Systematic Literature Review of ARDL Approaches in Investigating External Debt

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Abstract. Increased attention to external debt growth is encouraging a more comprehensive understanding. This condition encourages researchers to use the autoregressive distributed lag (ARDL) approach in research that analyzes short-term and long-term effects. To support this aim, this study used a systematic literature review to collect appropriate and up-to-date articles. The initial database we use is metadata from Scopus. The articles we chose were articles published from 2019 to 2023. We produced general and specific information that is very useful for external debt research using the ARDL approach. In general information, we provide data about journals that are available in the article, while in special information we present various variables that can be associated with external debt. We classify variables into Fiscal, Monetary, Production/Household, Foreign, Social, and Political. Apart from that, practitioners can also use this complete understanding to make more appropriate decisions in managing the external debt of countries.

Keywords: External Debt, Autoregressive Distributed Lag, ARDL, Systematic Literature Review, SLR

1. Introduction

Studies on macroeconomics, especially external debt, have increased in the past two decades. This increase was driven by increased attention to the growth of external debt. On the other hand, the effects on economic growth vary widely. Empirical examples such as Albania appear to have a positive relationship (Risilia et al. 2022), while Pakistan shows a negative influence (Udemba 2022). Apart from that, external debt in Nigeria shows results that do not affect economic growth (Adegbie et al. 2022).

Attention from academics to the growth of external debt makes sense considering that the risks faced by external debt are greater than domestic debt. A pivotal aspect of external debt risk research is examining its impact on financial stability. Empirical studies such as Reinhart and Rogoff (2010) have illustrated the perils of high external debt levels on a nation's financial stability. Their comprehensive analysis reveals that countries with elevated levels of external debt relative to GDP are prone to financial crises and economic downturns. These findings underscore the necessity for diligent monitoring of external debt dynamics to avert financial instability and its attendant

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repercussions. Furthermore, Lane and Shambaugh (2010) have demonstrated that an excessive accumulation of external debt can result in a heightened vulnerability to currency depreciation. These two risks are referred to by Mijiyawa and Oloufade (2023) as the 'original sin of debt'.

Are these the only two things we need to know about external debt? Certainly not. Macroeconomics is a complex comprehensive thing and cannot be seen from just one side. The results of short-term relationships need to be further investigated through long-term regression relationships. Likewise, with the theory used, the classical economic understanding that has been understood so far needs to be contrasted with modern understanding such as Keynes' economic understanding. The last one is about the use of variables that need to be tested dynamically and continuously.

Based on the descriptions above, this research aims to collect all the latest research that focuses on external debt. Using the Systematic Literature Review method, this research is expected to be able to provide a complete and broad picture. The findings of this research will help future researchers to develop research that uses external debt in the future, both as an exogenous and endogenous variable. This research comes from articles registered and indexed by Scopus within a very close range of years, namely the last six years. Before making policies related to external debt, practitioners can use this article as material for planning and mitigating risks.

The results of the research are presented sequentially to make it easier for readers and users of this article. In the second session, we will present a literature review that explains external debt and ARDL models to provide clear boundaries regarding the focus of the research. Next, in the third session, we will explain the method used, namely systematic literature review. In the fourth session, this article will present the results obtained from this research, and then the results of the discussion will be presented in the fifth session. In the last session, we presented conclusions and summaries that we need to emphasize throughout this article which are useful for further research.

2. Literature Review

The understanding of external debt can be ambiguous between a currency-based understanding or a residential-based understanding. This has been fully explained by Panizza (2008), who states that there are three definitions of external debt. Apart from the two understandings above, Panizza also added about debts issued outside the issuer's territory, so that all consequences are binding on laws outside the issuer's territory. This is based on the condition that several countries cannot separate debts that foreign parties or domestic parties own. However, he also realized that for now, the most theoretically appropriate use of terms is those relating to the debtor's nationality. The same definition that we use also comes from the International Monetary Fund (2014) which provides an understanding and research guide on external debt.

The understanding of external debt is as comprehensive as other macroeconomic variables. In drawing a relationship, ordinary regression still seems to have many obstacles in explaining its relationship with time. The Autoregressive Distributed Lag
(ARDL) method can answer this situation. Gujarati (2014) explains that the model comes from two models, namely Autoregressive and Distributed-Lag. Autoregressive adds dependent variables from the past to the independent variable section, while Distributed-Lag adds independent variables from the past as additional independent variables. Both together help us differentiate the short-run and long-run responses of the dependent variable to unit changes in the value of the explanatory variable. To provide a comprehensive understanding of external debts and the use of ARDL in its analysis, this research is systematically compiled based on literature to be used as a reference for subsequent research.

