External Debts and Economic Growth when Debts Rating Matters

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Abstract

The paper investigates the dependence pattern of economic growth on external debts supply by accounting for the safety of debts, measured by the sovereign debts rating. The method of cross-section regression is based on a sample of 145 advanced and developing economies with averaged data over 1990-2019 period. The pattern of economic growth follows an U-shaped curve, for which the growth rate is first decreasing then increasing on the external debts supply. An possible explaination can rely on the sovereign debts rating. For low supply of external debts, a higher supply of debts reduces the debts rating, which, in turn, lowers the economic growth rate. But for high enough supply of debts, more debts raise their rating, then, improving the growth rate. These results are robust on controlling for various determinants of economic growth and on the fixed-effect panel regression.

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1. Introduction.

The relationship between external debts and economic growth is important for the sustained economic development. While most of past evidence records that the external debts are detrimendal to economic growth, the recent literature on the international macro-finance suggest a novel approach to external debts. Since the debts are a type of safe assets, which are uncertainty-insensitive assets, they are potential to contribute on the economic growth, especially in the long-run. The debts not only place a burden on an economy's buget as traditional approach, but also serve as store of wealth, then, channelling savings into investment. The investment, in turn, can stimulates the economic growth rate. But until now, there are quite little papers accounting for the safety of debts on the relationship between debts and growth. Our paper aims to fill in this research gap.

The paper investigates the impact of external debts on the economic growth rate by accounting for the debts rating index.

The paper investigates a dependence pattern of economic growth on the external debts supply based on a cross-section sample of 145 advanced and developing economies. The evidence records that the pattern follows an U-shaped curve, for which the economic growth is first decreasing then increasing on the external debts. An possible explaination can rely on the sovereign debts rating. For low supply of external debts, a higher supply of debts reduces the debts rating, which, in turn, lowers the economic growth rate. But for high enough supply of debts, more debts raise their rating, then, improves the growth rate. These results are robust on controlling for various determinants of economic growth and also on the fixed-effect panel regression. Moreover, the paper also suggests that more external debts supply can be accompanied by public policy that improves their debts rating, so that the debts can contribute on the domestic economic growth.

The paper falls in the nexus between economic growth, capital flows and safe assets at international financial integration.

The paper belongs to the literature on the economic growth. On the neoclassical growth model (Solow, 1956; Swan, 1956), the income per capita grows with the rate of technology progress and labor force growth rate. The technology progress is usually measured by the productivity level, which is the Solow residual based on a constant-return-to-scale production function with labor-augemented technology (Freenstra et al, 2015). Thus, the productivity and labor fore growth rates are the determinants of economic growth rate in the long-run. The endogenous growth theory extends the neoclassical growth model by investigating the source of technology progress. This progress can be due to the accumulation of capital across domestic firms on the AK model (Frankel, 1962), or by the expansion of new variety of product on the product variety model (Romer, 1990). And on the Schumpeterian model (Aghion and Howitt, 1992), the technology growth rate is determined by the distance of an economy to the world technolgy frontier economy and by the research and development expenditure. Beside the theory, the empirical evidence also records various determinants of economic growth such as the institutional quality (Robinson and Acemoglu, 2012), the financial development level (Levine et al, 1997), the capital account openness (Bussiere and Fratzscher, 2008), or the human capital (Mankiw et al, 1992).

Our paper complements these aforementioned papers by providing an evidence on a non-linear dependence pattern of economic growth on the external debts. We show that the external debts are an important determinant of economic growth in the long-run.

The role of external debts on determining the economic growth is also proved by many papers, with a recent survey on Yared (2019). Clements et al (2003) the external debts affect negatively the economic growth rate. The substantioal reduction in the stock of external debts for highly indebted poor countires would directly increase per capita income growth by about 1 percentage point per annum. But the external debts can boost the economic growth through

their effect on public investment. Morsy et al (2019) also find empirical evidence on the debts-investment-growth link. They find that the private external long-term debts can stimulate the domestic capital formation, then, improve the economic growth rate.

Our paper differs these aforementioned paper by establishing a non-linear, U-shaped dependence pattern of economic growth on the external debts supply. Thus, the evidence on the negative impact of debts on economic growth applies for the low debts supply. For large enough debts supply, the external debts exert positive impact on the economic growth rate.

The paper is closedly related to the literature on the international capital flows. For many economies, including United States, Germany and China, the debts flows account for largest share of net capital inflows, in comparision with FDI and portfolio equities capital flows (Hung, 2020). As a type of capital flows, the debts flow is driven by the difference on the rate of return on capital investment. On theory (Lucas, 1990), capital flows from the advanced economies with abundant capital to the poor economies with scare capital. Recent evidence shows that the debts flow is largely driven by the motivation of seeking store of wealth (Bernanke et al, 2011). Huge savings by emerging economies such as China and Republic of Korea flow into United States in seeking the safe assets as the store of value. One of types of safe assets is the US government debts such as Bonds and Treasury Bills. This mechanism of debts flow is also analyzed on a relevant theory suggested by Caballero et al (2008). High economic growth rate can attract the inflows of foreign capital. But if an economy has a high growth rate combined with scarcity of safe assets, it can experience the outflows of capital in term of seeking foreign safe assets as store of wealth.

