BUKTI KORESPONDENSI ARTIKEL PADA JURNAL INTERNASIONAL BEREPUTASI

PENGUSUL :

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FAKULTAS EKONOMIKA DAN BISNIS

UNIVERSITAS NEGERI SEMARANG

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No	Tanggal	Aktivitas
1.	(9 Agustus 2022)	Artikel disubmit pada OJS dan telah mendapatkan bukti artikel telah diterima dalam sistem
2.	(10 Agustus 2022)	Informasi mengenai APC oleh Editor
3.	(11 Agustus 2023)	Informasi mengenai Editor yang ditunjuk oleh melakukan proses selanjutnya : tahapan review
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5.	(3 September 2022)	Revisi manuskrip telah disubmit dan diterima oleh Editor
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8.	(13 September 2022)	Mendapatkan informasi bahwa artikel telah diterima dan diminta membuat profil di Sciprofile.com
9.	(14 September 2022)	Diminta editor untuk melakukan final proofreading sebelum dipublikasikan
10.	(19 September 2022)	Penulis utama melakukan pembayaran APC Jurnal
11.	(19 September 2022)	Konfirmasi pembayaran oleh Editor Jurnal
12.	(20 September 2022)	Permintaan proofreading ke 2 oleh Editor
13.	(23 September 2022)	Proofreading telah dikirimkan dan mendapat respon bahwa artikel telah terbit

Demikian, agar dapat menjadi periksa. Terimakasih

Semarang, 30 Agustus 2023

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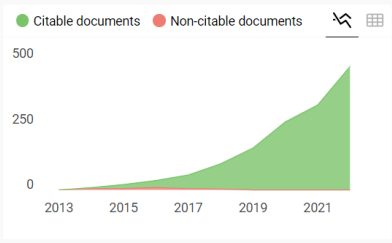
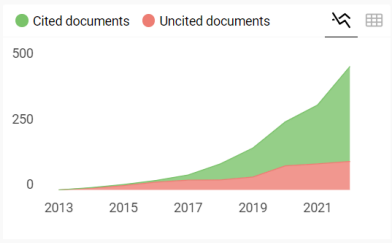
Economies

COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER	H-INDEX
Switzerland Universities and research institutions in Switzerland Media Ranking in Switzerland	Economics, Econometrics and Finance └ Economics, Econometrics and Finance (miscellaneous) Social Sciences └ Development	Multidisciplinary Digital Publishing Institute (MDPI)	25

PUBLICATION TYPE	ISSN	COVERAGE	INFORMATION
Journals	22277099	2013-2022	Homepage How to publish in this journal economies@mdpi.com





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Article

The Effects of Regulatory Performance on the Debt–Growth Relationship: Cases of Upper-Middle-Income Economies

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Citation: Abd Rahman, Nur Hayati, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, and Wijang Sakitri. 2022. The Effects of Regulatory Performance on the Debt–Growth Relationship: Cases of Upper-Middle-Income Economies. Economies 10: 235. https://doi.org/10.3390/economies10100235

Received: 9 August 2022

Accepted: 13 September 2022

Published: 23 September 2022

Abstract: Upper-middle-income economies (UMIE) are experiencing an economic slowdown, partly due to weak regulatory performance. This issue leads to slow growth in private sector participation, thus limiting the ability to achieve higher economic growth. At this critical point, the government's role is to inject funds into economies, hoping that growth can be increased and sustained for an extended period. Nevertheless, injecting more funds through borrowings from external debt exposes economies to vulnerable conditions. Thus, this study aimed to examine how regulatory performance affects economic growth and moderates the debt–growth relationship in UMIE. By using the gen-eralized method of moments (GMM) as an estimation method for 32 countries from 2004 to 2020, regulatory performance was found to adversely affect economic growth. Moreover, as regulatory performance improves, public debt is expected to enhance the economic growth of UMIE. These findings are novel, as they provide significant evidence for the importance of improving the regu-latory performance of UMIE. Weak regulatory performance might force a government to become the engine of growth instead of the private sector, thus leading to the adverse effect of debt on growth in UMIE. These findings have to several policy implications, particularly regarding reducing bureaucracy and improving regulatory performance in UMIE. Future researchers could extend this study by comparing the results from different groups of economies or countries.

Keywords: external debt; economic growth; regulatory performance; marginal effects; GMM

1. Introduction

In achieving sustainable economic development, upper-middle-income economies (UMIE) should invest in development projects that help generate multiplier effects on the economy. Nevertheless, statistics show that UMIE face challenges in obtaining capital from domestic and foreign investors, resulting in a barrier to achieving high economic growth and maintaining sustainable development. Therefore, external debt is becoming a medium to obtain funds.

Theoretically, external debt is good for economic growth (Elmendorf and Mankiw 1999). It is particularly good for developing countries who have a scarcity of capital and need additional sources of funds to boost the economy. The debt is used for productive purposes; among others, to finance education, infrastructure development, public trans-portation, research, and development, as well as human resource development. These development expenditures help by providing positive multiplier effects for the economy in the long run. Nevertheless, the debt to gross domestic product (GDP) ratio should not exceed 90% (Reinhart et al. 2012). In contrast, it would adversely affect the economy if the ratio exceeds 90%. Their findings were supported by other research that found a similar threshold, especially in advanced and emerging economies (Bitar et al. 2018). The 90% threshold might not be applicable for all countries or groups of economies, because there

is various empirical evidence that showed other threshold rates, such as 106% for 106 developing countries (Karadam 2018) and 80% for 40 advanced countries (Chudik et al. 2017). Even so, the threshold by Reinhart et al. (2012) is regularly used as a starting point in many similar empirical studies, as mentioned earlier.

Nevertheless, capital is one of the essential resources for UMIE to boost economic growth and achieve sustainable development. With limited capital, they might not be able to sustain their growth and development, leading to a middle-income trap position. Hence, capital is needed to create a better future. As outlined in the sustainable development goals (SDGs), globally, countries are striving towards investing in better health, quality education, improved infrastructure, higher research and development, and clean energy, to achieve the SDGs by 2030. These investments require a massive amount of funds, with one of the sources being external debt.

External debt might be good for economic growth when supported by sound regula-tory performance. The World Bank Group measures the regulatory performance using the ease of starting a business (EOSB) score (The World Bank Group 2019). This score varies between 0 (the worst regulatory performance) to 100 (the best regulatory performance). Countries with the best regulatory performance (EOSB score closer to 100) have greater private sector participation. This has positive multiplier effects on economic growth and development. In contrast, countries with a weak regulatory performance (EOSB score is closer to 0) might find attracting domestic and foreign investments challenging, leading to lower private sector participation. Eventually, the government has to act as the main engine of growth. An increase in the government's burden, the commitment to pay existing debts and maximizing citizens' welfare, will ultimately reduce the ability of the economy to grow. Furthermore, lower private sector participation leads to fewer employment opportunities and a decrease in people's purchasing power. Thus, weak regulatory performance exerts adverse multiplier effects on investment, consumption, and government expenditure.

Statistics from 2004 to 2020 show that countries in the UMIE have an average EOSB score of 76.03. Although the score is close to 100 (good regulatory performance), it is still lower than 80. Countries with a score of 80 to 90 have good regulatory performance, while countries that have scores of more than 90 have sound regulatory performance. Meanwhile, the score of 76.03 (lower than 80) indicates that the countries in the UMIE are still struggling to achieve a "good" regulatory performance. Thus, this score could be one of the reasons for declining private sector participation (measured by using domestic investment) from 2013 to 2018 (The World Bank Group 2018). In sustaining economic growth, a decline in private sector participation requires the government to inject funds into the economy. One of the ways to inject funds is through external debt. Hence, investigating how regulatory performance affects the debt–growth relationship in UMIE is essential.

The arguments in the previous paragraph represent the motivation for this study. The average scores of the EOSB for UMIE are less than 80. If countries in the UMIE group want to become advanced and developed countries, private sector participation is crucial to boost the economy. High reliance on the government should be reduced. To increase private sector participation, regulatory performance should be improved. Otherwise, firms will choose to invest in other countries where it is easier to start businesses. If this happens, UMIE might have the same economic status for a longer period of time. Given that the score of EOSB for UMIE is generally lower than 80, we would like to examine how regulatory performance affects the economic growth of UMIE. In addition, we would also like to investigate how regulatory performance moderates the debt–growth relationship in UMIE. This is an important issue to investigate, since it has policy implications for achieving and sustaining the higher economic growth of the UMIE.

The novelty of this paper is as follows. First, although much research has been undertaken on how external debt affects economic growth (Bitar et al. 2018; Le Van et al. 2018; Afonso and Ibraimo 2020), very limited research has examined how regulatory performance moderates the

relationship between external debt and economic growth in UMIE. This issue must be investigated, since UMIE must strive for better growth in the near

future to achieve their SDGs. Their existing regulatory performances might hinder them from achieving the SDGs. Second, previous studies that included interactive terms in their modelling calculated the marginal effects of the mean, minimum, and maximum values of the moderating variables (Shkolnyk and Koilo 2018; Brida et al. 2017). Although this method is correct, it is insufficient to explain the full effects brought by the moderating variable in the model, since the effects can only be viewed for some values of the moderating variables. Instead, this research applied a graphical method to illustrate the effect of the moderating variable (regulatory performance) on the debt–growth relationship, as recommended by Brambor et al. (2006). Policy recommendations are essential, as the researchers can recommend how the debt–growth relationship in UMIE can be improved by looking at specific values of regulatory performance.

2. Literature Review

Economic growth is one of the endless topics in the body of economic literature. To date, many researchers have conducted research on how various issues affect the economic growth of a country or a group of economies. Among the recent issues examined are public debt (Gomez-Puig et al. 2022), the ageing population (Liu et al. 2022), climate change (Duan et al. 2022), and immigration (Ullah et al. 2022). Although these studies have diverse perspectives and employ different methodologies, the goal remains similar. The studies were undertaken to investigate how different issues affect economic growth.

The endogenous growth model outlines four critical resources for achieving high economic growth in the economic literature: capital, human capital, labor, and technological growth (Romer 1986; Lucas 1988). These four factors are growing at an endogenous rate, thus allowing the economy to grow in the long run. Moreover, the inclusion of human capital in the growth model helps a country achieve increasing returns to scales that are highly applicable to the actual situation. Capital can be in the form of domestic and foreign investments. If a country lacks domestic investment, debt can be used as an alternative to funding capital. Nevertheless, the use of debt might have positive, negative, or insignificant effects on economic growth.

