put forth by Alonso (1964) and Muth (1969). In a multi-variation regression model, the hedonic price model often controls for the characteristics of the dwellings themselves and the neighbourhood in order to determine the value of ease of accessibility. Early hedonic models have come under criticisms for the limitation in accounting for the implications of geographical data. It is worthy of mention that endogeneity effects have also grown in importance recently.

To address spatial issues, a range of spatial tools have been created and made available thereby improving processing power and analytical opportunities for the availability and quality of geospatial data. Improvements like difference-in-differences models, as demonstrated by Mohammad et al. (2015), also helped with potential endogeneity concerns. Recent study on value uplift has led to the employment of cutting-edge techniques to explore a variety of research problems and larger volumes of data.

The addition of a high-quality set of controllable variables to analyses of crime data (Billings, 2011), the discovery of longitudinal studies using data on repeat purchases (Pagliara and Papa, 2011), strategies for resolving the dependence effects of spatial variables (Cao and Porter-Nelson, 2016), and improved techniques like geographic weighted regression (GWR) (Du and Mulley, 2006; Mulley, 2014)

And pseudo panel data are some examples of methodological advancements (Mohammed et al., 2015). When matched pair or GWR studies are used, the heterogeneity of uplift and down lift between geographic areas and stations becomes more apparent.

In the BFS (Tsai et al., 2015) and the BLS, distinct public transportation terminals have both experienced uplift and down-lift (Hess and Almeida, 2007). Although there was an increase in value at various locations across the research areas on average, local contextual considerations prevented investment in public transportation from having a favourable impact on property value. Researchers have examined nearly every significant mode of urban public transportation currently in use, and they have discovered uplift effects for light rail (Billings, 2011; Murray, 2016; Yen et al., 2018), bus way systems (Deng and Nelson 2013; Zhang and Liu, 2015; Stokenberga, 2014), urban ferries (Tanko et al., 2019), bicycle sharing stations (Chu et al., 2019), as well as high speed rail stations (Wang and Gu, 2019; Beckerich et al., 2019). There are variations in the findings of earlier researches.Many studies, however (Tsai et al., 2015; Mulley et al., 2016), come to the conclusion that some beneficial value uplift effects do exist. Numerous more studies, including those by Mohammed et al. (2013), Crocker et al. 2000, Du and Mulley 2007, Knowles and Ferbrache 2016, and Crocker et al. 2007 reported adverse effects from the provision of light rail systems.

Yen et al. (2018) states that the adoption of approaches different from earlier ones that lack the potential to show the complex nature of various factors that could affect the housing market may be responsible for the diverse findings of the researchers. Whether it is for the provision of fresh land for development or for the reorganization of municipal land use, location, like rail infrastructure, also matters (Knowles and Ferbrache, 2016). Due to economic factors and the implementation of light rail, the effect on home prices may also be delayed (Siripanich et al., 2019). Mulley (2014) adds that expectations matter a lot Throughout the value uplift phase even though governments are known for either delaying or cancelling projects, which virtually prevents value uplift when projects first start.

**Research Gap**

The majority of previous researches have focused on the effect of transportation infrastructure on property values (PVs), with little attention paid to the expenditures (Budgetary Expenditures) of providing the infrastructure (Yakubu et al. 2020). In addition to not focusing on infrastructure costs, effects are always evaluated solely in terms of property values rather than returns on investment.

Budgetary expenditure on road provision is the focus of this paper rather than that of rail systems, which was the subject of the majority of earlier studies except Yakubu et al, 2020. This is because the research areas lack rail system in place and there are many studies that have taken this direction of research in other locations. Hence, this paper adds literature to the three (3) research gaps of road budgetary expenditures, investment returns, and properties. Understanding how road provision expenditures affects property investment returns is crucial because it provides the cost-benefit analysis needed to compare investment returns against expenditures.

**The Study Areas**

The selected areas for the study are Area 1, Central Area, Jabi, Utako and Wuse. As earlier stated above, these areas were selected because of their bustling commercial activities nature. They are comprised of mostly commercial properties. These areas all fall within the Abuja metropolis and are all in the Abuja Municipal Area Council (AMAC) out of the six (6) council areas.

**Methodology**

Data for the study was gathered through the use of quantitative research approach. Commercial properties rental and capital values were collected through the use of a structured data collection schedule from all the one hundred and five(105) registered Estate Surveying and

Valuation Firms in Abuja (Nigerian Institution of Estate Surveyors and Valuers (NIESV) Directory, (2022). Schedule instrument was used because it suits the method used in collecting the nature and type of data required for researches of this nature (Messoand Byaruhanga, 2019). Out of a total of eight hundred and fifty three (853) properties found on the database of the firms, the rental and capital values of three hundred and seventy seven (377) sampled commercial properties (shops and offices)were obtained directly through the exploration of database of the firms with the help of a team of ten (10) field assistants with each assistant covering ten (10) firms within fourteen (14) days excluding Sundays. The sample size (377) properties were arrived at through the use of **Kothari (2004) model.**

$$n = \frac{Z^2 * N * ó^2}{(N-1)e^2 + Z^2 ó^2}$$

Where n is the sample size, Z is the standardized normal value and for this study it is taken as 1.96 for a 95% confidence interval, ó is the standard of deviation which was put at 0.5 depicting a safe decision enhancing large enough samples, N is the number of commercial properties in the firms records and e is the margin of error put at +/- 5%.