Our paper complements these papers by investigating the external debts flow. Beside their role on raising the economic growth and compensate the domestic investment, the external debts also affect the sovereign debts rating. In particular, our evidence shows that the external debts improve the sovereign debts

rating when their supply is large enough. Thus, the debts are safe only when their floating capacity is large. This evidence lays a ground for the theory developed by He et al (2019). These authors show that U.S government debts are considered as safe assets, with highest sovereign debts rating, since their debts floating capacity is high.

The paper also makes constribution on the safe assets at financial globalization. The safe assets are the assets with uncertainty-insensitive rate of return (Caballero et al, 2016). Then, the debts can be considered as a type of safe assets since their interest rate is known at the time of issuance. Thus, on many theoretical model, the safe assets are modelled as a type of debts. Farhi and Maggiori (2017) show that the multiple suppliers of safe assets can result in an unstable international monetary system. When there are competition between issuers of safe assets with low committment to keep their value of assets in term of exchange rate, the supply of safe assets can fall into a region of unstable equilibrium, in which more supply of assets deteriorates their safety. Moreover, the supply of safe assets also underlines the secular stagnation. When an economy has scarcity of safe assets, it can fall into a safety trap, as type of liquidity trap but originated on the low supply of safe assets. Within this trap, the monetary policy is ineffective. Then, for a reduction of domestic supply, the only way to restore the equilibrium is an endogenous reduction of aggregate demand. Then, the economy can fall into a secular stagnation. In the world economy, when the issuer of safe assets falls into the secular stagnation, it can lead to the world economy to fall into the secular stagnation too. The reason is the whole world economy also suffer from the scarcity of safe assets, then, a reduction of supply can be accompanied by a reduction of demand so that the market restores to its equilibrium.

Compared with these aforementioned papers, our paper records an evidence that the safe assets can have a positive impact on the economic growth. In our paper, the safety of debts is expressed by the sovereign debts rating. Our

evidence records that a higher sovereign debts rating raises the economic growth rate. Thus, when the debts are safer, they can stimulate the economic growth rate.

The paper is structured as following. After the first section on Introduction, the second section describes the framework with background, data and model. Then, the third section shows the empirical evidence the relationship of external debts - debts raing - economic growth, with a robustness analysis. Finally, the fourth section concludes the paper, then is followed by an Appendix on the evidence based on panel data regression.

2. Framework.

2.1. Background.

The external debts are a component of cross-border capital flows. In particular, net total capital inflows can be decomposed into foreign direct investment, foreign portfolio equities investment, external debts and other items (Alfaro et al, 2014). Thus, the relationship between the external debts and economic growth is also underlined by the theory and evidence relating the international capital flows and economic growth.

On neoclassical growth model (Solow, 1956; Swan, 1956), the capital accumulates until its ratio over each effective unit of labor is constant at the steady state. Then, the marginal product of capital, a measure of return on capital investment, is decreasing on the capital per effective unit of labor. Rich countries with high capital per effective unit of labor has lower rate of return than the poor counterparts. Thus, the capital would flow from rich to poor economies, so that, the latter economies has enough investment to cath-up with the rich economies in term of capital accumulation level. Lucas (1990) shows that low institutional quality, such as limited contract committment, prevents the flows of capital from rich to poor economies. Thus, the catch-up of economic growth is not realized. Gourinchas and Jeanne (2013) proves the existence of an allocation puzzle of capital across countries. Countries with high productivity growth rate does not receive more capital inflows, and they even experience the outflows of capital.

This pattern is also defined as the up-hill capital flows pattern by Prasad et al (2007). These authors show that the foreign capital inflows exert a positive impact on the domestic economic growth only when the domestic financial development level is high enough. Otherwise, the foreign capital is trimendal to the economic growth rate. Recently, Hung (2021) records an empirical evidence that the foreign capital inflows are the main driver of economic growth in Vietnam. And the foreign capital is even more important than the domestic credit supply on shaping the economic growth.

Therefore, the aforementioned empirical evidence records that the net total capital inflows, including the external debts, does not neccessarily lead to a higher economic growth rate as implied by the theory.

Moreover, the external debts are also a component of total debts. In details, total debts can be decomposed into domestic debts and external debts. Then, the relationship between the external debts and economic growth is also underlined by the theory and evidence on the relationship between the debts and economic growth.

The debts can affect the economic growth by various channels. The debts can serve as liquidity transformation so that domestic firms can save by accumulating debts to finance the investment project in the future (Woodford, 1990). When the firms face the borrowing constraint from banks, they can buy the government debts by their net profit. Then, to finance new investment opportunity in the future, they can exchange the debts for capital as complement to the borrowing from banks. Beside the liquidity function, the debts can also serve the store of wealth demand by households. Farhi and Maggiori (2017) proves that the supply of external debts matters for the economic growth. There exist multiple steady states in an economy with limited commitment by the economy which issues the debts. The equilbrium is stable for low and high supply of debts, but it is unstable for a middle range of debts. And for unstable

equilibrium, the economy collapses, then, experiences a decrease of economic growth rate.

There is, however, still a long distance between theory and evidence on the role of debts. Reinhart and Rogoff (2010) uncover an evidence that the relationship between the economic growth and debts are weak at normal debts supply, and it only becomes negative for debts per GDP ratio over 90 percent. Arcabic et al (2018) employs various panel regressions, from the threshold model to panel vector autoregression model, to show that the threshold of debts as Reinhart and Rogoff (2010) is not uniquely defined, and the estimated coefficients are insignificant.

In sum, there is not a consensus on the effect of external debts on the economic growth, on both theory and evidence. Our paper will carry out an empirical analysis with a new perspective on the role of debts as a type of safe assets to fill in this research gap.

