Research in Business & Social Science

IJRBS VOL 11 NO 6 (2022) ISSN: 2147-4478
Available online at www.ssbfnet.com
Journal homepage: https://www.ssbfnet.com/ojs/index.php/ijrbs

Assessment of fuel price, exchange rate and unemployment rate impact on road passenger journeys in South Africa

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ARTICLE INFO

Article history:
Received 19 July 2022
Received in rev. form 21 August 2022
Accepted 27 August 2022

Keywords:
Logistics, road transportation, fuel price, exchange rate, unemployment, South Africa

JEL Classification:
G14

ABSTRACT

The transportation sector is one of the sectors that contribute to the South African economy and its people’s well-being. This sector facilitates goods transportation and people’s mobility through air, water and land transportation. In recent decades passenger transportation journeys experienced a decline and this decline may due to various causes such as cost of transportation, low economic growth, exchange rate volatility, unemployment and petrol price. This study aimed to analyze the effect of petrol price, exchange rate and unemployment rate on on-road passenger journeys. The study applied ARDL and ECM models to data from 2008 to 2021 to examine how the variables above influence long-term and short behaviour in road passenger journeys. Findings revealed that, in the long run, all independent variables influence road passenger journeys. Yet, unemployment has more power over road passenger journeys than exchange rate and petrol price. Short-term dynamics reveal that only the exchange rate and unemployment influence road passenger journeys. The study recommends job creation, exchange rate strengthening and petrol subsidies to increase the number of road passenger journeys in South Africa.

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Introduction

Passenger transportation is one recent growing economic activity and the research forecasts assert that this rapid growth is more likely to continue in the future up to 2050 (Schafer & Victor, 2000). Some of the causes that influence roads passenger transportation growth at a high speed are improvement in the transportation system, access of mid-income social classes to individual transportation, suburbanization, severe traffic congestion and population growth (May, 2013; de Jong & van de Riet, 2007). In most developed countries, the contribution of the transport sector towards economic growth (GDP) varies between 6 and 12 percent. On the microeconomic revel, the transportation sector plays a major role in linking employees and employers, producers and customers (Rodrigue, 2020) and it is the vehicle in achieving the Sustainable Development Goals (Buonocore et al., 2019). Nonetheless, passer transportation faces various problems that include lack of adequate infrastructure, unfavourable transportation policies, unequal investment in passenger transportation between urban and rural areas and safety risks (May, 2013). These global issues within the transportation sector affect not only people who use public or private transportation but also the country's economy, especially within developing countries.

Apart from its worldwide importance, the transportation sector is one of major sectors drivers of economic activities in South Africa as it influences economic growth and economic development. The efficiency of the transport sector results in social and economic opportunities and its inefficiency leads to low quality of life and missed economic opportunities (Rodrigue, 2020). Irrespective of the role played by the transportation sector as a whole and road passenger transportation in South Africa, in recent times, the latter experience a drastic decline. Figure 1 displays passenger journeys changes for the period running from January 2015 to March 2021. As shown on the graph, South African passenger journeys increased only in June 2018 while before and after this month the transportation sector experienced a decline in passenger journeys. Considering only three months of 2021 the number of passenger
journeys decline by 27 percent whilst income from passenger road transports declined by 10.4 within the same period (Stats SA, 2021).

![Figure 1: Passenger transportation: year-on-year percentage change in passenger journeys; Source: Stats SA (2021)](image)

During 6 years, spanning between 2015 and 2021 exchange fluctuated from 11.57 USD-ZAR to 15.00 USD-ZAR (NEDBANK, 2021). Within the same period, the petrol price increase from R 11.24 per litter to R 18.10 (Petroleum, 2021) while the unemployment rate has risen from 25 percent to 34.4 percent (Maluleke, 2021). Looking at these statistics one can ask a question if there is no relationship between these economic variables and road passenger journeys. However, to the best knowledge of the author, no study was conducted to determine the relationship between the aforementioned variables. Therefore, the main objective of the current study is to analyse the impact of the exchange rate, petrol price and unemployment rate on road passenger journeys in the South African transportation sector.