The historical rental evidence and actual sales or sales valuation figures were used to compute the total returns within the period covered by the research, leveraging Akinsomi*et al.*, (2018).

Road Provision Budgets (Expenditures) data were collected purely as secondary data from the Engineering Department of the Federal Capital Development Authority (FCDA) Abuja. Formal letter of request for road provision budgets (expenditures) for the period covered by the research was written to the above mentioned office by the researchers. Subsequent follow ups were made before the researcher was availed the data. Regression analysis was used to model the contribution of road infrastructure provision expenditure on commercial property investment performance (returns). In other word, regression analysis modeled the amount of influence road infrastructure provision expenditures had on commercial property returns or amount of variation of commercial property returns that can be explained by road infrastructure budgetary expenditures. The model is stated as follows:

$$Y = á + âX + å$$

Where Y = returns on commercial property investment and X is the road infrastructure provision expenditures, á is the constant and â is a coefficient of regression and å = error term.

**Data Analysis and Results**

**Table 1: Road Provision Annual Expenditures in the Study Areas within the Last Five (5) Years (A , 000,000)**

| Year | Wuse | Central Area | Utako | Jabi | Area 1 |
|---|---|---|---|---|---|
| 2018 | 1580 | 1200 | 1000 | 60 | 250 |
| 2019 | 2000 | 1500 | 1000 | 95 | 300 |
| 2020 | 1700 | 1000 | 1500 | 100 | 500 |
| 2021 | 1600 | 1500 | 2000 | 179 | 450 |
| 2022 | 2000 | 2000 | 3200 | 330 | 580 |

***Source:*** *Federal Capital Development Authority (FCDA)*

Table 1 showed the annual amounts expended on road provision in the selected areas of Abuja. These comprised maintenance and construction of old and new roads respectively. The amounts spent on road provision in the study areas within the period under study are staggered. This shows that there was no uniformed expenditure on road provision in the study areas within the period under study.

**Table 2: Annual Rates of Property Investment Returns in Study Areas within the Last Five (5) Years (%)**

| Year | Wuse | Central Area | Utako | Jabi | Area 1 |
|---|---|---|---|---|---|
| 2018 | 37.81 | 30.33 | 37.81 | 26.66 | 21.44 |
| 2019 | 28.22 | 23.15 | 19.92 | 24.41 | 19.72 |
| 2020 | 23.87 | 18.86 | 18.22 | 20.64 | 15.98 |
| 2021 | 29.42 | 21.92 | 19.17 | 23.27 | 18.24 |
| 2022 | 21.43 | 11.24 | 22.39 | 18.86 | 26.86 |
| Average | 28.15 | 21.10 | 23.50 | 22.77 | 20.45 |

***Source:*** *Author computation, 2023*

*The property investment annual rate returns in study areas are presented in table 2.It shows a double digit annual rate of returns over the study period in the study areas. Wuse has the highest returns constituting 32.65% while Central Area, Utako, Jabi and Area 1respectively have 24.47%,27.25%, 26.41% and 23.72%.*

**Table 3: Effect of Road Provision Expenditures (RPEs) on Property Investment Returns in the Study Areas**

| Market | Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | $R^2$ |
|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | |
| Wuse | (Constant) | 7.099 | 5.399 | | 1.315 | .757 | .59 |
| | RPE | .347 | .104 | .629 | 3.333 | .004 | |
| Central Area | (Constant) | 24.436 | 5.332 | | 4.583 | .000 | .56 |
| | RPE | .230 | .114 | .281 | 2.074 | .000 | |
| Utako | (Constant) | 22.231 | 6.112 | | 4.482 | .000 | .60 |
| | RPE | .411 | .132 | .328 | 3.114 | .010 | |
| Jabi | (Constant) | 25.192 | 5.557 | | 3.586 | .002 | .57 |
| | RPE | .126 | .105 | .150 | 1.206 | .008 | |
| Area 1 | (Constant) | 24.593 | 6.667 | | 3.689 | .002 | .55 |
| | RPE | .175 | .135 | .251 | 1.302 | .009 | |

Source*: Author computation, 2023*

The result of simple regression analysis presented in table 3 showed the effect of road provision expenditures on property investment returns in the study areas. It revealed that 59%, 56% 60%, 57% and 55% variation in property investment returns in Wuse, Central area, Utako, Jabi and Area 1 respectively can be explained by the variations in the budgets spent on maintenance and construction of roads in the study areas. In other words, variation in returns of property investment is significantly influenced by the amount expended on both maintenance and construction of new roads such that any further successful N1 spent on road provision, will significantly cause 34.7%, 23%, 41.1%. 12.6% and 17.5% positive change in property investment returns in Wuse, Central area, Utako, Jabi and Area 1 respectively.

**Findings**

It was found that budgetary expenditures on road provision have positive effect on property investment returns and this is as a result of the role good accessibility. This therefore, implies that in addition to social benefits, government spending on roads provision also has economic advantages on the real estate sector of the economy.

In view of the above finding, governments too can share from this economic benefit that their spending has brought about, through the institution of appropriate property tax.

**Conclusion**

In conclusion, the study has been able to establish the effect of annual road provision expenditures on property investment returns in the study areas of Abuja. This means that with more expenditure, property investment returns will be influenced and consequently, government can generate revenue through property tax.

To achieve this, it is recommended that government needs to first invest more in funding researches of this nature in order to get the most value out of its spending. It should then engage the services of Estate Surveyors and Valuers to capture increases in property values for property tax purposes.

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