2.2. Data.

The data is a cross-section sample of 145 advanced and developing economies. Each variables is averaged over 1990-2019. This nearly 30-year period is long enough to absorb the fluctuation of economic variables. As the Appendix shows, the evidence is also similar for the panel data regression.

The economic growth, denoted by *(aGDPpcgrowth),* is measured by the growth rate of real output per capita. The real output is the gross domestic product (GDP) at constant 2011 national price in million USD. This variable is from the Penn World Table 10.0 (PWT, 2020). With the population data from the Worldbank Development Indicators (WDI, 2020), the GDP per capita is the real output divided by the population. Then, we takes the annual growth rate of GDP per capita, which is on percentage.

The external debts, denoted by *(axtdebty),* is the total external debts per GDP ratio on percentage. Then, it is decomposed into sub-components, including the public and private debts, the short-term and long-term debts, foreign currency

and domestic currency debts. This decomposition is employed on the robustness analysis. These variables are from the Worldbank Fiscal Space Database with updated version in 2020 (Kose et al, 2017).

The control variables are taken from various source. First, the financial development is the total credit to private sector per GDP ratio on percentage. This variables is from the WDI database. Second, the growth rate of labor force is the anual growth rate of peopple engaged into production, which is from the PWT 10. Third, the human capital is the Barro-Lee human capital index, which accounts for the school enrollment. This variable is from the PWT 10. Fourth, the trade openness is the sum of exports and imports per GDP ratio on percentage. The data on exports, imports and nominal GDP are on current USD, and are from the Worldbank Development Indicators. Fifth, the capital account openness is the Chinn-Ito capital index, which is constructed by Chinn and Ito (2008). And institutional quality covers the economic, political and legal index. These indices are from the database constructed by Kunčič (2014).

Table 1: Descriptive Statistics

Variables	Observations	Mean	Std.Dev	Min	Max
Economic Growth (aGDPpcgrowth)	179	1.90	1.65	-2.10	7.84
External Debts Supply (Lnaxtdebty)	170	4.17	0.86	2.17	8.38
Financial Development (LnaFinDev)	185	3.39	0.85	0.44	5.30
Labor Force Growth (aEmpgrowth)	176	2.19	1.84	-2.47	11.68
Human Capital (aHc)	143	2.20	0.67	1.07	3.52
Trade Openness (aEopen)	200	86.26	49.18	13.34	388.95
Capital Openness (aKaopen)	179	0.02	1.26	-1.87	2.34
Economic Institution (aEconomic)	188	0.49	0.17	0.12	0.88

Legal Institution *(aLegal)*	189	0.55	0.19	0.11	0.93
Political Institution *(aPolitical)*	180	0.50	0.19	0.10	0.89

Table (1) reports the descriptive statistics of the data sample. The economic growth rate has a mean of 1.90% and standard deviation of 1.65%. Compared with this variable, the labor force growth rate has a higher mean (2.19%) and deviation (1.84%). The log value of external debt per GDP has a mean of 4.17 with standard deviation of 0.86, which are higher than the corresponding value of financial development level measured by log value of credit per GDP at 3.39 and 0.85 respectively. For the openness, the trade openness has a mean of 86% and standard deviation of 49%, while the capital openness has a mean of 0.02 with standard deviation of 1.26. Other variables, including the human capital and institutional quality, also exhibits large standard deviation. Thus, the data offers a rich variation for exploring the dependence pattern of economic growth on the external debts.

2.3. Model.

The regression equation with the sample of economy *(j)* is as following:

$$aGDPpcgrowth_j = \propto + \beta^{Debts} Lnaxtdebty_j + \beta^{Debts2} Lnaxtdebty_j^2 +$$
$$\beta^{FinDev} LnaFinDev_j + \beta^{Emp} aEmpgrowth_j + \beta^{Hc} aHc_j + \beta^{Eopen} aEopen_j +$$
$$\beta^{Kaopen} aKaopen_j + \beta^{aEco} aEconomic_j + \beta^{aPol} aPolitical_j +$$
$$\beta^{aLeg} aLegal_j + u_j$$

The model represents the cross-section regression. With this methods, the analysis can focus on the long-run equilibrium on the relationship between external debts and economic growth. This strategy is the traditional method on analyzing the economic growth (Barro and Sala-i-Martin, 1990) and the cross-border capital flows, including the extern debts (Gourinchas and Jeanne, 2013; Alfaro et al, 2014). As Galor (1996) argue, this method is consistent to the class

of models relevant to neoclassical growth model for which there exist an unique stable steady state.

The focal point is on the coefficients ($\beta^{Debts}; \beta^{Debts2}$). They present the impact of external debts supply on the economic growth. When they are significantly different to zero, the dependence pattern of economic growth on the external debts follows a quadratic function. Then, the impact of external debts on the economic growth can be positive or negative, depending on the suply of external debts.

$$\frac{\partial aGDPpcgrowth}{\partial Lnaxtdebty} = \beta^{Debts} + \beta^{Debts2} Lnaxtdebty_j$$

$$\Rightarrow \frac{\partial aGDPpcgrowth}{\partial Lnaxtdebty} > 0 \Leftrightarrow Lnaxtdebty_j > \frac{-\beta^{Debts}}{\beta^{Debts2}}$$