The growing debate on how debt affects economic growth encompasses three different schools of thought: classical, Keynesian, and Ricardian. The classical economists (Krugman 1988) claimed that debt exerts an adverse effect on economic growth if the present value of a country's expected income is lower than its accumulated debt level. This is documented under the debt overhang hypothesis, where the government is forced to use its national savings to pay for the debt burden when its income is insufficient to pay off the debt (Blanchard 1985). Thus, most of the government's available investment funds will be consumed, leading to a crowding-out effect on private investments (Arˇcabi´ et al. 2018). Furthermore, when this scenario happens, investors expect that the tax rate will be increased to settle the debt burden (Mhlaba and Phiri 2019). Thus, the crowding-out effect and the imposition of higher taxes will lead to lower economic growth. Empirical findings that support this negative relationship have been conducted in Mozambique (Afonso and Ibraimo 2020), Oman (Kharusi and Ada 2018), and European (Arsi´c et al. 2019) and South Asian countries (Akram 2016).

On the other hand, the Keynesian economists (Elmendorf and Mankiw 1999) argued the opposite. Debt is good for economic growth if the debt is used for productive expen-ditures such as education, health, and infrastructure development. Empirically, this view is consistent with previous research that found similar findings in parallel to the theory. Nevertheless, a threshold of the debt to GDP ratio must be observed. This threshold varies from 15% (Reinhart et al. 2003) to 106% (Karadam 2018), and it depends on the type of economies, countries, time frame, and methodologies used to derive the findings. When the debt level exceeds the threshold, an increase in the debt level will adversely affect economic growth. This hypothesis by the Keynesian economists supports the existence of a non-linear relationship between debt and economic growth. The reason being that the debt to growth relationship can have both positive and negative relationships, as argued

by Keynesian and classical economists, respectively. Instead of a linear relationship, it can be quadratic, depending on the existence of a debt threshold.

In contrast to the above debates, debt can also insignificantly affect economic growth, due to the future taxation that the government imposes to finance the current debt level. This view has been thoroughly discussed by Barro (1989) under the Ricardian equivalence hypothesis. As a result, rational households will reduce current consumption, increase savings, and enhance investments, to pay future tax payments. Consequently, the growth level remains unchanged, although the debt level increases. Several empirical findings support this argument concerning the insignificant relationship between debt and economic growth, especially in Nigeria (Akhanolu et al. 2018) and other mixed economies (Kim et al. 2017).

The above literature discusses the determinants of growth and the debt–growth re-lationship from theoretical and empirical perspectives. To the researchers' knowledge, no study has been conducted on how regulatory performance moderates the relationship between external debt and the economic growth of UMIE. As mentioned earlier, regula-tory performance is a crucial element that reflects the institutions of a country. Thus, the following hypotheses are proposed in this study:

H1. Regulatory performance is significant in influencing the economic growth of UMIE.

H2. Regulatory performance is significant in moderating the debt–growth relationship of UMIE.

The motivations for including the two hypotheses are as follows: First, we wanted to look at how regulatory performance affects the economic growth of UMIE. The reason being that EOSB as a measure of regulatory performance has yet to receive significant attention in the existing growth literature (Krammer 2015; Bonga and Mahuni 2018; Ncube et al. 2019). Even so, its role should not be neglected, as strong regulatory performance attracts more private sector participation and drives the economy toward a better state. This is consistent with the Politicisation of Growth Theory by Hibbs (2001), which emphasizes the importance of institutions to economic growth. Institutions that impose high constraints such as tedious and multiple procedures distort the economic growth of a nation, as individuals and firms do not like to conduct activities that require them to deal with various bureaucracy elements.

Second, we wanted to examine how regulatory performance affects the debt–growth relationship in UMIE. This is because good regulatory performance motivates higher private sector participation, leading to a positive effect of debt to growth of the UMIE. In contrast, a weak regulatory performance will reduce private sector participation in the country, leading to a lower inflow of capital investments from domestic and foreign sources. Consequently, the government has to act as the main growth engine and inject additional capital to finance the national agenda. Since the capital investment inflow is low, the amount of debt is expected to increase beyond a certain threshold (Kharusi and Ada 2018), potentially resulting in an adverse effect on economic growth. These arguments warrant this study's attempt to examine how EOSB moderates the relationship between public debt and economic growth.

Our findings may help researchers and policymakers to understand the existing state of regulatory performance of UMIE, and how this reacts to the debt–growth relationship. If it is found that regulatory performance is weak and adversely affects the debt–growth relationship, then there must be actions taken to improve regulatory performance, so that the debt obtained by the government can create positive multiplier effects for the economy. Based on the above hypotheses, the theoretical framework for this study is shown in Appendix B.

3. Materials and Methods

The baseline regression model to estimate the economic growth of UMIE is as follows:

$$y_{it} = \mu + r y_{it\ 1} + b x_{it} + m_i + \#_{it} \quad (1)$$

where

y_{it} = Real GDP growth per capita

μ = A constant term

$y_{it\ 1}$ = Initial real GDP per capita

x_{it} = Vector of explanatory variables

m_i = Individual-specific effects

$\#_{it}$ = Error term

The subscripts of I and t represent the country and time, respectively. The inclusion of $y_{it\ 1}$ is in parallel to previous prominent studies on growth (Barro and Sala-i-Martin 2004; Kim et al. 2017; Karadam 2018). The growth model suits the dynamic specification rather than the static model. The argument is as follows: A country with a lower initial real GDP per capita rate is expected to achieve a higher growth rate that year. This is due to the use of higher utilization of capital and savings that were not being fully utilized the previous year. Thus, the sign of *r* is expected to be negative.

The vector of explanatory variables (x) is the set of control variables used in this research. It represents all factors contributing to a country's economic growth, as identified by Lucas (2017) and Romer (1986). The factors are labor, capital, human capital, and technological progress. All these variables are expected to affect economic growth positively. Apart from the four variables, other variables are also included as control variables, as per previous research; namely, trade openness (Gomez-Puig and Sosvilla-Rivero 2018) and inflation (Kim et al. 2017; Kharusi and Ada 2018). Trade openness is widely used as a control variable, since it gives a positive multiplier effect to economic growth via transfers of knowledge and technology and efficiency gains. On the contrary, inflation is a factor that adversely affects economic growth, due to its uncertainty for the economy (Wen et al. 2022).

As the main interest of this study was to examine the moderating effect of regulatory performance on the debt–growth relationship, external debt and regulatory performance were also included in the explanatory variables. These two variables were included as independent variables and the interactive term to capture the moderating effect. Thus, the econometric model for this research is shown below.

$$y_{it} = \mu + r y_{it\ 1} + b_1 EDEBT_{it} + b_2 EOSB_{it} + b_4\, I\, NV2_{it} + b_5 SAV_{it} + b_6\, POPG_{it} + b_7\, HC_{it} + b_8 TO_{it} + b_9\, I\, NF_{it} + b_{10}(EDEBT\ X\ EOSB)_{it} + m_i + \#_{it} \quad (2)$$

Descriptions of the notations used in the model are outlined in Table 1.

Table 1. Descriptions of the notations used in the model.

Notation	Description of the Variable	Proxy	Sources
y	Annual percentage of the growth rate of real GDP per capita	Economic growth	WDI by The World Bank
$y_{it\ 1}$	Initial real GDP per capita	Convergence variable	WDI by The World Bank
EDEBT	Ratio of external debt to GDP	External debt	IDS by The World Bank
EOSB	Ease of starting business score	Regulatory performance	Doing Business statistics by The World Bank
INV2	The ratio of gross capital formation to GDP	Capital and technological progress	WDI by The World Bank

SAV	The ratio of gross savings to GDP	Capital and technological progress	WDI by The World Bank
POPG	Population growth	Labor	WDI by The World Bank
HC	Human capital index	Human capital	Penn World Table

Table 1. Cont.

Notation	Description of the Variable	Proxy	Sources
TO	Trade openness	External sector	WDI by The World Bank
INF	Inflation	Economic uncertainty	IFS by IMF
EDEBT EOSB	Interactive term between EDEBT and EOSB	Moderating variable	-

Note: WDI—World Development Indicators; IDS—International Debt Statistics; IFS—International Financial Statistics.

Although the primary aim of this study was to examine the moderating effect of regulatory performance on the debt–growth relationship in UMIE, examining both the direct and indirect effects of regulatory performance on the economic growth of UMIE is essential. Therefore, the econometric model in Equation (2) can be sub-divided into two model specifications: linear (Equation (3)) and non-linear (Equation (4)).

$$y_{it} = \mu + ry_{it-1} + b_1 EDEBT_{it} + b_2 EOSB_{it} + b_4 INV2_{it} + b_5 SAV_{it} + b_6 POPG_{it} + b_7 HC_{it} + b_8 TO_{it} + b_9 INF_{it} + m_i + \#_{it} \quad (3)$$

$$y_{it} = \mu + ry_{it-1} + b_1 EDEBT_{it} + b_2 EOSB_{it} + b_4 INV2_{it} + b_5 SAV_{it} + b_6 POPG_{it} + b_7 HC_{it} + b_8 TO_{it} + b_9 INF_{it} + b_{10}(EDEBT EOSB)_{it} + m_i + \#_{it} \quad (4)$$

The moderating effect of regulatory performance on the debt–growth relationship cannot be solely based on the coefficient of b_{10} in Equation (4). Instead, as per Brambor et al. (2006), the marginal effect in Equation (4) must be calculated using the following formula:

$$\frac{\P y_{it}}{\P EDEBT_{it}} = b_1 + b_{10} EOSB \quad (5)$$

In order to test the significance of the marginal effect, t-statistics can be computed by simply dividing the new marginal effects by the new standard error. In order to derive the standard error, the variance must be calculated, as the new standard error is a square root of the variance. Following Brambor et al. (2006), the formulas to calculate the variance and standard errors are stated in Equations (6) and (7), respectively.

$$\hat{s}^2_{\frac{dy}{dEDEBT}} = \text{var}(\hat{b}_1) + EOSB^2 \text{var}(\hat{b}_{10}) + 2EOSB \text{cov}(\hat{b}_1 \hat{b}_{10}) \quad (6)$$

$$\text{New standard error} = \sqrt{\hat{s}^2} \quad (7)$$

The scope of this study covers 32 countries with UMIE from 1990 to 2020. In total, 60 countries fell under the category of UMIE within the analysis period. Nevertheless, only 32 countries were chosen, due to data availability. The list of countries under investigation is tabulated in Appendix A. In order to avoid a structural break in the data, five-year data averaging was conducted, following the procedures of Ahlborn and Schweickert (2018) and Ewaida (2017). Considering the 31-year period and five-year data averaging, six data (time) points were produced for each country. The six data points are as follows: (1) 1990 to 1994, (2) 1995 to 1999, (3) 2000 to 2004, (4) 2005 to 2009, (5) 2010 to 2014, and (6) 2015 to 2020.