3. Research Methods

The content of this research is very clear in the previous section, namely about external debt variables and the use of ARDL as an analysis tool. To form this content, the right context is needed as a medium for collecting and processing data. We chose the Systematic Literature Review method used by Rincon-Novoa et al. (2021) with a sequence of processes, namely Research Question, Identification, Screening, Eligibility and Inclusion, and Reporting. By meticulously following this systematic approach, we aim to ensure transparency and objectivity in the selection and evaluation of relevant articles, ultimately enhancing the quality and credibility of our research.

Step 1 - Research Question. To embark on this research endeavor, we recognized the significance of establishing a robust framework, beginning with a well-defined research question. In this initial phase, we meticulously determined the relevant keywords and queries, carefully selected the databases to be explored, and set forth the inclusion and exclusion criteria. This preparatory stage delineated the specific focus and scope of our systematic literature review.

Step 2 – Identification. The subsequent stage in our systematic review journey entailed a comprehensive process of identification. Here, we meticulously scoured the chosen databases, employing the keywords and queries that were meticulously crafted in the Research Question phase. The objective was to assemble a broad collection of articles that resonated with the essence of our research question.

Step 3 – Screening. Having amassed a substantial body of articles in the Identification stage, our focus shifted to the critical phase of screening. During this stage, we aimed to meticulously evaluate each article, with a keen eye on the metadata. The title, theme, journal name, and abstract of each article underwent rigorous scrutiny to ensure their alignment with our initial research objectives. This stage was instrumental in winnowing down the pool of potential candidates.

Step 4 - Eligibility and Inclusion. Following the judicious screening process, we progressed to the stage of Eligibility and Inclusion. Here, a deeper level of scrutiny was applied to assess the compatibility of each article with the established inclusion criteria. The articles that successfully navigated this phase were deemed pertinent and qualified for inclusion in our research. This step marked a pivotal point in the selection process.

Step 5 – Reporting. The final leg of our systematic literature review journey is the Reporting stage. At this juncture, our focus pivoted toward summarizing and
synthesizing the findings derived from the selected articles. This stage involves the meticulous preparation of a comprehensive report, one that encapsulates the insights gleaned throughout the systematic review process. We aim to present the results of our rigorous review in a format that is informative and accessible.

4. Results

To show originality, we first searched the Scopus database with the keywords "ARDL", "External", "Debt", "Systematic" and "Review" in the title of the article. The absence of results in this search shows the originality of this research. Meanwhile, when we search with the keywords that are the basis of this research, namely "ARDL", "External" and "Debt" in the content section to expand this research, we get increasing results as shown in the image below.

Fig. 1. Number of research by year.

Next, using a predetermined process according to Rincon-Novoa et al. (2021), we report according to the following figure:

Fig. 2. Systematic Literature Review progress report
In the initial stage, we got 97 articles according to the keywords used. After the identification process, we removed 18 articles that were not in the 2019 to 2023 time period. This was intended to obtain research novelty. We also remove articles that have not been recorded in tiers Q1 to Q4 based on the Scopus database. We did not find duplicate articles and articles without abstracts.

At the Screening stage, researchers carry out justification based on the abstract. Articles that did not comply with the aims of this research, 11 articles, were excluded from the screening process. Next, in the retrieval stage, the researcher retrieves articles from various sources such as the publisher's website, ResearchGate, or asks the researcher directly via email. Forty articles were collected for comprehensive reading.

In the final stage, we carried out extraction and obtained 4 articles that were not eligible because they did not match the objectives of this research. In the end, 36 articles following the objectives of this research were subjected to metadata analysis.

4.1. Journal Information

As initial information, we present publisher journal data taken from the Scopus database via the web application, Watase. The following pie charts are data on journal rankings and the year of publication of the articles that we use. We classify the publication into journal quartile (top-left), year of publication (bottom-left), and journal publishers (right).

![Fig. 3. Journal Chart Information](image-url)
With the restrictions we have previously made, journals are dominated by the second quartile ranking (Q2), while the year of publication is predominantly 2020. This shows that the issue of External Debt analysis is still very worthy of discussion, especially using the ARDL approach. Furthermore, we also found that the publisher that received the most articles about external debt was Taylor. We also note that the interest of researchers in the topic of external debt-ARDL is still well maintained.