**Literature Review**

Logistics plays an important role in any country's business development and socio-economic progress. Logistics is also a core factor of commercial activities through its contribution to the distribution of inputs and outputs. From inputs supply to outputs distribution. This explains why logistics is closely linked to or influenced by various macroeconomics variables such as inflation, employment/unemployment, exchange rate and fuel price changes (Havenga, 2010; Pienaar, 2009). Throughout the 20th century, the transportation industry was considered as one of the key drivers of the South African economic and investment objectives. This sector assisted in the growing movement of information, goods and people, and the creation of economic and social opportunities where the transport sector was linked to employment, output production and national aggregate income (Tsikai, 2016).

Road transportation is one crucial form of transportation in South Africa. Passenger road transportation in South Africa is subdivided into two main types of trip purposes namely commuter trips and both social and leisure trips. The commuter trips are those requested by passengers at any given time mainly for work and education purposes. These kinds of trips are mandatory as passengers have to take them irrespective of costs and quality of transport service provided. On the other hand, social and leisure trips are fixed for a specific period and are not mandatory. These trips can be adjourned or disregarded if the cost of transportation (cost of trip) is greater than the expected benefits (Onderwater & Kishoon, 2017).

Apart from public transport, there also individual's transports where people can use their cars. However, this form of transport involves also a financial cost. Additionally, to monetary cost, personal transport incurs time and both mental and physical efforts. Furthermore, some of the South African national roads are tolled and this increases the transport cost. Consequently, to minimize either monetary budget or physical and mental burden, irrespective of having their cars, people prefer to use public transport (Guo & Wilson, 2011; Onderwater & Kishoon, 2017). Likewise, the monthly income of the majority of South African households is less than R6000 and only a minority can have thy cars. This explains why a large number of people in South African uses public transport (buses and taxis) as means of mobility. The road journeys are preferred to rail transport because, irrespective of the latter being less expensive, the former is more reliable and flexible and it saves walking time to the train station (Walters, 2013).

**Overview of fuel price, exchange rate and unemployment**

Although the road journeys are preferred to other means of passenger transportation in South Africa, it is faced with various constraints that include high and volatile fuel price, exchange rate and high unemployment rate. Although the fuel price has been fluctuating over time, the period between the 2008 and COVID-19 pandemic has caused drastic price volatility. From December 2008 to December 2012, global crude oil increased from $40 to $126 per barrel. In January 2016 the Brent crude oil price went down to $30.5 a barrel to rise again to $81 in 2018. Due to the corona pandemic, in 2020 the fuel price dropped again to $20 per barrel.
Domestic fuel price is directly influenced by the power and stability of the domestic currency. The South African Rand has been fluctuating over the last decade. Irrespective of the financial crisis, in January 2008, one American dollar was exchanged for seven south African Rand (R7/$1). This exchange was also affected by the COVID-19 pandemic as in April 2020, one American dollar was exchanged for R19. In August 2021 the average exchange rate was R15 for one American dollar (South African Reserve Bank (SARB), 2021). South African road transport depend on the imported fuel and the price of the latter within the domestic market is determined by the exchange rate. Therefore, the exchange rate is another economic variable that impacts road transport demand (Havenga et al., 2014).

Travelling requires financial means and the latter is almost impossible when a person is jobless. Unemployment is another factor that impedes the South African transport industry. Historical statistics show that jobless in South Africa is becoming a critical challenge to both economic and social development which influence the logistics and transport industry. Between 1994 after the apartheid era and the 2008 financial crisis, the official unemployment rate increased from 20 to 22,9 percent (Stats SA, 1998; Stats SA, 2009) whilst the number of unemployed people reach its high level of 7,8 million in the second quarter of 2021 implying at 34.4 percent (Stats SA, 2021). This high growth of the unemployment rate is more likely to have an impact on passenger journeys as analysed and discussed in section 4.

Research and Methodology

A quantitative analysis was applied on quarterly time series for the period ranging from the first of 2008 to the first quarter of 2021. The period selection was based on the availability of some data and secondly on the fact that the author intended to only analyze the effect of independent on the dependent variable after the 2008 financial crisis. The selected series or variables were road passenger journeys as a dependent while petrol price, exchange rate and unemployment were employed as explanatory variables. All variables, except for the unemployment rate, were transformed natural logarithm to create a common ground and enables interpretation of percentage growth (Habanabakize, 2017). Unemployment was not converted in the log as the employed data was already in growth format.