Other coefficients illustrates the impact of various control variables on the economic growth. First, (β^{FinDev}) shows the impact of financial development level. According to the evidence by Levine (1997), and theory by Jannacovic et al, the financial development contributes on the economic growth. Thus, this coefficient is expected to be positive: $\beta^{FinDev} > 0$. Second, (β^{Emp}, β^{Hc}) measures the impact of labor force growth and human capital. According to the neoclassical growth model (Solow, 1956; Swan, 1956) and evidence by Mankiw et al (1992), both of labor forice growth and human capital have positive effect on the economic growth. Thus, they are expected to be positive: $\beta^{Emp} > 0, \beta^{Hc} > 0$. Third, ($\beta^{Eopen}, \beta^{Kaopen}$) show the role of international integration on the economic growth. As suggested by the evidence by Bussiere and Fratzscher (2008), the openness has a positive impact on the economic growth. And ($\beta^{aEco}, \beta^{aPol}, \beta^{aLeg}$) shows the impact of institutional quality on the economic growth. When the institution improves, the economic growth increases. Thus, both the coefficients of openness and institutional quality are expected to be positive: $\beta^{Eopen} > 0; \beta^{Kaopen} > 0; \beta^{aEco} > 0; \beta^{aPol} > 0; \beta^{aLeg} > 0$.

Next, we apply the empirical model on the data to investigate the dependence pattern of economic growth on the external debts supply, and also a possible explaination for that pattern.

3. Evidence.

3.1. External Debts and Economic Growth: an U-Shaped Pattern.

Figure (1) depicts the dependence pattern of economic growth on the external debts. The economic growth is first decreasing then increasing on the external debts. And the increasing pattern only applies for a high supply of external debts. While both the decreasing and increasing pattern is recorded on the literature, the combination of them in a form of an U-shaped pattern is a new finding to the literature. In brief, the external debts exert a non-linear impact on the economic growth.

Figure 1: External Debts and Economic Growth
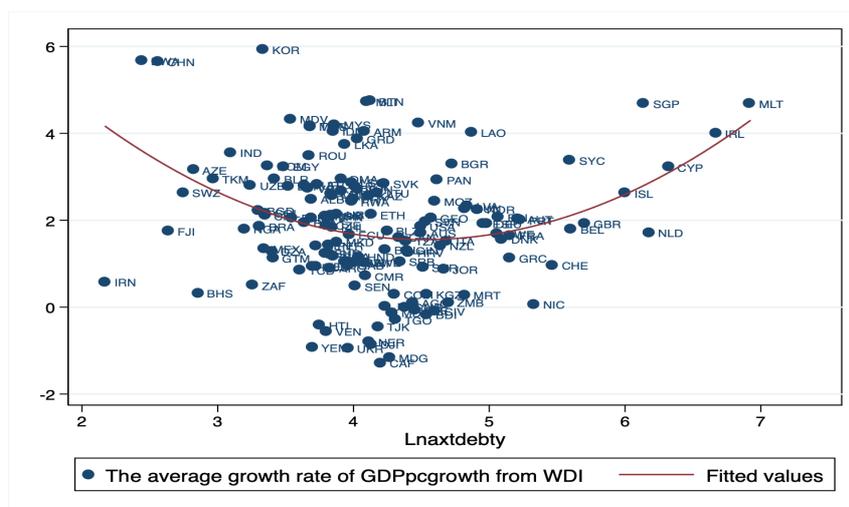
Source: *Lnaxtdebty* is external debts per GDP (%), extracted from World Bank Fiscal Space and *aGDPpcgrowth* is per capita GDP growth rate (%), extracted from World Bank Development Indicators.

Table (2) records the estimated results of economic growth rate on the external debts and other independent variables. In column (1), the external debts has an insignificant effect on the economic growth. In column (2), when the regression equation follows a quadratic form, the coefficients of external debts become significant. Thus, the dependence of economic growth on the external

debt follows a non-linear pattern. This evidence is consistent to the graph depicted on the Figure (1). In details, with the positive coefficient of the quadratic term, i.e, in column (6), $\beta^{Debts2} = 0.323$, there exists an upwards parabola. On figure, this parabola is similar to the U-shaped pattern observed in Figure (1). In brief, the empirical evidence confirms an U-shaped dependence pattern of economic growth on the external debts supply.

The U-shaped pattern of economic growth on the external debts supply holds on accounting for financial development level, labor force growth rate and human capital recorded in column (3), for the trade and capital openness in column (4), and for the institutional quality in column (5). And the U-shaped pattern also hold when the empirical model takes into account all control variables, shown in column (6).

Table 2: Regression Results of Economic Growth *(aGDPpcgrowth)* on External Debts Supply *(Lnaxtdebty)* and other Independent Variables.

VARIABLES	(1) aGDPpc growth	(2) aGDPpc growth	(3) aGDPpc growth	(4) aGDPpc growth	(5) aGDPpc growth	(6) aGDPpc growth
External Debts	-0.0640	-4.281***	-3.753***	-3.994***	-4.166***	-3.521***
(Lnaxtdebty)	(0.154)	(0.973)	(1.036)	(0.991)	(0.958)	(1.069)
Squared Value		0.474***	0.383***	0.410***	0.444***	0.323***
of *(Lnaxtdebty)*		(0.108)	(0.115)	(0.110)	(0.107)	(0.120)
Financial Development			0.632***			0.524**
(LnaFinDev)			(0.214)			(0.234)
Labor Force Growth			0.0200			-0.0792
(aEmpgrowth)			(0.117)			(0.126)
Human Capital			0.0443			-0.214
(aHc)			(0.292)			(0.333)
Trade Openness				0.00913***		0.0106***
(aEopen)				(0.00312)		(0.00337)
Capital Openness				0.146		-0.0140
(aKaopen)				(0.106)		(0.190)
Economic Institution					1.098	0.745
(aEconomic)					(1.430)	(2.124)