Since the number of cross-sections was 32 and the number of time periods was six, this study used a two-step system generalized method of moments (GMM) as the estimation method. The two-step GMM was utilized for multiple reasons. First, this method is able to control any endogeneity issues that exist due to the correlation between the explanatory variables and the error terms. In addition, this issue may also exist due to the existence of reverse causality between the dependent variable and independent variables (Ahmad 2011). For instance, growth theory argues that capital is essential for a country's economic growth. When a country grows, domestic and foreign investments will attract more capital

as the market size becomes substantial. Thus, this argument indicates that reverse causality exists between capital and economic growth. Similarly, when a country achieves higher economic growth, investment in human capital will increase. These arguments indicate that some examples of reverse causality might exist, which in turn leads to biased estimation results if it is not treated accordingly. Traditional panel estimators, such as fixed effect (FE), random effect (RE), and pooled ordinary least square (POLS), are inappropriate (Nickell 1981). The use of these methods might lead to biased and inconsistent estimates. Second, the GMM system allows researchers to capture potential heterogeneity across countries, by adding the individual specific effect (m_i) in the model specification (Ibrahim and Law 2016). Finally, Arellano and Bond (1991) suggested using GMM for small sample sizes and large cross-sections. Although the number of cross-sections for this study was not more than 50, previous research showed unbiased and consistent estimations when cross-sections are 29 (Zhang et al. 2018), 24 (Mencinger et al. 2015), and 40 (Nagarajan et al. 2017).

Even though previous empirical studies have proven the existence of the endogeneity issue in most of the growth model, it was also essential to test its existence using the datasets of this study. Thus, a Hausman-Wu test was conducted for the growth model, with a null hypothesis that the variables are exogenous variables (Guo et al. 2018). Given that there is a structural model (Equation (8) and reduced form equation (Equation (9), all z's in both equations are not correlated with u, but y_2 in Equation (9) is correlated with m. In this example, y_2 is an endogenous variable if u is correlated with m.

$$y_1 = b_0 + b_1 y_2 + b_2 z_1 + m \quad (8)$$

$$y_2 = p_0 + p_1 z_1 + p_2 z_2 + u \quad (9)$$

The idea of conducting a Hausman-Wu test is to examine whether $\hat{u}$ is significant or not. If it is significant, then y_2 is proven to be an endogenous variable. To conduct this test, the variables should be instrumented by other instrumental variables. The choice of the instrumental variables was based on previous empirical research. The results of the Hausman-Wu test are illustrated in the following table.

The results in Table 2 show that all p-values were less than 0.1. Thus, this means that the null hypothesis, that the variables are exogenous variables, can be rejected. It also means that all of these variables are endogenous. Hence, this result warrants the use of the GMM as the estimation method.

Table 2. Results of the Hausman-Wu test.

	(1)	(2)	(3)	(4)	(5)	(6)
Instrumented Variable (with respect to lny)	lnINV2	lnSAV	lnHC	lnTO	lnINF	EDEBT
Instruments	lnSAV lnFDI	lnINV2 lnFDI	lnSAV lnFDI	lnFDI lnINV2 lnINF	lnHC lnFDI	lnSAV lnINV2
F-statistics	2.98772	7.89132	5.28205	6.44136	6.44136	2.97539
p-Value	0.0856 *	0.0055 ***	0.0227 **	0.0120 **	0.0120 **	0.0863 *

Note: ***, ** and * indicate significance at 1%, 5% and 10%, respectively.

In determining the accuracy of the estimations, the GMM system uses three diagnostic tests. First, as mentioned earlier, the GMM system can cater for endogeneity problems by instrumenting endogenous variables using its own lags. Therefore, confirming the validity of the instruments using the Hansen J test, with the null hypothesis that over-identifying restrictions are valid, is crucial (Hansen 1982). If the over-identifying conditions are correctly specified, then the instruments are valid. In addition, a Arellano-Bond test was conducted to determine whether a second-order serial correlation exists for the disturbances

in the first-difference equation (Arellano and Bond 1991). The null hypothesis of no second-order serial correlation should be rejected, to ensure no specification error. Lastly, the use of the GMM system requires careful selection of instruments, by carefully selecting the number of lags. Therefore, to ensure unbiased estimation, the number of instruments should be lower than the number of cross-sections (Roodman 2009).

Moreover, to ensure the estimation results are robust, the expected signs towards economic growth must be consistent with the signs suggested by the endogenous growth model. In addition, the coefficients of each explanatory variable should also be consistent for both models, regardless of the model specification; either a linear (Equation (3)) or non-linear specification (Equation (4)). The expected signs of the control variables in the endogenous growth model are as indicated in Table 3 below.

Table 3. Expected signs of the variables.

Variable	Expected Sign	References
$y_{it\ 1}$	-ve	Barro and Sala-i-Martin (2004) Elmendorf and Mankiw (1999); Reinhart et al. (2003);
EDEBT	+ve	Karadam (2018)
	-ve	Krugman (1988); Arˇcabi´ et al. (2018); Mhlaba and Phiri (2019); Afonso and Ibraimo (2020)
INV2	+ve	Romer (1986); Lucas (1988)
SAV	+ve	Romer (1986); Lucas (1988)
POPG	-ve	Romer (1986); Lucas (1988)
HC	+ve	Romer (1986); Lucas (1988)
TO	+ve	Gomez-Puig and Sosvilla-Rivero (2018)
INF	-ve	Kim et al. (2017); Kharusi and Ada (2018)

4. Results and Discussion

Using both models in Equations (3) and (4), the results of the two-step GMM system are given in the following Table 4.

Table 4. Results of two-step GMM system.

		Model 1	Model 2
	Notation	Coefficient	Coefficient
Initial GDP per capita	$y_{it\ 1}$	3.6425 ***	3.4002 ***
		(0.543)	(0.624)
External debt	EDEBT	0.0214 *	0.1892 ***
		(0.013)	(0.036)
Regulatory performance	EOSB	0.0480 **	0.0472
		(0.024)	(0.037)
Interaction term between EDEBT and EOSB	EDEBTEOSB		0.0022 ***
			(0.000)
Gross capital formation	INV2	0.1338 ***	0.0869 ***
		(0.040)	(0.033)
Gross savings	SAV	0.0853 **	0.0860 ***
		(0.039)	(0.031)
Population growth	POPG	1.2274 ***	1.2310 ***
		(0.184)	(0.189)
Human capital	HC	3.7214 ***	2.3456 *
		(1.346)	(1.296)
Trade openness	TO	0.0106	-0.0016

		(0.014)	(0.010)
Inflation	INF	0.0314	0.0725 ***
		(0.030)	(0.021)
Constant		22.1259 ***	19.5172 ***
		(5.396)	(4.477)

Table 4. Cont.

		Model 1	Model 2
	Notation	**Coefficient**	**Coefficient**
Observations		99	97
Number of countries		30	30
No. of instruments		27	29
AR2 p-value		0.402559	0.146567
Hansen p-value		0.584658	0.358820

Note: EDEBT—External debt; EOSB—Ease of starting business. ***, ** and * represent 1%, 5% and 10% significance level, respectively.

The above results are robust for several reasons. First, the coefficients of the initial GDP per capita are negative. This is consistent with previous literature, in which the significant negative relationship between y_{it-1} and y denotes the convergence level of the UMIE to its steady-state (Barro 2003). Second, the external debt in both models is positive and significant, in parallel with the Keynesian hypothesis (Elmendorf and Mankiw 1999). Even though there is a slight difference in the size of parameter for EDEBT in model 1 and model 2, the results are still robust, as both parameters of EDEBT are positive and significant. The parameter differences might have been due to the inclusion of the interaction term in the second model, while none of the interaction terms were added in the first model. Nevertheless, we cannot directly interpret the results of EDEBT in the second model, since we first have to calculate the marginal effects of EDEBT to growth. Third, the signs for gross capital formation (INV2), gross savings (SAV), population growth (POG), and human capital (HC) are similar and consistent with previous research (Romer 1986; Lucas 1988; Kim et al. 2017; Kharusi and Ada 2018). Investments, savings, and human capital contributed positively to economic growth, while population growth reacted negatively. Fourth, the number of instruments for both models does not exceed the number of countries. This situation is a requirement to ensure that the results are free from estimation bias (Roodman 2009). Finally, the p-values for both the Arellano bond (AR2) and Hansen tests were greater than 0.05, implying that the models were free from misspecification error and that the instruments used were valid.

The findings in Model 1 indicate a direct relationship between regulatory performance and economic growth. The negative coefficient of EOSB illustrates a negative relationship between regulatory performance and economic growth. This surprising result might have been due to the average statistics of EOSB in the UMIE from 2014 to 2020. The average EOSB score was 76.03. This score is relatively low relative to high-income economies (HIE) that scored more than 90, including Canada, New Zealand, Australia, Hong Kong, Singapore, and Sweden.

In addition, only 37.5% of the countries in the UMIE obtained an EOSB score above 80 within the same period. The remaining 62.5% of countries obtained average EOSB scores lower than 80. These statistics indirectly indicate slight difficulties in starting businesses in UMIE compared to HIE. The difficulties might be derived from the multiple procedures involved in setting up new businesses, which consume a long period. Appendix A shows that the average scores for procedures and time involved in starting up businesses were mainly lower than 60. For instance, regarding UMIE, Venezuela had average scores of 2.75 to 0 from 2004 to 2018, respectively. Score values close to zero indicate a low institutional quality that requires tedious procedures and a lot of time to start a business. Similarly, statistics show that 23 countries with UMIE adopted lengthy procedures to start businesses, since the average scores, specifically for this EOSB component, were less than 60.