To make publication planning easier, we provide information in the form of days needed for publication in articles that are referenced in our literature review. As seen in the following data, the publication takes place from 15 to 525 days. From separate calculations, the average publication of all reference articles was 307 days with a median of 238 days.

Table 1. Table captions should be placed above the tables

<table>
<thead>
<tr>
<th>Journal Name</th>
<th>Publisher</th>
<th>Tier</th>
<th>Qty</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Economics, Finance, and Administrative Science</td>
<td>Emerald</td>
<td>Q2</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Heliyon</td>
<td>Elsevier</td>
<td>Q1</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>Journal of Economic Asymmetries</td>
<td>Elsevier</td>
<td>Q1</td>
<td>1</td>
<td>79</td>
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<tr>
<td>Resources Policy</td>
<td>Elsevier</td>
<td>Q1</td>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>Journal of East-West Business</td>
<td>Routledge</td>
<td>Q3</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>Economic Change and Restructuring</td>
<td>Springer</td>
<td>Q2</td>
<td>1</td>
<td>103</td>
</tr>
<tr>
<td>Journal of Sustainable Finance and Investment</td>
<td>Taylor</td>
<td>Q1</td>
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<tr>
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<td>Springer</td>
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<td>International Economics</td>
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<td>Industrial Engineering and Management Systems</td>
<td>KIIE</td>
<td>Q3</td>
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<tr>
<td>International Review of Applied Economics</td>
<td>Taylor</td>
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<td>174</td>
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<td>Q2</td>
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<tr>
<td>Journal of International Trade and Economic Development</td>
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<td>211</td>
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<td>Society and Economy</td>
<td>AKJournal</td>
<td>Q3</td>
<td>1</td>
<td>225</td>
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<tr>
<td>Journal of Cleaner Production</td>
<td>Elsevier</td>
<td>Q1</td>
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<td>Q2</td>
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<td>Q3</td>
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<tr>
<td>African Development Review</td>
<td>Wiley</td>
<td>Q2</td>
<td>1</td>
<td>525</td>
</tr>
</tbody>
</table>
4.2. Article Information

First, we present a map of the distribution of article authors. Respectively, the total authors by continent are Asia with 21 authors, Africa with 16 authors, Europe with 8 authors, and America with 3 authors. The countries with the most authors are India, Nigeria, and Ethiopia with 5 authors. These results can be used by researchers to look for future research relationships related to the topic of External Debt-ARDL.

Fig. 4. Geo chart of number of research by country.

Next, we present a bar chart of the total citations from articles that have been obtained until this research was conducted. Of the 40 articles, 9 articles have not been cited. Meanwhile, 31 other articles showed a minimum number of citations of 1 and a maximum of 27 citations. Furthermore, the citation rate has a median of 4 and an average of 6.6 points.

Fig. 5. Number of Citation.
We close this section by providing various keywords that have been used in our reference articles. The keywords can be useful for inspiring future writers and researchers while looking for variables.

4.3. Theory Development

From all the articles used in this research, we noted that several theories can be used in future research. The economic theories that can be used are Classical, Neoclassical, Ricardian, and Keynesian. Complementing the grand theory, several theories can also be used, such as Fiscal Theory (Helmy, 2021), Debt Laffer Curve (Yusuf and Mohd, 2023), Endogenous Growth Theory (Yusuf and Mohd, 2021; Alemu et al., 2023), Theory of Population Growth (Alemu et al, 2023), Growth Theory (Dey and Tareque, 2020), Investment Theory (Fonchamnyo et al., 2021). Unfortunately, we will not explain further about this theory due to research limitations. However, we believe that the references we provide are very useful for further research. As a complete general overview, we recommend reading Barik and Sahu (2020) which explains several theoretical perspectives clearly and completely.

4.4. Metadata Analysis

From 36 articles, we collected all the variables used for research with the keywords that we determined at the beginning, namely "ARDL" and "External Debt". We get a total of 117 variables used, both exogenous and endogenous. We present all these variables in the following word tree map below. The wider the colored area, the more articles that have used these variables.
As our metadata final result, we compiled variables related to External Debt and used ARDL as the research method. We separate the variables influenced by External Debt which are on the left, and the variables influenced by External Debt which are on the right. We group variables based on the type of policy by the government related to the variable. The group classifications are Fiscal, Monetary, Production/Household, Foreign, Political, and Social.