In an attempt to assess the effect of petrol price, exchange rate and unemployment rate on road passenger journeys, this study employed the autoregressive distributed lag (ARDL) model introduced by Pesaran et al. (2001). This model was adopted to establish both long-run and short-run relationships among variables. The choice of the ARDL model was driven by its advantages. Firstly, this model is known for its ability to provide solid and valid results when applied to small samples (Romilly, Song and Liu, 2001). Secondly, the model is very flexible as it is applicable on data irrespective of their integration order provided that none of them is integrated of the second difference. Thirdly, lags selection are automatically by the software and the research is to select the best model. Fourthly, the ARDL model facilitates the regression analysis as it provides both short run and long run results simultaneously (Habanabakize et al., 2019). The ARDL model for this study was formulated as follows:

\[
\Delta LPPR = \alpha_0 + \sum_{i=1}^{k-1} \beta_i \Delta LPPR_{t-i} + \sum_{i=0}^{k} \delta_i \Delta LPR_{t-i} + \sum_{i=0}^{k} \eta_i \Delta LEXR_{t-i} + \sum_{i=1}^{k} \psi_i UNR_{t-i} + \lambda_1 \Delta LPR_{t} + \lambda_2 LPPR_{t} + \lambda_3 \Delta LEXR_{t} + \lambda_4 LUNR_{t} + \epsilon_t
\]

Where \(LPPR\) is the natural log of road passenger journeys, \(LPR\) is the natural log of petrol price, \(LEXR\) is the natural log of real effective exchange rate and \(UNR\) is the South African unemployment rate. The estimated short-run coefficient for each variable is represented by \(\beta_i\), \(\delta_i\), \(\eta_i\) and \(\psi_i\) while the estimated long-run coefficients are denoted by \(\lambda_1\) to \(\lambda_4\), the latter t represents the period of data while the \(\Delta\) denotes changes. Both \(\alpha_0\) and \(\epsilon_t\) indicate intercept and error terms respectively. To test the cointegration or long-run relationship among variables using equation 1, the following hypotheses were tested:

Null hypothesis \((H_0)\): \(\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0\) \(\rightarrow\) variables do not cointegrate

Alternative hypothesis \((H_1)\): \(\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0\) \(\rightarrow\) variable cointegrate

The author performed the bounds testing for cointegration to ensure that an adequate decision is made if rejecting or fail to reject the null hypothesis. The Pesaran (2001) critical values were compared to the value of computed F-statistics. Generally, the Wald test is subjected to three possible outcomes: either the value of calculated F-statistics is greater than the tabulated upper bound critical values, the value of calculated F-statistics is smaller than the tabulated upper bounds critical values or the calculated F-statistics value falls between tabulated upper bound and lower critical values (Habanabakize, 2021). The first outcome suggests a rejection of the null hypothesis implying that variables cointegrate, the second outcome implies failure to reject the null hypothesis meaning the absence of cointegration; while the last outcome leads to indecision. In case the first scenario of outcome reveals, meaning that a long-run relationship exists between variables, the next step is to perform the error correction model (ECM). Thus, from Equation 1, the subsequent error correction model is estimated:
\[ \Delta \text{LPJR}_t = \alpha_0 + \sum_{i=1}^{k} \beta_i \Delta \text{LPJR}_ {t-i} + \sum_{i=0}^{k} \delta_i \Delta \text{LPPR}_ {t-i} + \sum_{i=0}^{k} \eta_i \Delta \text{LEXR}_ {t-i} + \sum_{i=1}^{k} \psi_i \text{LUNR}_{t-i} + \lambda_1 \text{LPJR}_t + \lambda_2 \text{LPPR}_t + \lambda_3 \ln \text{LEXR}_t + \lambda_4 \text{LUNR}_t + \theta \text{ECT}_{t-1} + \epsilon_t \]

Where \( \text{ECT}_{t-1} \) is the error correction term and \( \theta \) represents the coefficient of the ECT used to measure the speed of adjustment of short-run shocks to long-run equilibrium.