In contrast, Model 2 shows that the EOSB was positive and insignificant. Even though the direct relationship between EOSB and growth was insignificant, it is essential to assess how EOSB moderates the relationship between public debt and economic growth. Both coefficients of EDEBT and EDEBTEOSB were significant, but these coefficients cannot be directly interpreted (Brambor et al. 2006). The marginal effect of debt on growth must

In contrast, Model 2 shows that the EOSB was positive and insignificant. Even though the direct relationship between EOSB and growth was insignificant, it is essential to assess how EOSB moderates the relationship between public debt and economic growth. Both

coefficients of EDEBT and EDEBTEOSB were significant, but these coefficients cannot be directly interpreted (Brambor et al. 2006). The marginal effect of debt on growth must be calculated when EOSB acts as a moderating variable. Thus, as stated in Equation (5), this

be calculated when EOSB acts as a moderating variable. Thus, as stated in Equation (5),
formula is used as a starting point to compute the marginal effects at the minimum, mean,
this formula is used as a starting point to compute the marginal effects at the minimum,
and maximum values of the EOSB. Nevertheless, the significance of the marginal effects
mean, and maximum values of the EOSB. Nevertheless, the significance of the marginal
was computed based on the t-statistics derived by dividing the new marginal effects (for-
effects was computed based on the t-statistics derived by dividing the new marginal effects
mula in Equation (5)) by the new standard error (formula in Equation (7)). The following
(formula in Equation (5)) by the new standard error (formula in Equation (7)). The following
table shows the results of the marginal effects, new standard error, and t-statistics for
table shows the results of the marginal effects, new standard error, and t-statistics for Model
Model 2. 2.

The table below shows that the marginal effect of EOSB was only significant when

The table below shows that the marginal effect of EOSB was only significant when the EOSB was at the minimum was at the level minimum. Thus, level an increase. Thus, an increase the debt in to the GDP debt ratio GDP would ratio would decrease the economic decrease the growth the economic when growth the EOSB when score the EOSB was at score the minimum was at the value minimum of 23 value. 75. of 23.75. Furthermore, Furth the debt rmore, to growth the debt relationship to growth relati becomes nship insignificant becomes significant when the when EOSB the val EOSB- values ues are at the are mean at the and me maximum nand maximum levels. When lvels identifying. When identifying the point where the point EOSB where starts EOSB starts to become insignificant, to become insignificant, the graph of the marginal graph of effects, marginal as shown effects, in as Figure shown 1, in is Figure a good 1, is a good guideline. guideline.

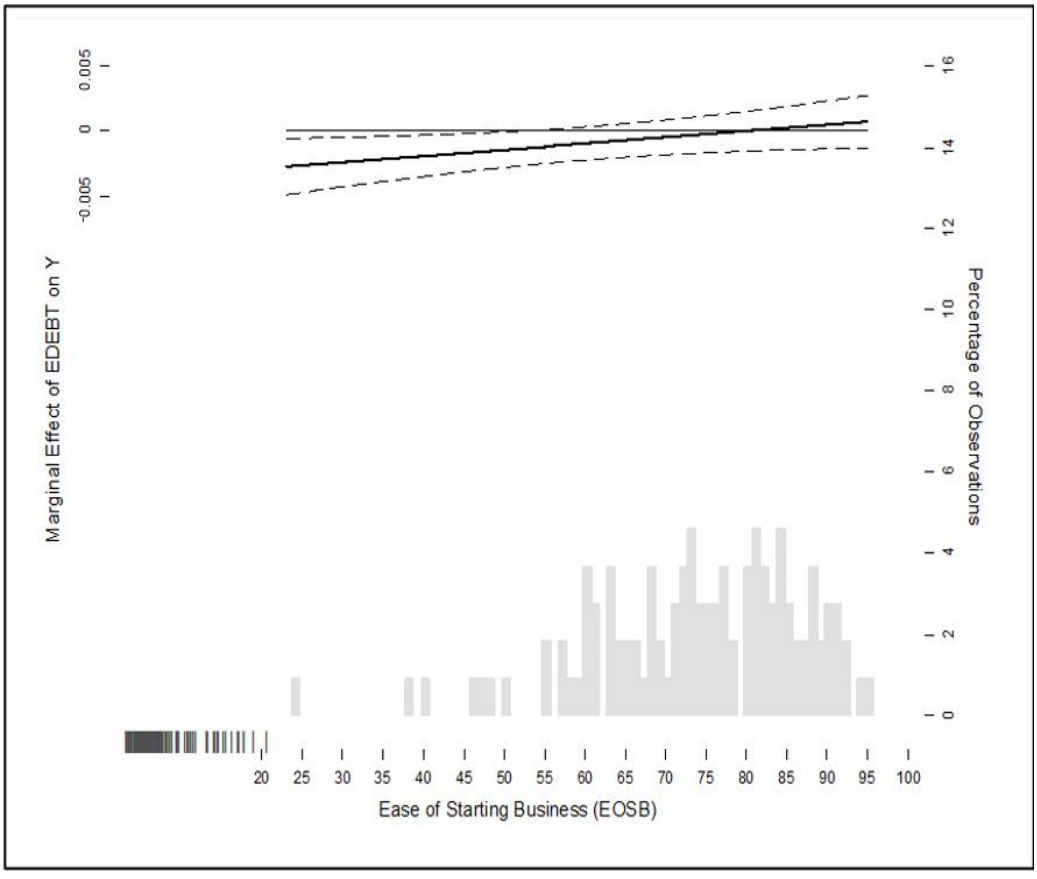

Figure 1. Marginal **Figure** effects **1.** Marginal of public effects debt of on public economic debt on growth economic when growth EOSB when is present. EOSB is present.

Figure 1 shows Figure the marginal 1 shows the effects marginal of public effects debt of public one economic debt economic growth when growth EOSB when EOSB in

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significant when the confidence intervals (which are illustrated as the dotted lines) are not nificant when the confidence intervals (which are illustrated as the dotted lines) are not

zero. Therefore, the EOSB is significant in moderating the debt–growth relationship of zero. Therefore, the EOSB is significant in moderating the debt–growth relationship of

UMIE when the EOSB values are from 23.75 to 55. Although the effects are all negative, UMIE when the EOSB values are from 23.75 to 55. Although the effects are all negative,

the adverse effects are minimal, improving as the EOSB increases. Even though there were the adverse effects are minimal, improving as the EOSB increases. Even though there were

only a few observations of low values of the EOSB, the results illustrated in Figure 1 are robust, since they are consistent with the results tabulated in Table 5, where the marginal effects are insignificant when the EOSB values are at a mean (73.87) and maximum value (95.72).

Table 5. Summary of the marginal effects, new standard errors, and t-statistics in Model 2.

EOSB	Marginal Effect	New Standard Error	t-Statistics
Mean	0.00021	0.000711	0.29009
Minimum	0.00271 **	0.001082	2.50696
Maximum	0.000886	0.001029	0.86143

Note: ** indicates significance at 5%.

The above findings indicate that the low regulatory performance of UMIE (at the minimum level) adversely affected the debt–growth relationship. Nevertheless, as the regulatory performance improved, the adverse effects slowly reduced. The findings showed higher private sector participation as the score improved, as it was easier for firms to start businesses in UMIE. This increased private sector participation helped governments to boost economic growth. Thus, public debt can be utilized for more productive purposes, generating higher economic growth.

5. Conclusions and Recommendations

From 2004 to 2020, UMIE experienced a weak regulatory performance since the average score of the EOSB was lower than 80. A weak regulatory performance indicates difficulties for new businesses to start their operations, due to lengthy procedures and the time-consuming opening and registering of new businesses. In addition, weak regulatory performance adversely affects the economic growth of UMIE. This finding was supported by previous researchers, such as Krammer (2015). Even though regulatory performance is often neglected in the growth literature, its role is important, since an improvement in regulatory performance will attract more business owners to start their business in the UMIE. Indirectly, it assists citizens in getting better jobs and increases the standard of living. The government can focus its expenditure on productive types of spending, thus helping to boost economic growth.

This study's findings lead to the following policy implications: In achieving high economic growth, the government should reduce bureaucracy and documentation to improve the regulatory performance of the UMIE. Existing procedures should be revised by allowing new firms to open businesses within a short period, with less hassle in filling out forms and other bureaucratic matters. Hence, the UMIE will attract higher private sector participation, thus enabling the government to utilize its debt for productive expenditure, which would help boost the economic growth of the UMIE.

This study has some limitations, as the World Bank Group discontinued the Doing Business Report since June 2020. Therefore, future research may not be able to use EOSB as a variable to measure regulatory performance. Other variables might be of interest to the researchers. Apart from this issue, we did not take into consideration the cross-sectional dependencies when the time dimension becomes large. This is an area to be explored by future researchers, to examine the cross-sectional dependency when they access the relationship among variables in the UMIE for large time dimensions.

Moreover, researchers recommended to compare their results based on a group of economies or countries in future research, since this study's scope only

covered 32 countries in UMIE. Finally, assessing the findings for each of the 32 countries separately using a time series analysis would also be interesting.

Author Contributions: Conceptualization, N.H.A.R. and S.I.; methodology, N.H.A.R. and K.A.S.; software, N.H.A.R. and K.A.S.; validation, S.I.; formal analysis, N.H.A.R.; investigation, K.A.S.; resources, S.I.; data curation, N.H.A.R.; writing—original draft preparation, N.H.A.R.; writing—review and editing, B.D.H., Y.A.R. and W.S.; visualization, N.H.A.R.; supervision, S.I.; project administration, B.D.H.; funding acquisition, N.H.A.R. and B.D.H. All authors have read and agreed to the published version of the manuscript.

Funding: Strategic Research Partnership (SRP) grant between Universiti Teknologi MARA, Malaysia and Universitas Negeri Semarang, Indonesia (file no: 100-RMC 5/3/SRP INT (027/2022)).

Acknowledgments: Thank you to the reviewers and editors for the insightful review and comments of this manuscript. Besides, we thank to the grant providers under the Strategic Research Partnership (SRP) grant between Universiti Teknologi MARA, Malaysia and Universitas Negeri Semarang, Indonesia (file no: 100-RMC 5/3/SRP INT (027/2022)).

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

Appendix A

Table A1. List of Upper-Middle-Income Economies (UMIE).