Fig. 7. Various variables in research.

Fig. 8. Variable connectivity
5. Discussions

5.1. Variable Influence External Debt

There are several variables for which we get gaps in the empirical results. This gap can be useful for future research as a basis for research. These variables include Capital Control, Commercial Balance Reform, Institutional Reform, Fiscal Balance, Gross Domestic Product, and Oil Price.

Zehri and Madjd-Sadjadi (2021) get different results on variables that influence external debt. The three variables we identified are Capital Control, Commercial Balance Reform, and Institutional Reform. The research used 102 countries in 1999-2019. These countries are classified based on their income level, namely 25 Low-Income Countries, 51 Medium-Income Countries, and 26 High-Income Countries. This research shows that there are different results at each income level. Apart from that, the influence of lag years is also a differentiator even at the same income level. The research outlines the intricacies of the impact of capital controls, particularly emphasizing the disparities between low-income countries with less developed financial systems and high-income countries with more sophisticated financial structures. The research underscores that low-income countries with underdeveloped financial systems experience smaller effects from capital controls, whereas the impacts are more pronounced in high-income countries with advanced financial systems. While the research yields significant findings for these factors, it acknowledges that other variables may also influence outcomes and divert the impact of capital controls from their intended objectives. The multifaceted nature of these channels renders the impact of capital controls a complex issue, thereby posing a challenging decision for policymakers. In addition, these reforms encourage the use of foreign borrowing, especially for lower-income countries.

The Gross Domestic Product (GDP) to External Debt has been widely studied. Okwoche and Nikolaidou (2022) researched Nigeria in the period 1970-2020, Beyene and Kotosz (2020) researched the country of Ethiopia in the period 1981-2013, and Yasar (2021) researched the Commonwealth Independent States of Russia in the period 1995-2018. Results in the short-run and long-run are different from each other. What is interesting is that Yasar explains clearly the use of two contradictory economic theories, Keynesian and Classical Theory. Neoclassical theory suggests that foreign debt crowds out private investment restraining the economic growth process. Keynesians argue that on the contrary, foreign debt will encourage economic growth. Whatever results you get, you can still strengthen existing theories.

5.2. Variable Influenced by External Debt

Research that examines the relationship between External Debt and GDP is no less than the opposite research. We also found different results in the research we analyzed. Results in the form of an insignificant relationship were shown in research by Yusuf and Mohd (2023), Joshua et al. (2020), the first model of Dey and Tareque (2020), and Hasim et al. (2019). Meanwhile, the positive influence of External Debt on GDP was shown by Tahir et al. (2020), Saungweme and Odhiambo (2020), and Demikha et al.
On the other hand, the results in the form of a negative influence were shown by Faizulayev et al. (2020), Udemb (2021), Roy (2023), Alemu et al., (2023), second model of Dey and Tareque, (2020) and Yasar (2021). We recognize that more research can make a difference in results. At least this also proves that two extreme theories can still apply, namely Classical and Keynesian.

Likewise, the relationship between External Debt and Economic Growth can produce an empirical gap. The example taken is research by Guei (2019) which examined 13 Emerging Countries in 1990-2016, Edo et al. (2020) who studied 8 Sub-Saharan African Countries in 2005-2017, and Makun (2021) who studied Fiji Islands in 1980-2018. Edo et al. (2020) show that External Debt does not affect Growth, while Guei (2019) and Makun (2021) produce a negative relationship. This difference can be explained in the previous paragraph about opposing theories. In addition, we suspect the existence of regional factors in the countries studied.

6. Conclusions

The Systematic Literature Review (SLR) that we compiled at the end of 2023 comes from reliable literary sources. Moreover, the steps we carry out and the purposive measures we require can further sharpen the focus we have directed on two keywords, namely "External Debt" and "ARDL".

To achieve targeted goals, with appropriate resources and a rigorous process, we present results that are useful for future research. We hope that the various keywords and variables that we present can inspire the birth of research that strengthens existing theories. We also compiled classifications such as Fiscal, Monetary, Production/Household, Foreign, Social, and Political which we did not expect before. We see connectivity between economic variables, which also creates links with social and political variables. Hopefully, this can broaden our understanding of External Debt. In the end, we return to our aim in compiling this SLR, namely to pave the way for further research. And we feel like we've achieved that.

References


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