The theory argues that cointegration between two more variables implies causation between those variables. There are various methods to determine causation among variables. These methods include Granger (1969) causality test which is often used when all variables under the study are integrated after first difference I(1) and I(0) the Toda-Yamamoto test applied on variables that integrate at different order: I(0) and I(1) (Toda & Yamamoto, 1995). Given that this study’s variables of interest are a mixture of I(0) and I(1); the following equations were estimated for the Toda-Yamamoto causality test:

\[
\begin{align*}
\text{LPJR}_t &= \alpha_0 + \sum_{i=1}^{k} \beta_i \text{LPJR} _{t-i} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LPPR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LEXR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \eta_{j1} \text{LUNR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \psi_{j1} \text{LUNR} _{t-j} + e_t \\
\text{LPPR}_t &= \alpha_1 + \sum_{i=1}^{k} \beta_i \text{LPJR} _{t-i} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LPPR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LEXR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \eta_{j1} \text{LUNR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \psi_{j1} \text{LUNR} _{t-j} + e_t \\
\text{LEXR}_t &= \alpha_2 + \sum_{i=1}^{k} \beta_i \text{LPJR} _{t-i} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LPPR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LEXR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \eta_{j1} \text{LUNR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \psi_{j1} \text{LUNR} _{t-j} + e_t \\
\text{LUNR}_t &= \alpha_3 + \sum_{i=1}^{k} \beta_i \text{LPJR} _{t-i} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LPPR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \delta_{1j} \text{LEXR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \eta_{j1} \text{LUNR} _{t-j} + \sum_{j=0}^{d_{\text{max}}} \psi_{j1} \text{LUNR} _{t-j} + e_t 
\end{align*}
\]

Where \( d_{\text{max}} \) denotes the maximum order variable’s integration for each selected series. The modified Wald (MWALD) test was applied on both null and alternative hypotheses to test whether causality exists between variables or not. In this case, the null hypotheses assumes that the lagged value of each independent variables equates to zero. Therefore, causality exists between independent and explanatory variables is rejected otherwise no causation between variables. The study also performed several diagnostic tests to ensure that results from all models are robust and valid. The next section presents and discusses regression results.

### Empirical findings and discussion

Before presenting and discussing the effect of independent variables on the dependent variable, it is indispensable to present and elucidated the characteristic of the study’s data. Descriptive statistics summarise and simply provide the data behaviour. Table 1 provides descriptive statistics established to describe the central tendency and variability of the data used in this study. The variable with the lowest mean is the exchange rate (LEXR) while the unemployment rate has the highest mean. This implies that the UNR fluctuates over time compare to LEXR as argued by Manikandan (2011) the large is the mean of a variable to high is its standard deviation. This theory is proved by results in Table 1 as the mean of UNR is 25.9 and its standard deviation is 3.341597 while the mean of LEXR is 4.570939 and its standard deviation is 0.111112. Additionally, results displayed in Table one suggest a close association between mean, maximum and standard deviation. A variable with a large mean is the one with maximum value and large variance (standard deviation).

#### Table 1: Descriptive statistics

| Measurement | LPR  | LPPR | LEXR | UNR  |
|-------------|------|------|------|------|
| Mean        | 10.07402 | 7.043650 | 4.570939 | 25.90000 |
| Maximum     | 10.21591 | 7.370231 | 4.803126 | 33.20000 |
| Std. Dev.   | 0.159839 | 0.241191 | 0.111112 | 2.341597 |

### Unit root results

To ensure a better model selection for cointegration tests, the study performed a unit root test using the Augmented Dickey-Fuller (ADF) test. The test aimed to verify if the underlined data of the study meets the ARDL model preconditions implying that no variable should be stationary at the second difference. The results from the ADF test in Table 2 indicates that variables are stationary at different levels, that is, both LPR and UNR are stationary at levels while LPPR and LEXR are stationary at first difference. Given that variables represent a mixture of I (0) and I (1), the ARDL model is the appropriate model cointegration test.
Table 2: Unit root test

| Variables | Model          | 1st Difference | 1st Differences |
|-----------|----------------|----------------|-----------------|
| LPJR      | intercept      | 0.0261*        | 0.000**         |
|           | intercept & trend | 0.0594        | 0.000**         |
| LPPR      | intercept      | 0.6764         | 0.0000**        |
|           | intercept & trend | 0.1410        | 0.0000**        |
| LEXR      | intercept      | 0.2326         | 0.0000**        |
|           | intercept & trend | 0.3728        | 0.0000**        |
| UNR       | intercept      | 0.9571         | 0.0000**        |
|           | intercept & trend | 0.0012**      | 0.0003**        |

Note: *, ** rejection of null hypothesis at 5% and 1% level of significance respectively

Bound testings

The results in Table 2 above, approved the appropriateness of the ARDL to assess the long-run relationship among variables. This long-run relationship was established through bound testing. The results reported in Table 3 show that the calculated F-statistics is greater than upper bound critical values. Therefore, the null hypothesis of no cointegration between petrol price, exchange rate, unemployment rate and road passenger journeys is rejected. This result infers the presence of a long-run relationship amongst the study variables.