Countries Included:	Countries Excluded Due to Data Unavailability:
1. Albania	1. American Samoa
2. Algeria	2. Azerbaijan
3. Argentina	3. Belarus
4. Armenia	4. Bosnia Herzegovina
5. Belize	5. Cuba
6. Botswana	6. Dominica
7. Brazil	7. Equitorial Guinea
8. Bulgaria	8. Fiji
9. China	9. Georgia
10. Colombia	10. Grenada
11. Costa Rica	11. Guyana
12. Dominican Republic	12. Iraq
13. Ecuador	13. Kosovo
14. Gabon	14. Lebanon
15. Guatemala	15. Libya
16. Islamic Republic of Iran	16. Maldives
17. Jamaica	17. Marshall Islands
18. Jordan	18. Montenegro
19. Kazakhstan	19. Namibia
20. Malaysia	20. Nauru
21. Mauritius	21. North Macedonia
22. Mexico	22. Samoa
23. Paraguay	23. St. Lucia
24. Peru	24. St. Vincent & The Grenadines
25. Romania	25. Suriname
26. Russian Federation	26. Tonga
27. Serbia	27. Turkmenistan
28. South Africa	28. Tuvalu
29. Sri Lanka	
30. Thailand	
31. Turkey	
32. Venezuela	

Appendix B

Appendix B

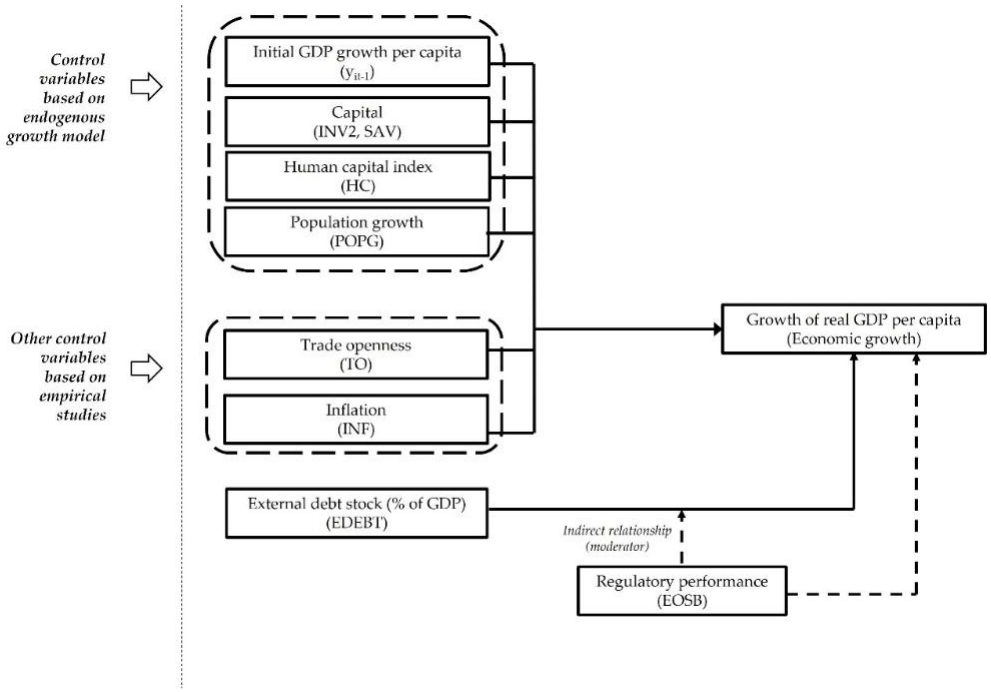

Figure A1. Theoretical Framework.

Figure A1. Theoretical Framework.

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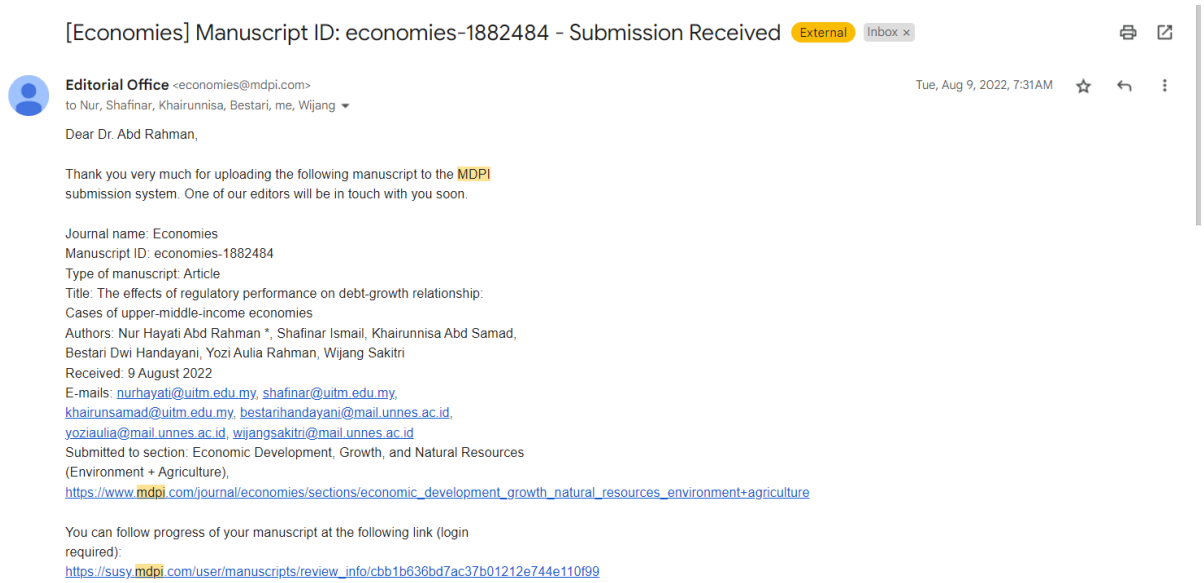

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Received: 9 August 2022
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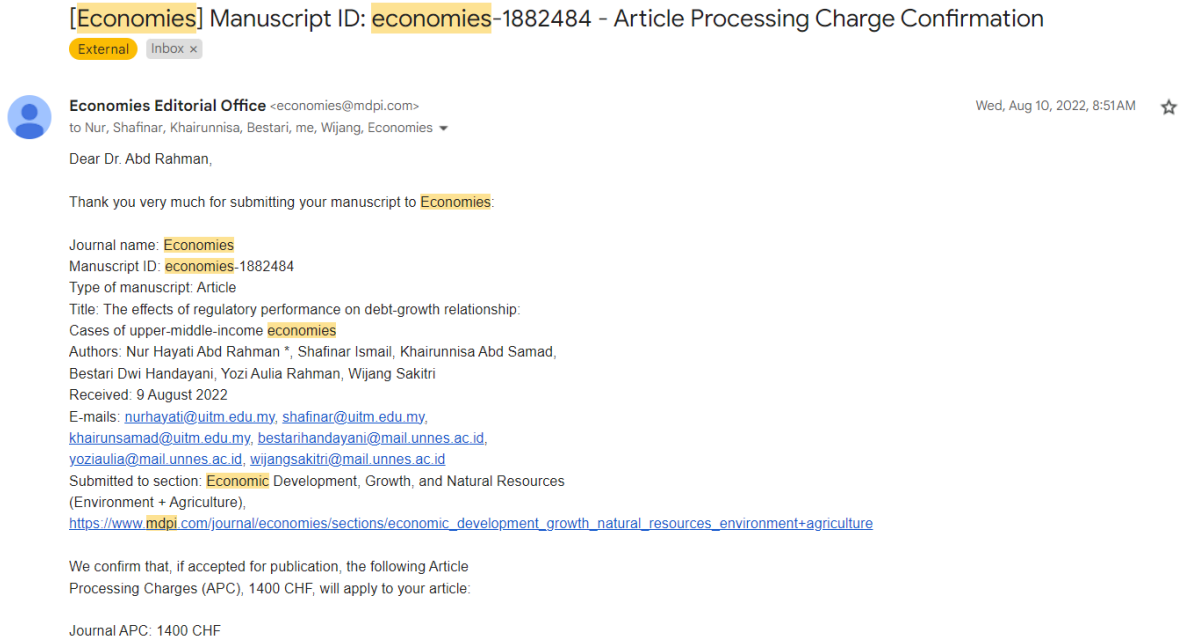

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Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
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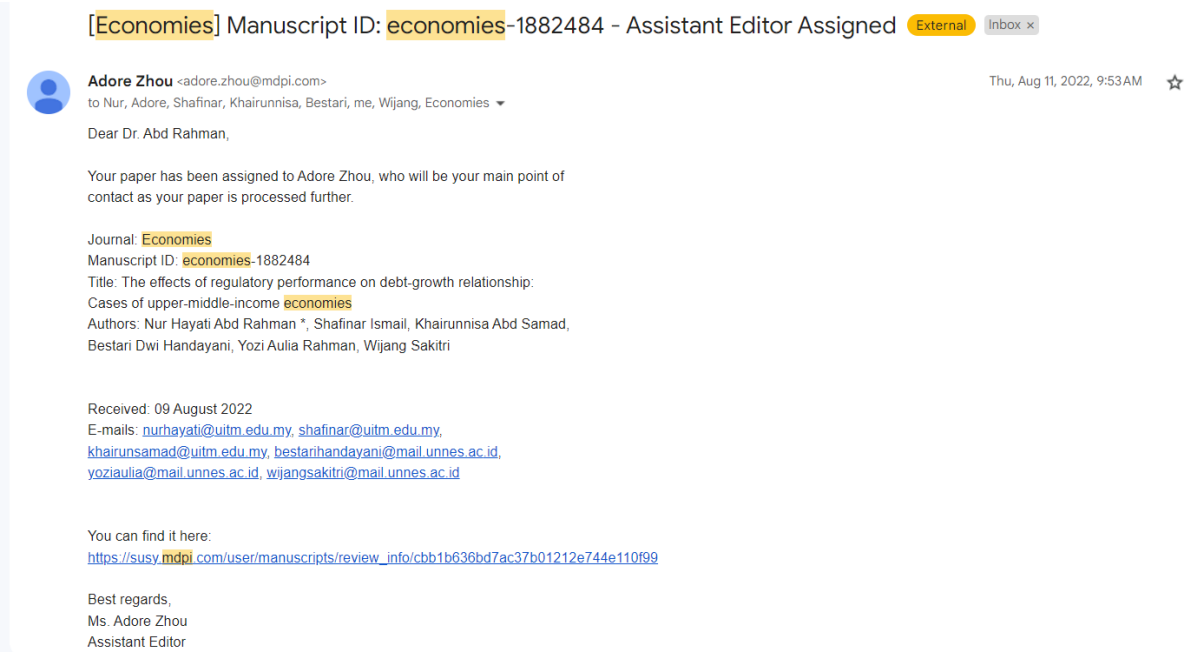
We confirm that, if accepted for publication, the following Article Processing Charges (APC), 1400 CHF, will apply to your article:

Journal APC: 1400 CHF

3. **Informasi mengenai Editor yang ditunjuk oleh melakukan proses selanjutnya : tahapan review (11 Agustus 2023)**



[Economies] Manuscript ID: economies-1882484 - Assistant Editor Assigned External Inbox ×

Adore Zhou <adore.zhou@mdpi.com> Thu, Aug 11, 2022, 9:53 AM
to Nur, Adore, Shafinar, Khairunnisa, Bestari, me, Wijang, Economies

Dear Dr. Abd Rahman,

Your paper has been assigned to Adore Zhou, who will be your main point of contact as your paper is processed further.