Legal Institution					4.014*	4.385
(aLegal)					(2.317)	(2.653)
Political Institution					-3.232	-3.735
(aPolitical)					(2.278)	(2.486)
Constant	2.180***	11.22***	8.274***	10.51***	10.18***	7.941***
	(0.653)	(2.153)	(2.521)	(2.254)	(2.141)	(2.734)
Observations	143	143	123	139	141	119
R-squared	0.001	0.122	0.241	0.202	0.178	0.330

Notes: Standard errors in parentheses: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The regression results also uncovers the role of various independent variables on the economic growth. In column (3), a higher financial development level is associated with a greater economic growth rate. In column (4), more trade openness goes along with higher economic growth rate. In column (5), when the legal institution improves, the economic growth also goes up.

3.2. An Explaination Based on Sovereign Debts Rating.

Figure (2) depicts the relationship between economic growth, sovereign debts rating and external debts. In Panel A, a higher sovereign debts rating is associated with a greater economic growth rate. In Panel B, the sovereign debts rating follows a U-shaped pattern of external debts supply. For low supply of external debts, the sovereign debts rating is decreasing on the external debts supply. But for high supply of external debts, the debts rating is increasing on the debts supply.

The combination of these two panels can provide a solution for the U-shaped pattern of economic growth rate. In particular, for low supply of external debts, more debts reduce the debts rating, which in turn, reduce the economic growth. For high supply of external, more debts raises the debts rating, which raises the economic growth. Thus, more debts supply is associated with lower economic growth for low debts supply but with higher economic growth for high debts supply. Therefore, the sovereign external debts rating is a potential

candidate to explain the non-linear dependence pattern of economic growth on the external debts.

Figure 2: Economic Growth, External Debts and Sovereign Debts Rating
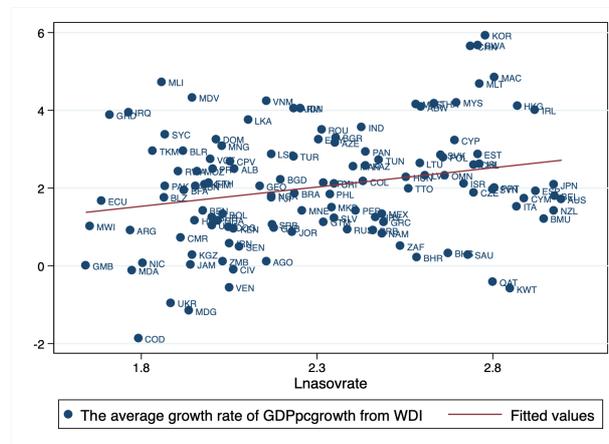
Panel A: Economic Growth and External Debts
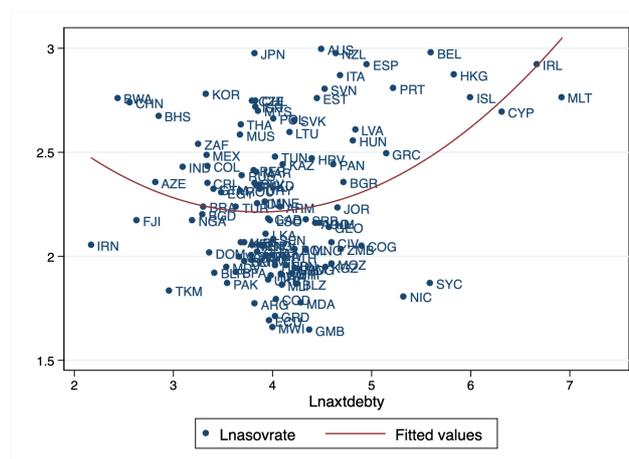
Panel B: External Debts and Sovereign Debts Rating

Source: *(Lnaxtdebty)* is external debts per GDP (%), extracted from World Bank Fiscal Space; *(aGDPpcgrowth)* is per capita GDP growth rate (%), extracted from World Bank Development Indicators; *(Lnasovrate)* is sovereign debts rating index ranging from 1 to 21, extracted from World Bank Fiscal Space.

Table (3) records the regression result of economic growth on the sovereign debts rating. In column (1), a higher sovereign external debts rating raises the economic growth rate. This result holds on accounting for trade and capital openness in column (2) and institutional quality in column (3). Thus, the evidence confirms

the linearly increasing dependence pattern of economic growth on the sovereign debts rating shown in Panel A of Figure 2.

Table 3: Regression Results of Economic Growth *(aGDPpcgrowth)* on Sovereign Debts Rating *(Lnasovrate)* and other Independent Variables.