Table 3: Bound test for cointegration

| F-statistic | Critical Value Bounds |
|-------------|-----------------------|
|             | I (0) Bound | I(1) Bound |
| Significance |            |            |
| 10%         | 2.72        | 3.77        |
| 5%          | 3.23        | 4.35        |

Analysis of Long-run relationship

As the previous section suggested the presence of long-run relationship, it is important to analyse to which extend independent variables influences long term changes in the dependent variable. Table 4 displays the long-run estimated coefficient from the ADRL model. The results in the table suggest that both unemployment and exchange rate negatively impact on road passenger journeys while the late is positively influenced by petrol price. In other words, a one percent increase in petrol price reads to 0.636208 increase in road passenger journeys. On the other hand, a one percent increase in the exchange rate and unemployment reads to 1.665935 and 0.173423 decline in road passenger journeys respectively.

Looking at the long-run coefficient, it can be deduced that exchange rate impacts more on road passenger journeys compared to other variables. This is because when the value of domestic currency depreciate everything becomes more expensive and travelling might not be the priority in such a situation. The negative impact of unemployment on road passenger journeys can be explained into two different scenarios. the first scenario is that employment is the south of income for most south African people. Without a job, people have no means to pay for public transport. Besides, travelling for luxury or going shopping (which is the case of most people using public transport) requires enough money which is hard to find when unemployed. The second scenario suggests that most of the people use road transport going to work, without employment people are bound to stay at home. Thus, the number of journeys declines. The positive relationships between petrol price may imply that people travel for important reasons and even if petrol price increase people will keep travelling going to buy or acquire essentials and travelling from home to workplace vice-versa.

Table 4: Long run coefficients

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| LPPR     | 0.636208    | 0.569601   | 1.116935    | 0.2773|
| LEXR     | -1.665935   | 1.119229   | -1.488467   | 0.1522|
| UNR      | -0.173423   | 0.056706   | -3.058282   | 0.0062|
| C        | 17.437198   | 7.805078   | 2.234084    | 0.0371|

Error correction and short term dynamics

Equation 2 was considered in capturing the short term model dynamics through the error correction model (ECM). The ECM assessment plays an important role as it provides the speed of short-run fluctuations towards long-run equilibrium. Any appropriate ECM needs to fulfill two conditions: one is the error correction term to have a negative sign and the second is to be statistically significant. These conditions were met as the value of ECT is -0.399451 with t-statistics of 2.546173. In other words, the ECT is
negative and significant at a 5 percent level. As the ECT meets all requirements, approximately 40 percent of short turn disturbance will be adjusted each quarter and it takes almost four quarters and a half (1/0.399451) for the system (model) to revert to long-run equilibrium.

Considering the short term dynamics results in Table 5 show similar to long-run findings, petrol price influence positively road passenger journeys. This may imply when petrol price rises some people decides to use public transports rather than using their cars. The short turn result confirms the long-run relationship between road passenger journeys and unemployment. The latter is not a problem only in long run as jobless results in a decline of road passenger journeys even in the short run. Both short-run and long-run results imply that solving the issue of declining road passenger journeys should start with creating more jobs with the count

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| D(LPR)   | 0.486728    | 0.194911   | 2.497180    | 0.0214* |
| D(LPR(-1)) | 0.059749    | 0.217698   | 0.274457    | 0.7865  |
| D(LPR(-2)) | -0.324311  | 0.218246   | -1.485989   | 0.1529  |
| D(LPR(-3)) | -0.015362  | 0.243559   | -0.063075   | 0.9503  |
| D(LEX)   | -0.117861   | 0.317338   | -0.371405   | 0.7142  |
| D(LEX(-1)) | -0.593598  | 0.340432   | -1.743663   | 0.0966  |
| D(LEX(-2)) | 0.383382    | 0.345074   | 1.11016     | 0.2797  |
| D(LEX(-3)) | -0.65495    | 0.401995   | -1.628114   | 0.1192  |
| D(LEX(-4)) | 0.949061    | 0.365367   | 2.597554    | 0.0172* |
| D(UN)    | 0.083038    | 0.017614   | 4.714459    | 0.0001* |
| D(UN(-1)) | 0.028361    | 0.014582   | 1.944970    | 0.0660  |
| D(UN(-2)) | 0.029649    | 0.015395   | 1.925879    | 0.0685  |
| ECT (-1) | -0.399451   | 0.156883   | -2.546173   | 0.0192* |