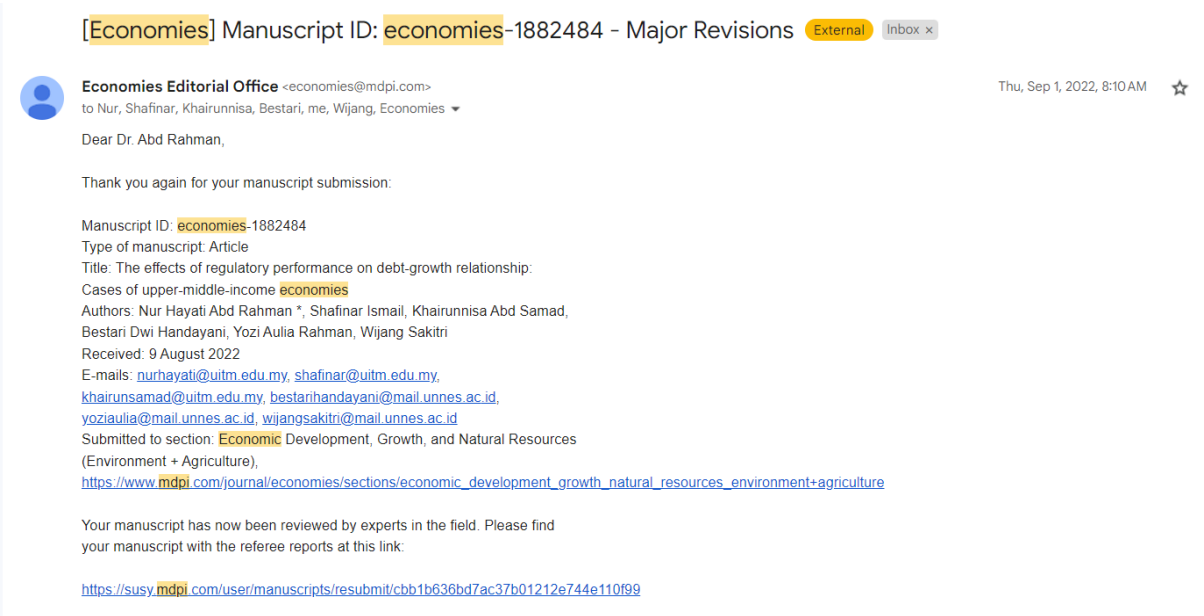
Journal: Economies
Manuscript ID: economies-1882484
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri

Received: 09 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id, yoziaulia@mail.unnes.ac.id, wijangsakitri@mail.unnes.ac.id

You can find it here:
https://susy.mdpi.com/user/manuscripts/review_info/cbb1b636bd7ac37b01212e744e110f99

Best regards,
Ms. Adore Zhou
Assistant Editor

4. **Informasi mengenai revisi mayor yang harus dilakukan oleh penulis (1 September 2022)**



[Economies] Manuscript ID: economies-1882484 - Major Revisions External Inbox ×

Economies Editorial Office <economies@mdpi.com> Thu, Sep 1, 2022, 8:10 AM
to Nur, Shafinar, Khairunnisa, Bestari, me, Wijang, Economies

Dear Dr. Abd Rahman,

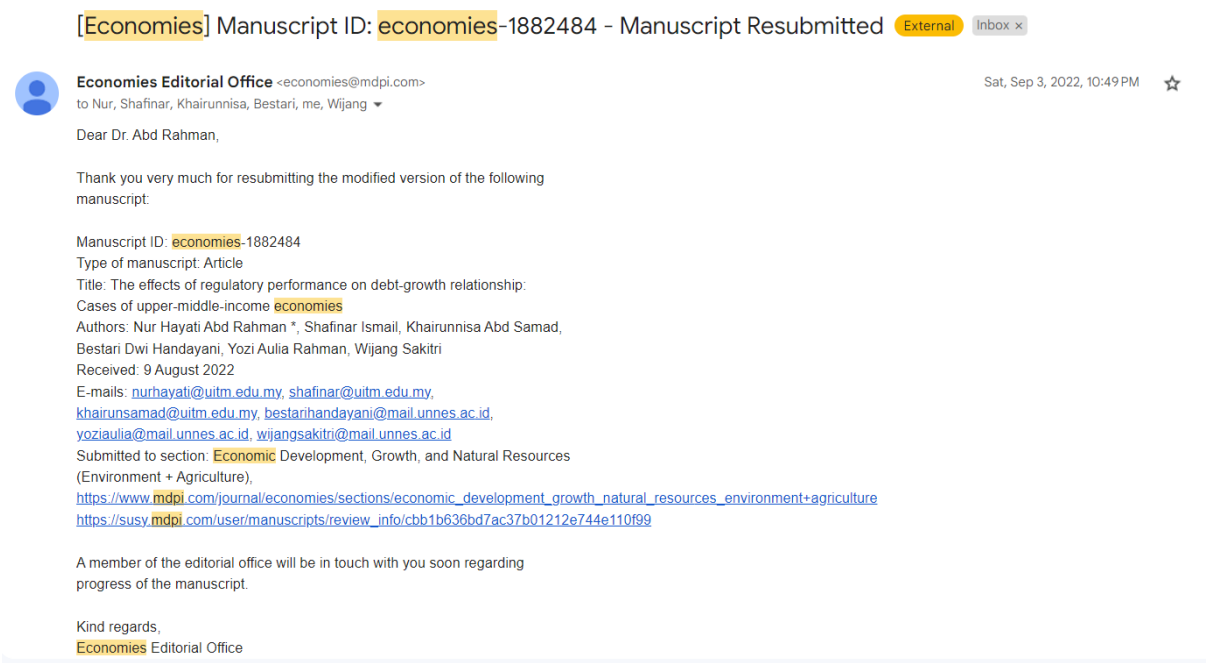
Thank you again for your manuscript submission:

Manuscript ID: economies-1882484
Type of manuscript: Article
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id, yoziaulia@mail.unnes.ac.id, wijangsakitri@mail.unnes.ac.id
Submitted to section: Economic Development, Growth, and Natural Resources (Environment + Agriculture),
https://www.mdpi.com/journal/economies/sections/economic_development_growth_natural_resources_environment+agriculture

Your manuscript has now been reviewed by experts in the field. Please find your manuscript with the referee reports at this link:

https://susy.mdpi.com/user/manuscripts/resubmit/cbb1b636bd7ac37b01212e744e110f99

5. Revisi manuskrip telah disubmit dan diterima oleh Editor (3 September 2022)



[Economies] Manuscript ID: economies-1882484 - Manuscript Resubmitted External Inbox ×

Economies Editorial Office <economies@mdpi.com> Sat, Sep 3, 2022, 10:49 PM
to Nur, Shafinar, Khairunnisa, Bestari, me, Wijang

Dear Dr. Abd Rahman,

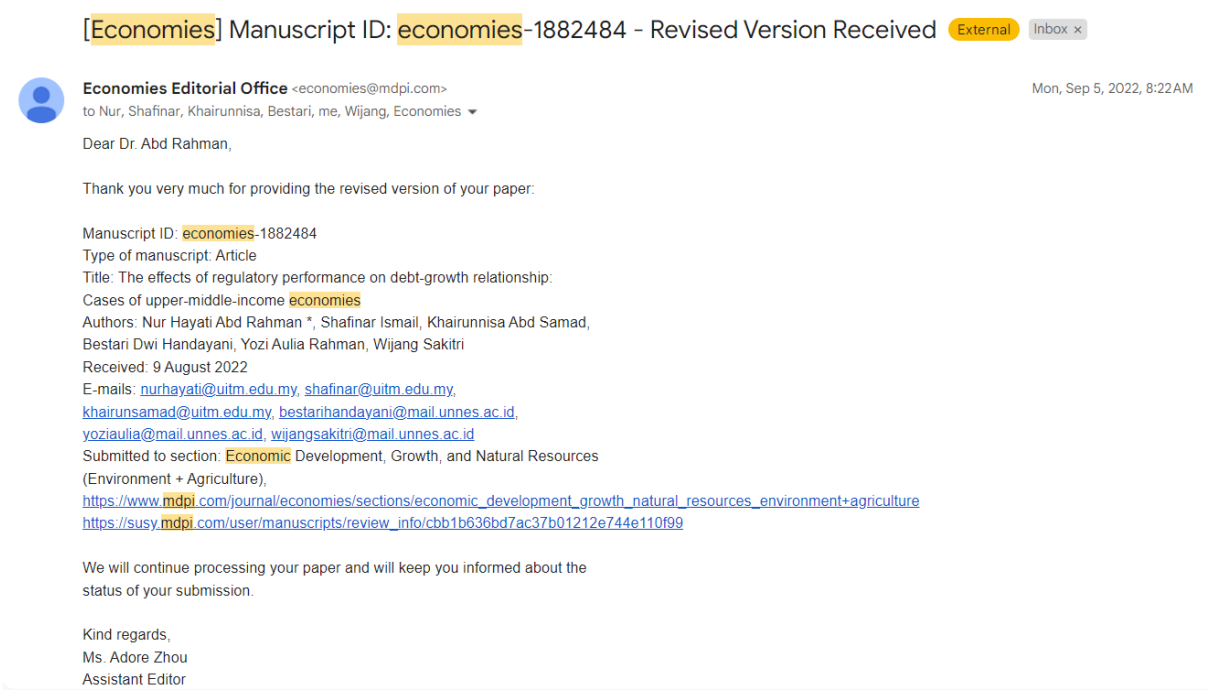
Thank you very much for resubmitting the modified version of the following manuscript:

Manuscript ID: economies-1882484
Type of manuscript: Article
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id, yoziaulia@mail.unnes.ac.id, wijangsakitri@mail.unnes.ac.id
Submitted to section: Economic Development, Growth, and Natural Resources (Environment + Agriculture),
https://www.mdpi.com/journal/economies/sections/economic_development_growth_natural_resources_environment+agriculture
https://susy.mdpi.com/user/manuscripts/review_info/cbb1b636bd7ac37b01212e744e110f99

A member of the editorial office will be in touch with you soon regarding progress of the manuscript.