VARIABLES	(1) aGDPpcgrowth	(2) aGDPpcgrowth	(3) aGDPpcgrowth
Sovereign Debts Rating *(Lnasovrate)*	0.799*** (0.296)	0.977*** (0.351)	1.588*** (0.478)
Trade Openness *(aEopen)*		0.00924*** (0.00288)	
Capital Openness *(aKaopen)*		-0.185 (0.124)	
Economic Institution *(aEconomic)*			-1.044 (1.487)
Legal Institution *(aLegal)*			0.841 (2.582)
Political Institution *(aPolitical)*			-2.411 (2.470)
Constant	0.180 (0.710)	-0.944 (0.859)	-0.274 (0.731)
Observations	122	118	121
R-squared	0.057	0.143	0.101

Notes: Standard errors in parentheses: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table (4) shows the regression result of sovereign debts rating on the external debts supply. In column (1), a huger debts raises the sovereign debts rating. In column (2), when the regression is a quadratic function, the impact of external debts on the sovereign debts rating follows an upward parabola. It is decreasing for low external debts supply but increasing for high debts supply. This result holds on accounting for trade and capital openness in column (3), and institutional quality in column (4). Moreover, the sovereign debts rating is also positively affected by the capital account openness recorded in column (3) and

by the economic and legal institutional quality in column (4). In brief, the evidence establishes an U-shaped dependence pattern of sovereign debts rating on the external debts supply. This evidence is consistent to panel B of Figure (2).

Table 4: Regression Results of Sovereign Debts Rating *(Lnasovrate)* on External Detbs Supply *(Lnaxtdebty)* and other Independent Variables.

VARIABLES	(1) Lnasovrate	(2) Lnasovrate	(3) Lnasovrate	(4) Lnasovrate
External Debts	0.195***	-0.467*	-0.893***	-0.594***
(Lnaxtdebty)	(0.0410)	(0.272)	(0.251)	(0.183)
Squared Value		0.0739**	0.109***	0.0657***
of *(Lnaxtdebty)*		(0.0300)	(0.0275)	(0.0202)
Trade Openness			-0.00127	
(aEopen)			(0.000786)	
Capital Openness			0.197***	
(aKaopen)			(0.0295)	
Economic Institution				1.157***
(aEconomic)				(0.279)
Legal Institution				1.122**
(aLegal)				(0.491)
Political Institution				-0.203
(aPolitical)				(0.480)
Constant	1.542***	2.969***	4.194***	2.482***
	(0.175)	(0.604)	(0.573)	(0.407)
Observations	119	119	116	118
R-squared	0.162	0.204	0.437	0.658

Notes: Standard errors in parentheses: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The non-linear dependence pattern of sovereign debts rating on the external debts supply can be explained by recent theoretical results on the safe assets literature. Debts become safe when their economic fundamental is strong, and their floating capacity is high enough (He et al, 2019). Only with high supply, the debts can ensure the investor's belief. And when the investors believe that an asset is safe, their investment behaviors would make the asset to be safe. Farhi and Maggiori (2017) also show that the supply of debts is crucial for its safety

determination. There exists stable steady state only for low or high enough supply of external debts. Under this stable steady state, the debts are considered as safe assets by the foreign investors. But there is a middle range of debts supply in which the debts turn to be a risky asset. Therefore, these two aforementioned papers together suggest that only for a high enough supply of external debts, the debts turn to be safe. As an implication, for a high enough debts supply, more debts issuance can improve its safety, measured by the sovereign debts rating. This result underlines the U-shaped curve recorded by the empirical evidence on Table (4).

3.3. Robustness Analysis.

Table 5 records the regression results of economic growth on the components of external debts. The economic growth is negatively affected by the public external debts in column (1), the short-term external debts in column (3) and foreign currency external debts in column (5). These negative impact can underlines the decreasing pattern of economic growth on the total external debts. Moreover, the economic growth rate is positively affected by the long-term external debts in column (4). Thus, this positive impact can determine the increasing pattern of economic growth on the total external debts. We also note that these results hold on accounting for other determinants of economic growth.

Table 5: Regression Results of Economic Growth *(aGDPpcgrowth)* on Components of External Debts and other Independent Variables.

VARIABLES	(1) aGDPpc growth	(2) aGDPpc growth	(3) aGDPpc growth	(4) aGDPpc growth	(5) aGDPpc growth	(6) aGDPpc growth
Public External Debts	-0.524***					
(Lnapubdebty)	(0.163)					
Private External Debts		-0.000724				
(Lnaprdebty)		(0.0664)				
Short-term External			-0.567***			
Debts *(Lnastdebty)*			(0.141)			
Long-term External				1.918***		

	(1)	(2)	(3)	(4)	(5)	(6)
Debts (Lnaltdebty)				(0.717)		
Foreign-Currency External Debts					-0.621*	
(Lnafxdebty)					(0.360)	
Domestic-Currency External Debts						0.626
(Lnadxdebty)						(0.468)
Financial Development	0.522**	0.737***	0.933***	0.845***	-0.523	-0.239
(LnaFinDev)	(0.240)	(0.262)	(0.238)	(0.259)	(0.795)	(0.846)
Labor Force Growth	-0.0381	0.0121	-0.0596	-0.0900	0.180	0.286
(aEmpgrowth)	(0.130)	(0.136)	(0.128)	(0.139)	(0.312)	(0.317)
Human Capital	-0.414	-0.180	-0.167	-0.382	-1.016	-0.818
(aHc)	(0.343)	(0.366)	(0.329)	(0.367)	(0.747)	(0.747)
Trade Openness	0.00663**	0.00907***	0.0135***	0.00804*	0.0198*	0.0232**
(aEopen)	(0.00310)	(0.00323)	(0.00323)	(0.00445)	(0.0101)	(0.0106)
Capital Openness	-0.0263	-0.167	-0.104	0.00985	0.146	0.172
(aKaopen)	(0.200)	(0.203)	(0.190)	(0.212)	(0.331)	(0.334)
Economic Institution	0.111	1.395	1.539	1.391	-4.708	-5.193
(aEconomic)	(2.258)	(2.378)	(2.133)	(2.367)	(4.798)	(4.928)
Legal Institution	2.471	3.652	4.088	4.083	15.85	12.22
(aLegal)	(2.696)	(3.028)	(2.672)	(2.897)	(9.891)	(9.459)
Political Institution	-2.225	-4.615	-3.150	-3.498	-9.964	-6.753
(aPolitical)	(2.593)	(2.907)	(2.516)	(2.706)	(7.847)	(7.372)
Constant	2.105	-1.267	-2.029**	-10.23***	6.345	0.321
	(1.414)	(1.133)	(0.949)	(3.512)	(3.920)	(3.038)
Observations	119	115	119	110	34	33
R-squared	0.268	0.217	0.302	0.204	0.302	0.312