Note: * denote a rejection of null hypothesis at 5% level of significance

Testing causality between variables

To analyse the causality amongst the study variables, the Toda-Yamamoto granger non-causality test was performed. The test outcome is reported in Table 6. As indicated by probability values in the table, a bidirectional causality exists between road passenger journeys and the unemployment rate. This implies that a high rate of unemployment may cause road passenger journeys to decline while an increase in road passenger journeys can cause job creation in the transport industry, and thus reduces the unemployment rate. The exchange rate is another variable that causes a short-run change in road passenger journeys while petrol price is not statistically significant to influence road passenger journeys. These causality results support the results of the short-run dynamics exhibited in Table 4. Both results indicate that only the exchange rate and unemployment rate can impact road passenger journeys in the short run. Although the petrol price has the power to cause changes in road passenger journeys, it can cause changes in both unemployment rate and exchange rate. Consequently, it might have an indirect influence on road passenger journeys as well.

| Excluded lags | Dependent variable | LPJR | LPRR | LEXR | LUNR |
|---------------|---------------------|------|------|------|------|
|               |                     | LPRR | LPRR | LEXR | LUNR |
| LPJR          |                     | (0.2060) | 0.139377 | 26.93090 |
|               |                     | (0.02571) | 0.0009* | 0.0364* |
| LPRR          |                     | (0.02524) | 0.013964 | 0.000105 |
|               |                     | (0.0154*) | 0.049729 | 0.000105 |
| LUNR          |                     | (0.02524) | 0.013964 | 0.000105 |
|               |                     | (0.0154*) | 0.049729 | 0.000105 |

Note: () and * indicates P-values and rejection of null hypothesis at 5% significant level.

Model robustness and diagnostic tests

The solidity of the selected ARDL model was assessed using both stability and diagnostic tests. Tests performed include Jarque-Bera test for normal distribution, Breusch-Pagan-Godfrey test for heteroscedasticity, Lagrange Multiplier (LM) test for serial correlation, Ramsey RESET and CUSUM tests for stability. As shown by the result reported in Table 7 and Figure 2, the selected model has passed all performed tests. Therefore, the selected ARDL model is robust and the study findings are genuine and reliable.
Table 7: Diagnostic stability summary of results

| Test performed                        | P or F-values | Conclusion                      |
|---------------------------------------|---------------|--------------------------------|
| Jarque-Bera (JB)                      | 0.33275       | Residuals are normally distributed |
| Lagrange Multiplier (LM) test         | 0.5115        | No serial correlation           |
| Breusch-Pagan-Godfrey                 | 0.8682        | No heteroscedasticity           |
| Ramsey RESET Test                     | 0.3527        | The model is properly specified |

Figure 2: CUSUM test outcome

Conclusions

Given the importance of the transport sector and the current situation of unemployment, exchange rate and petrol price volatilities, this study analysed the effect of the aforementioned variables on the road passengers’ journeys. The Autoregressive distributed lag (ARDL) and ECM models were employed to determine the long run and short-run effects of explanatory variables on the dependent variable. The results from regression analysis suggested the presence of a long-run relationship between road passenger journeys, exchange rate, unemployment rate and petrol price. Through ECM and Toda-Yamamoto test, it was found that only exchange rate and unemployment rate are statistically significant to influence short term changes in road passenger journals and cause movement within the latter variables. Using various diagnostic tests and stability tests, the used model was attested to be robust and study results to be accurate.

The study results also highlighted that among three independent variables namely petrol price, exchange rate and unemployment rate, the latter variable has a large influence on passenger journeys. Therefore, the issue of road passenger journeys can easily be solved if more jobs are created, the domestic exchange rate is strengthened and petrol price is reduced through the government injections. This study, did not consider other land transport with may cause changes in road passenger journeys. Therefore, the study recommends the consideration of other means of transport in future studies.

Acknowledgement

Author Contributions: Conceptualization, Methodology, Data Collection, Formal Analysis, Writing—Original Draft Preparation, Writing—Review And Editing by author who has read and agreed to the published the final version of the manuscript.

Institutional Review Board Statement: Ethical review and approval were waived for this study, due to that the research does not deal with vulnerable groups or sensitive issues.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

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