Kind regards,
Economies Editorial Office

6. Perbaikan manuskrip mayor dikirimkan dan direspon pada 5 September 2023



[Economies] Manuscript ID: economies-1882484 - Revised Version Received External Inbox ×

Economies Editorial Office <economies@mdpi.com> Mon, Sep 5, 2022, 8:22 AM
to Nur, Shafinar, Khairunnisa, Bestari, me, Wijang, Economies

Dear Dr. Abd Rahman,

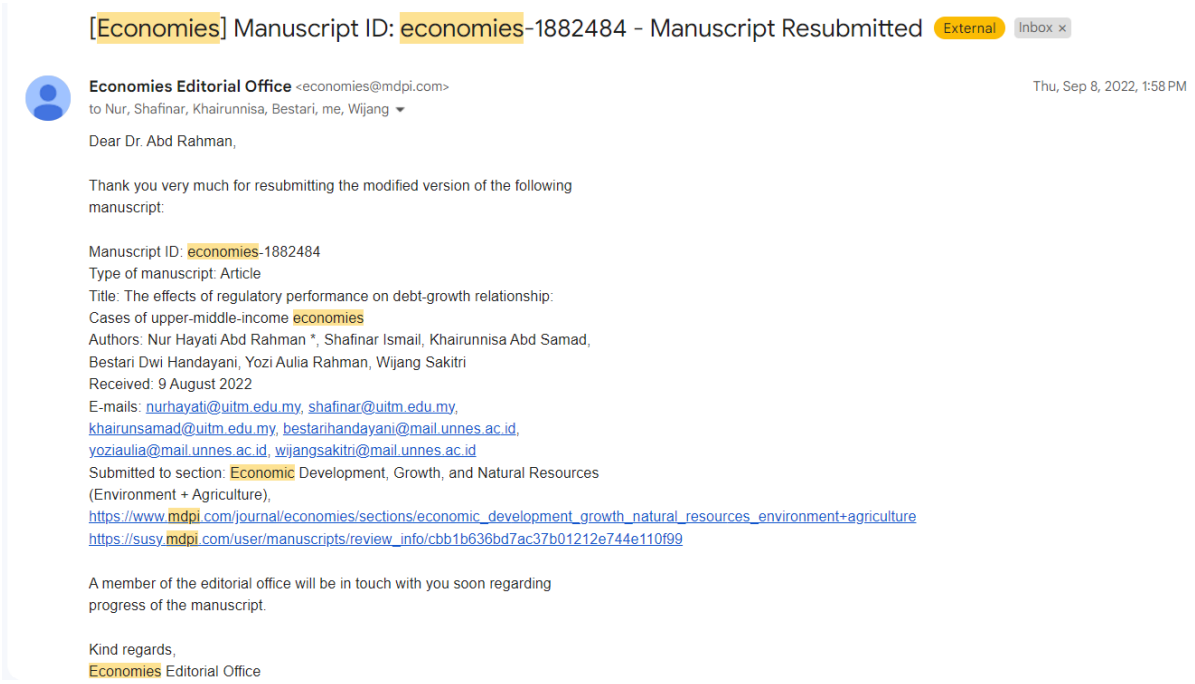
Thank you very much for providing the revised version of your paper:

Manuscript ID: economies-1882484
Type of manuscript: Article
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id, yoziaulia@mail.unnes.ac.id, wijangsakitri@mail.unnes.ac.id
Submitted to section: Economic Development, Growth, and Natural Resources (Environment + Agriculture),
https://www.mdpi.com/journal/economies/sections/economic_development_growth_natural_resources_environment+agriculture
https://susy.mdpi.com/user/manuscripts/review_info/cbb1b636bd7ac37b01212e744e110f99

We will continue processing your paper and will keep you informed about the status of your submission.

Kind regards,
Ms. Adore Zhou
Assistant Editor

7. **Melakukan submit ulang manuskrip yang telah direvisi kembali dan mendapatkan respon pada 8 september 2023**



[Economies] Manuscript ID: economies-1882484 - Manuscript Resubmitted External Inbox ×

Economies Editorial Office <economies@mdpi.com> Thu, Sep 8, 2022, 1:58 PM
to Nur, Shafinar, Khairunnisa, Bestari, me, Wijang

Dear Dr. Abd Rahman,

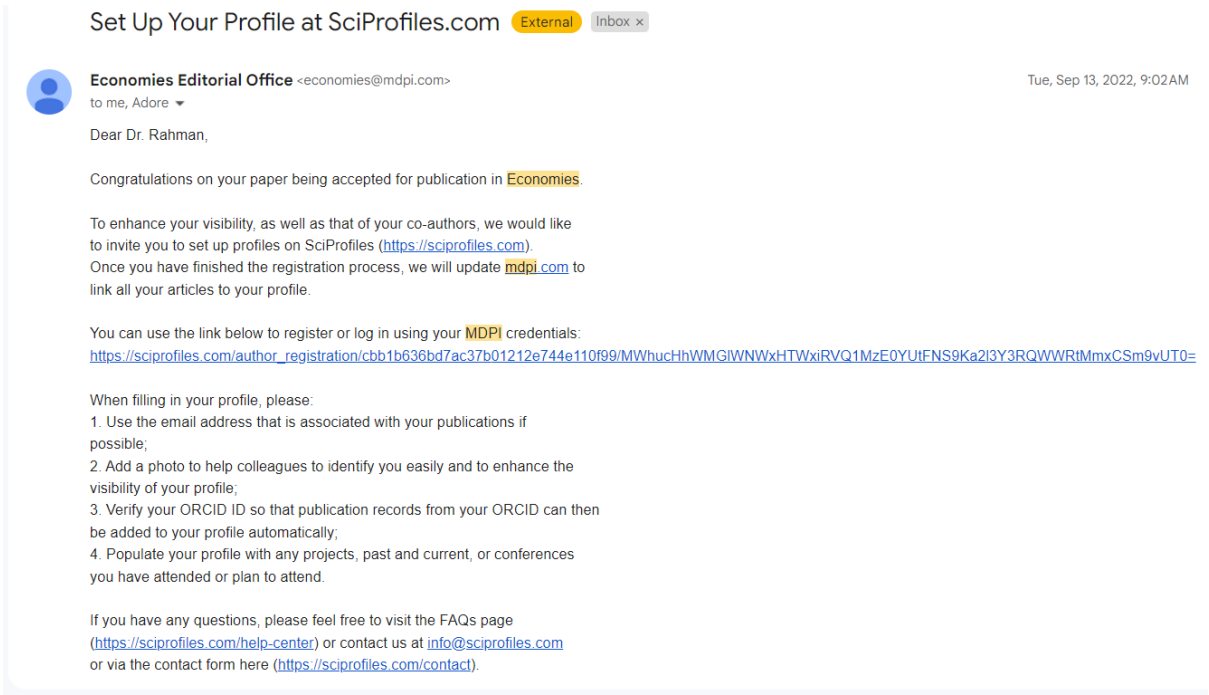
Thank you very much for resubmitting the modified version of the following manuscript:

Manuscript ID: economies-1882484
Type of manuscript: Article
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id, yoziaulia@mail.unnes.ac.id, wijangsakitri@mail.unnes.ac.id
Submitted to section: Economic Development, Growth, and Natural Resources (Environment + Agriculture),
https://www.mdpi.com/journal/economies/sections/economic_development_growth_natural_resources_environment+agriculture
https://susy.mdpi.com/user/manuscripts/review_info/cbb1b636bd7ac37b01212e744e110f99

A member of the editorial office will be in touch with you soon regarding progress of the manuscript.

Kind regards,
Economies Editorial Office

8. **Mendapatkan informasi bahwa artikel telah diterima dan diminta membuat profil di Sciprofile.com (13 September 2022)**



Set Up Your Profile at SciProfiles.com External Inbox ×

Economies Editorial Office <economies@mdpi.com> Tue, Sep 13, 2022, 9:02 AM
to me, Adore

Dear Dr. Rahman,

Congratulations on your paper being accepted for publication in Economies.

To enhance your visibility, as well as that of your co-authors, we would like to invite you to set up profiles on SciProfiles (https://sciprofiles.com). Once you have finished the registration process, we will update mdpi.com to link all your articles to your profile.

You can use the link below to register or log in using your MDPI credentials:
https://sciprofiles.com/author_registration/cbb1b636bd7ac37b01212e744e110f99/MWhucHhWMGlWNWxHTWxiRVQ1MzE0YUtFNS9Ka2l3Y3RQWWRtMmxCSm9vUT0=

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3. Verify your ORCID ID so that publication records from your ORCID can then be added to your profile automatically;
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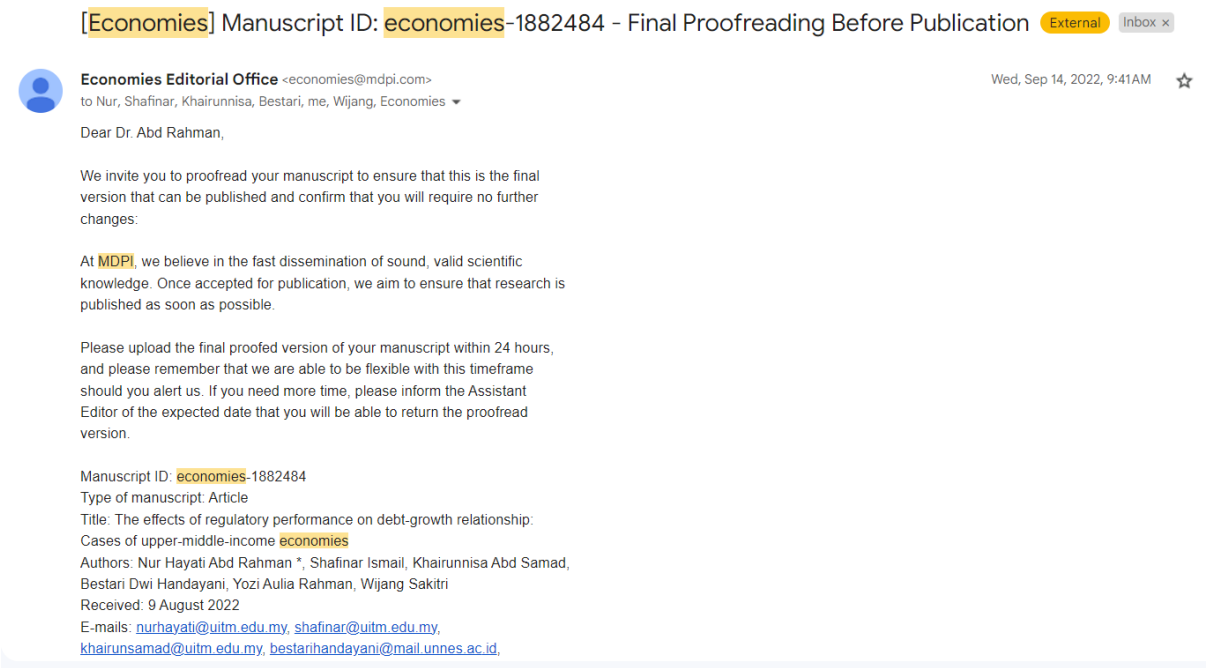
If you have any questions, please feel free to visit the FAQs page (https://sciprofiles.com/help-center) or contact us at info@sciprofiles.com or via the contact form here (https://sciprofiles.com/contact).