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table (6) shows the regression result of sovereign debts rating on the components of external debts. The sovereign external debts rating is negatively affected by the public external debts in column (1), the long-term external debts in column (4) and the foreign currency external debts in column (5). Thus, these negative impact can underline the linearly decreasing pattern of sovereign debts rating. Moreover, the sovereign debts rating is positively affected by the private external debts in column (2), the short-term external debts in column (3) and the domestic currency external debts in column (6). These positive impact can result

in the linearly increasing pattern of economic growth. We also note that these results hold on accounting for other determinants of economic growth.

Table 6: Regression Results of Sovereign Debts Rating *(Lnasovrate)* on Components of External Debts and other Independent Variables.

VARIABLES	(1) Lnasovrate	(2) Lnasovrate	(3) Lnasovrate	(4) Lnasovrate	(5) Lnasovrate	(6) Lnasovrate
Public External Debts	-0.144***					
(Lnapubdebty)	(0.0268)					
Private External Debts		0.0238**				
(Lnaprdebty)		(0.0102)				
Short-term External			0.0667***			
Debts *(Lnastdebty)*			(0.0250)			
Long-term External				-0.258**		
Debts *(Lnaltdebty)*				(0.126)		
Foreign-Currency External Debts					-0.0846*	
(Lnafxdebty)					(0.0445)	
Domestic-Currency External Debts						0.115*
(Lnadxdebty)						(0.0573)
Financial Development	-0.000596	0.000146	-0.000486	-0.000762	0.000119	0.000597
(LnaFinDev)	(0.000533)	(0.000539)	(0.000609)	(0.000815)	(0.00110)	(0.00120)
Labor Force Growth	0.0831***	0.0168	0.0373	0.0373	0.0696	0.0756*
(aEmpgrowth)	(0.0289)	(0.0302)	(0.0326)	(0.0358)	(0.0418)	(0.0427)
Human Capital	0.232	0.376	0.573	0.591	-0.173	-0.272
(aHc)	(0.340)	(0.351)	(0.364)	(0.398)	(0.565)	(0.576)
Trade Openness	1.242***	1.327***	0.892***	0.896***	1.526***	1.510***
(aEopen)	(0.222)	(0.238)	(0.258)	(0.285)	(0.398)	(0.405)
Constant	2.025***	1.324***	1.404***	2.692***	1.917***	1.197***
	(0.176)	(0.129)	(0.136)	(0.609)	(0.291)	(0.308)
Observations	116	112	115	107	37	36
R-squared	0.711	0.697	0.657	0.597	0.747	0.731

Notes: Standard errors in parentheses: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

4. Conclusion.

The paper investigates a dependence pattern of economic growth on the external debts supply based on a cross-section sample of 145 advanced and developing economies. The evidence records that the pattern follows an U-shaped

curve, for which the economic growth is first decreasing then increasing on the external debts. An possible explaination can rely on the sovereign debts rating. For low supply of external debts, a higher supply of debts reduces the debts rating, which, in turn, lowers the economic growth rate. But for high enough supply of debts, more debts raise their rating, then, improves the growth rate. These results are robust on controlling for various determinants of economic growth and also on the fixed-effect panel regression.

The results provide important policy implications. More external debts are helpful to economic growth rate only when they are associated with improvement of sovereign debts rating. Thus, when a government issues more external debts, an important concern is whether this increase of debts has positive impact on the debts rating. This relationship can be enhanced by adjusting the factors that only have positive impact on the sovereign debts rating but insignificant impact on the debts. Recent evidence by Hung (2020) suggests that the stock market size and inflation rate can be potential variables.

For the future research avenue, the paper can be extended by various directions. The external debts can be compared with the domestic debts on their impact on the economic growth. This direction can provide more insights into the combination of two types of debts to attain an optimal overall debts per GDP ratio. Another extension can focus on the relationship of economic growth and external debts across different income groups. Since the income per capita is the taxation base, then, determining the financing resource for paying debts, this direction can analyze jointly the impact of debts on economic growth and theirs financial credibility.

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Appendix: Further Robustness Analysis: Panel Data Analysis.

We carry out a panel data regression to check the relationship between economic growth, sovereign debts rating and external debts supply. The panel sample covers the variables on the cross-section sample over the 1990-2017 period. The yearly sample is strongly balanced. Then, the panel sample adds the time dimension on the cross-section analysis on the main text. On this sample, we employ a fixed-effect regression. This method is useful to control for the unobserved heterogeneity which is constant over time in each country. The regression equation for the country *(j)* at year *(t)* is as following:

$$GDPpcgrowth_{j,t} = \propto + \beta^{Debts} Lnxtdebty_{j,t} + \beta^{Debts2} Lnxtdebty_{j,t}^2 +$$

$$\beta^{Credit} LnFinDev_{j,t} + \beta^{Emp} Empgrowth_{j,t} + \beta^{Hc} Hc_{j,t} + \beta^{Eopen} Eopen_{j,t} +$$

$$\beta^{Kaopen} Kaopen_{j,t} + \beta^{Eco} Economic_{j,t} + \beta^{Pol} Political_{j,t} + \beta^{Leg} Legal_{j,t} + u_{j,t}$$

There exists a non-linear dependence pattern of economic growth on the external debts supply. In column (1), a higher supply of external debts is associated with a decrease of economic growth rate. In column (2), the impact of external debts on the economic growth rate follows a quadratic function. This pattern holds on accounting for the financial development level, growth rate of labor force and human capital in column (3). But the coefficients become insignificant on accounting for other determinants of economic growth, including the trade and capital openness in column (4), the institutional quality in column (5) and all of control variables in column (6). In brief, the non-linearity on the dependence of economic growth on the external debts is robust on the panel data regression.

The evidence also confirms the important role of sovereign debts rating on explaining the depdence pattern of economic growth on the external debts. The economic growth is positively affected by the sovereign debts rating, as recorded in column (1). This result holds on accounting for the trade and capital openness in column (2), and for the institutional quality in column (3). Moreover, there exists a non-linear dependence pattern of sovereign debts rating on the external debts supply, as shown in column (5). This results holds on accounting for the trade and capital openness in column (6), and only becomes weaker on accounting for the institutional quality in column (7). Thus, the cross-section evidence on the role of sovereign debts rating is also recorded on the panel data regression.

In sum, the empirical results on the relationship between external debts and economic growth recorded by the cross-section regression is robust by the panel regression.

Table 6: Regression Results of Economic Growth *(GDPpcgrowth)* on External Debts Supply *(Lnxtdebty)* and other Independent Variables.

VARIABLES	(1) GDPpcgrowth	(2) GDPpcgrowth	(3) GDPpcgrowth	(4) GDPpcgrowth	(5) GDPpcgrowth	(6) GDPpcgrowth
External Debts	-0.389**	3.979***	1.895***	0.679	0.706	0.708
(Lnxtdebty)	(0.156)	(0.606)	(0.725)	(0.647)	(0.927)	(0.989)
Squared Value		-0.597***	-0.303***	-0.251***	-0.258**	-0.192
of *(Lnxtdebty)*		(0.0801)	(0.0921)	(0.0840)	(0.118)	(0.125)
Financial Development			-0.0391***			-0.0467***
(LnaFinDev)			(0.00634)			(0.00816)
Labor Force Growth			0.227***			0.222***
(aEmpgrowth)			(0.0284)			(0.0328)
Human Capital			3.009***			1.387
(aHc)			(0.595)			(1.066)
Trade Openness				0.0297***		0.0329***
(aEopen)				(0.00492)		(0.00717)
Capital Openness				0.189*		0.296*
(aKaopen)				(0.114)		(0.151)
Economic Institution					4.842***	2.600*
(aEconomic)					(1.230)	(1.547)
Legal Institution					-4.748**	0.655
(aLegal)					(1.915)	(2.021)
Political Institution					5.943***	4.696**
(aPolitical)					(1.938)	(1.945)
Constant	3.712***	-3.669***	-5.815***	1.567	1.189	-5.377
	(0.630)	(1.171)	(2.108)	(1.348)	(2.156)	(3.509)
Observations	3,518	3,518	2,840	3,173	2,411	1,894
R-squared	0.002	0.018	0.053	0.038	0.041	0.090
Number of wcode	158	158	132	148	151	123

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression Results of Economic Growth *(GDPpcgrowth)* on Sovereign Debts Rating *(Lnsovrate)* and other Independent Variables.

VARIABLES	(1) GDPpcgrowth	(2) GDPpcgrowth	(3) GDPpcgrowth	(4) Sovrate	(5) Sovrate	(6) Sovrate	(7) Sovrate
Sovereign Debts Rating *(Lnsovrate)*	0.130***	0.130***	0.151*				
	(0.0459)	(0.0466)	(0.0800)				
Economic Institution *(Economic)*			-0.0525				7.763***
			(1.567)				(0.634)
Legal Institution *(Legal)*			-5.295***				2.126***
			(2.007)				(0.733)
Political Institution *(Political)*			2.944				3.328***
			(2.517)				(0.869)
Trade Openness *(Eopen)*		0.0156***				-0.00746***	
		(0.00429)				(0.00258)	
Capital Openness *(Kaopen)*		-0.163				0.746***	
		(0.108)				(0.0597)	
External Debts *(Lnxtdebty)*				-0.696***	1.445***	1.152***	0.192
				(0.0991)	(0.407)	(0.419)	(0.345)
Squared Value of *(Lnxtdebty)*					-0.283***	-0.248***	-0.111**
					(0.0522)	(0.0541)	(0.0452)
Constant	0.717	-0.510	2.234	14.62***	10.86***	11.64***	5.049***
	(0.603)	(0.692)	(1.579)	(0.401)	(0.799)	(0.859)	(0.878)
Observations	2,678	2,460	1,827	1,959	1,959	1,857	1,267
R-squared	0.003	0.009	0.006	0.026	0.042	0.131	0.205
Number of wcode	141	130	128	127	127	120	117

Notes: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$