9. Diminta editor untuk melakukan final proofreading sebelum dipublikasikan (14 September 2022)



[Economies] Manuscript ID: economies-1882484 - Final Proofreading Before Publication External Inbox ×

Economies Editorial Office <economies@mdpi.com> Wed, Sep 14, 2022, 9:41AM
to Nur, Shafinar, Khairunnisa, Bestari, me, Wijang, Economies

Dear Dr. Abd Rahman,

We invite you to proofread your manuscript to ensure that this is the final version that can be published and confirm that you will require no further changes:

At MDPI, we believe in the fast dissemination of sound, valid scientific knowledge. Once accepted for publication, we aim to ensure that research is published as soon as possible.

Please upload the final proofed version of your manuscript within 24 hours, and please remember that we are able to be flexible with this timeframe should you alert us. If you need more time, please inform the Assistant Editor of the expected date that you will be able to return the proofread version.

Manuscript ID: economies-1882484
Type of manuscript: Article
Title: The effects of regulatory performance on debt-growth relationship: Cases of upper-middle-income economies
Authors: Nur Hayati Abd Rahman *, Shafinar Ismail, Khairunnisa Abd Samad, Bestari Dwi Handayani, Yozi Aulia Rahman, Wijang Sakitri
Received: 9 August 2022
E-mails: nurhayati@uitm.edu.my, shafinar@uitm.edu.my, khairunsamad@uitm.edu.my, bestarihandayani@mail.unnes.ac.id,

10. Penulis utama melakukan pembayaran APC Jurnal (19 September 2022)

Payment confirmation

MDPI
St. Alban-Anlage 66
4052 Basel
Switzerland

Tel.: +41 61 683 77 34
E-Mail: billing@mdpi.com
VAT nr. CHE-115.694.943

Nur Hayati Abd Rahman
UiTM Cawangan Melaka
110 Off Jalan Hang Tuah
Melaka 75300
Malaysia

nurhayati@uitm.edu.my

Basel, 19 September 2022

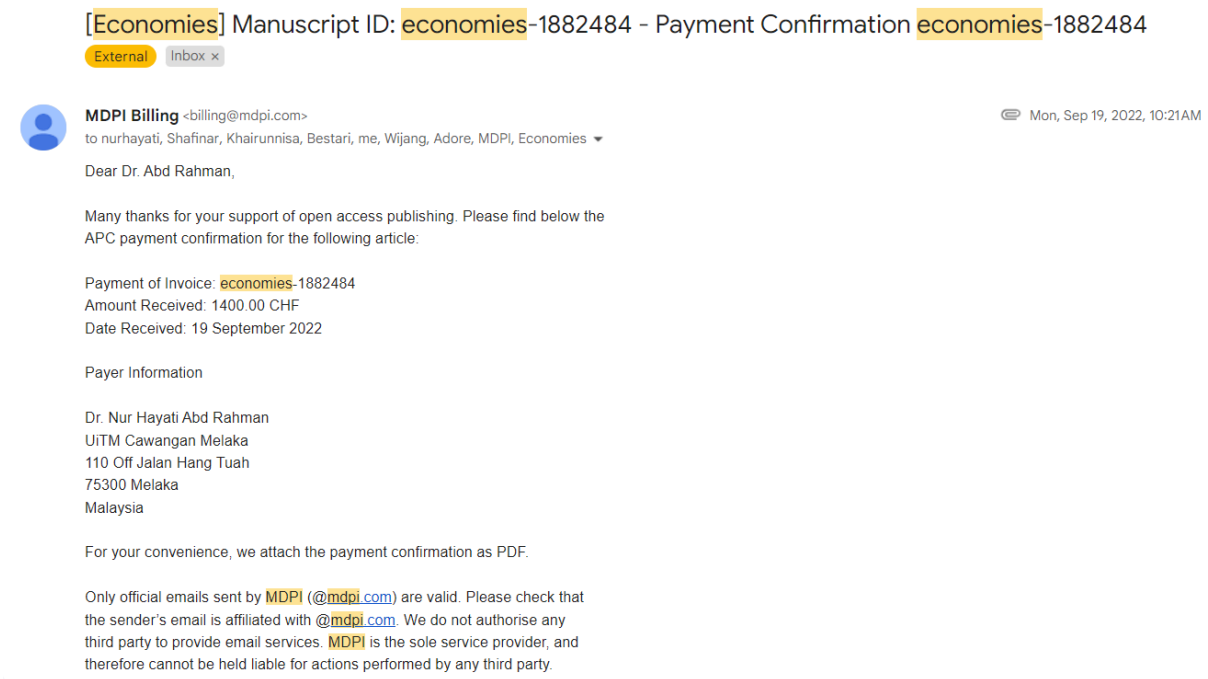
Description
Payment confirmation for invoice: economies-1882484

MDPI confirms that it has received payment of invoice economies-1882484 (invoice dated 13 September 2022)

Amount Received: 1400.00 CHF
Date Received: 19 September 2022

MDPI
Financial Accounting
St. Alban-Anlage 66
CH–4052 Basel
Switzerland

11. Konfirmasi pembayaran oleh Editor Jurnal (19 September 2022)



[Economies] Manuscript ID: economies-1882484 - Payment Confirmation economies-1882484

External Inbox ×

MDPI Billing <billing@mdpi.com> Mon, Sep 19, 2022, 10:21 AM
to nurhayati, Shafinar, Khairunnisa, Bestari, me, Wijang, Adore, MDPI, Economies

Dear Dr. Abd Rahman,

Many thanks for your support of open access publishing. Please find below the APC payment confirmation for the following article:

Payment of Invoice: economies-1882484
Amount Received: 1400.00 CHF
Date Received: 19 September 2022

Payer Information

Dr. Nur Hayati Abd Rahman
UiTM Cawangan Melaka
110 Off Jalan Hang Tuah
75300 Melaka
Malaysia

For your convenience, we attach the payment confirmation as PDF.

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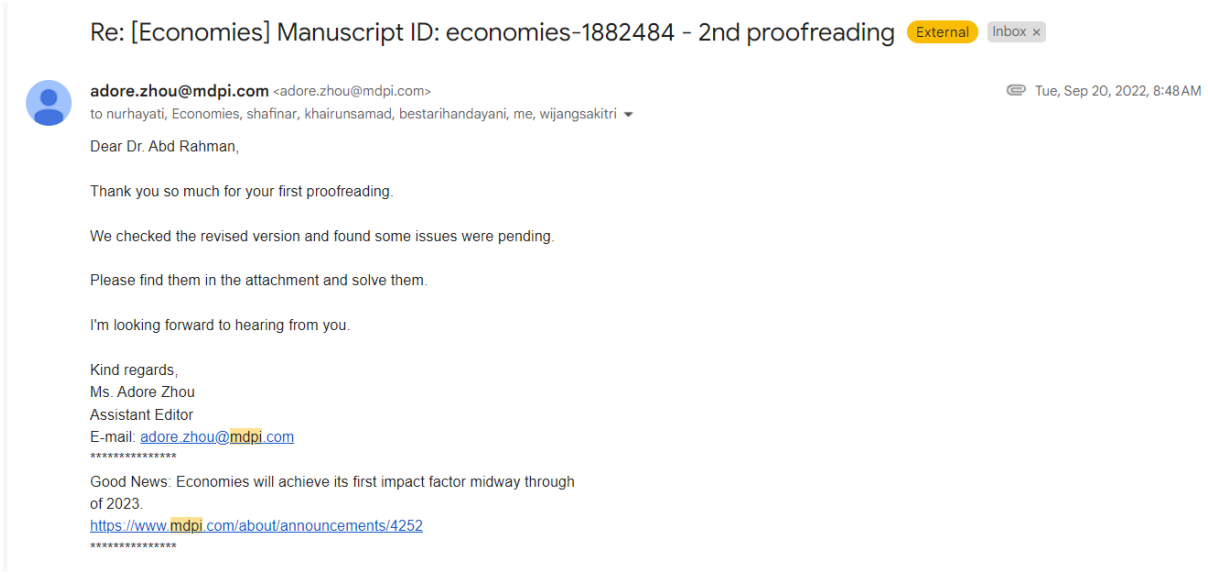
12. Permintaan proofreading ke 2 oleh Editor (20 September 2022)



Re: [Economies] Manuscript ID: economies-1882484 - 2nd proofreading External Inbox ×

adore.zhou@mdpi.com <adore.zhou@mdpi.com> Tue, Sep 20, 2022, 8:48 AM
to nurhayati, Economies, shafinar, khairunsamad, bestarihandayani, me, wijangsakitri

Dear Dr. Abd Rahman,

Thank you so much for your first proofreading.

We checked the revised version and found some issues were pending.

Please find them in the attachment and solve them.

I'm looking forward to hearing from you.

Kind regards,
Ms. Adore Zhou
Assistant Editor
E-mail: adore.zhou@mdpi.com
****
Good News: Economies will achieve its first impact factor midway through of 2023.
https://www.mdpi.com/about/announcements/4252
****

13. Proofreading telah dikirimkan dan mendapat respon bahwa artikel telah terbit (23 September 2022)

[Economies] Manuscript ID: economies-1882484; doi: 10.3390/economies10100235. Paper has been published. External Inbox ×

economies@mdpi.com Fri, Sep 23, 2022, 4:22 PM
to nurhayati, shafinar, khairunsamad, bestarihandayani, me, wijangsakitri, billing, website, economies, minghui.sun, adore.zhou

Dear Authors,

We are pleased to inform you that your article "The Effects of Regulatory Performance on the Debt–Growth Relationship: Cases of Upper-Middle-Income Economies" has been published in Economies and is available online:

Abstract: https://www.mdpi.com/2227-7099/10/10/235
PDF Version: https://www.mdpi.com/2227-7099/10/10/235/pdf
The meta data of your article, the manuscript files and a publication certificate are available here (only available to corresponding authors after login):
https://susy.mdpi.com/user/manuscripts/review_info/cbb1b636bd7ac37b01212e744e110f99

Please note that this is an early access version. The complete PDF, HTML, and XML versions will be available soon. Please take a moment to check that everything is correct. You can reply to this email if there is a problem. If any errors are noticed, please note that all authors must follow MDPI's policy on updating published papers, found here:
https://www.mdpi.com/ethics#16.