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Does Financial Development Improve Agricultural Productivity Growth?

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ABSTRACT— From the importance of food security and sustainable agricultural production in the future, we are necessary to know the main determinants and to understand the future policy implications. This study examines the impact of financial development (financial depth and financial efficiency) on agricultural productivity growth in 3 groups of countries namely high, middle-upper, and middle-lower income classes. This study used a panel ARDL model with different lags in each variable from 1991 until 2017. Our results show that financial development is very important for the three groups of countries to increase their agricultural productivity. Especially, it was found that financial depth and efficiency have a bigger effect on agricultural productivity in middle-upper-income countries. Contrast to previous results, financial efficiency was found not to affect agricultural productivity in middle lower-income countries. In addition, agricultural productivity also is increased by several factors such as physical capital and human capital. Therefore, this research encourages governments and central banks to gradually improve financial depth to become one of the drivers of improvement in the agricultural sector. In addition, the financial efficiency must be improved to encourage agricultural productivity, especially in the high and middle-upper countries.

KEYWORDS: Agricultural Productivity, Financial Development, Panel ARDL, Income Class Analysis

1. Introduction

Over the past decades, many countries have tried to develop their agricultural sector to increase their development. At least, there are 3 roles of the agricultural sector. First, agriculture is a source of growth in the industrial sector and is the main engine of sustainable economic growth [14]. Second, agricultural production provides food for the world's population which is estimated to increase to 11.2 billion in 2100 [10]. Third, the agricultural sector serves employment for many people, especially those living in rural areas and they are below in poverty line. So, our expectation was created agricultural productivity lead to property reduction in many developing and developed countries.

The important role of agriculture in each country drives the challenge to increase productivity in this sector. Therefore, it is important to examine factors for promoting agricultural productivity growth in all countries. Various theories have shown that several factors affect agricultural productivity, including the environment, skilled human resources, physical capital, fertilizers, GDP, trade openness, industrial growth, and various other factors. However, there is one factor that is still being debated, namely financial developments. In some theory shows that high financial development provides greater access for farmers to buy additional inputs, fertilizers, and various other agricultural tools to increase their productivity. Higher financial development helps the farmer to increase their capital to adopt new inventions and technologies to increase their productivity.

Several empirical studies explain the impact of financial development on the agricultural sector like [22], [17], [20], [2], [23], [1] and etc. They used various methods, country samples, and proxies for financial development. We were concluded that those results are different. Some of the studies show positive and negative impacts of financial development on agriculture. But some of them have no significant impact on agriculture.

However, the existing research still provides quite limited information. Many previous studies used the financial development index for example [6], [1], [14] and the latest one [23]. Their results don't provide 2 important pieces of information. First, the financial development index is built based on three assessments namely financial depth, access, and efficiency. In their research didn't provide complete information on the indicators that most influence the agricultural sector. Second, the characteristics and level of financial development differ between countries. In high and middle upper-income countries, financial development is high primarily on indicators of the efficiency of their financial institutions and markets. However, these conditions may not apply in low-income countries.

Therefore, this study tries to contribute to the existing literature by using an empirical model to investigate the impact of financial development with more detail, namely financial depth and financial efficient indices on agricultural productivity growth. This study uses a sample of 35 countries which are divided into several groups, namely income class (high, middle-upper, and middle-lower) during the period 1991-2017. This study uses a new method that has not been used in previous studies, namely the ARDL panel. The purpose of this study is divided into 2 parts. 1) Analyzing the impact of financial depth and financial efficiency on agricultural productivity in the long term and 2) Analyzing financial depth and financial efficiency on agricultural productivity growth in the short term? This study specifically uses the productivity measure (TFP) from Fuglie to more accurately assess the efficiency of agricultural performance.

This study differs from the existing literature in 3 ways. First, using a measure of agricultural productivity with the Fuglie approach. This value considers all inputs such as land, labor, capital, and material resources and all inputs used in production. At this measure, TFP shows efficiency in converting all inputs into outputs. That is, the increase in TFP on that measure is determined by technological changes and innovations, improvements in technical and allocative efficiency in the use of resources, and economies of scale. In this measure, TFP is strongly influenced by long-term investments in agricultural research and extension, education and infrastructure, as well as changes in the quality of resources and institutions. Therefore, this study uses TFP growth data from Fuglie because it describes the efficiency of the agricultural sector as a whole.

Second, this study uses financial development indicators more specifically, namely financial depth and financial efficiency. Both illustrate the ability of the financial sector to allocate funds. In addition, these indicators help assess the financial condition of facilitating financing for the agricultural sector. Third, to expand the results of the study and complement the previous literature, this study divides the sample into several groups based on income class and the economic structure of the agricultural sector. The main consideration, this study divides the sample based on country characteristics to facilitate differences in economic size, financial market conditions, economic openness, inflation rates, and capital intensity in the agricultural sector [19]. Differences in country characteristics lead to differences in financial conditions between groups [12].

2. Material and Methods

2.1. Data

The data was collected from the top 35 agricultural production ranking countries around the world. The 35 countries are grouped by income classes, namely high, middle-upper, and middle lower-income countries (see Table 1).

Table 1. Countries sample

No	High	Middle upper	Middle lower
1	United states	China	India
2	France	Brazil	Indonesia
3	Australia	Russia	Nigeria
4	Japan	Argentina	Pakistan
5	Italy	Turkey	Bangladesh
6	Spain	Mexico	Vietnam
7	Korea	Iran	Philippines
8	Canada	Thailand	Kenya
9	Germany	Malaysia	Egypt
10	United Kingdom	Colombia	Morocco
11	Netherland	Peru	Ukraine
12	Poland		
13	Chile		

Furthermore, we use 26 years from 1991 through 2017. Following [16] and [1], the explanatory variables are some of the drives of Agricultural productivity in literature, namely financial depth and financial efficiency as financial development indicators, physical capital, and human capital. Measure of agricultural productivity with the Fuglie approach. This value considers all inputs such as land, labor, capital, and material resources and all inputs used in production. At this measure, TFP shows efficiency in converting all inputs into outputs. Financial depth is measured as private bank credit to GDP (% GDP), financial efficiency is calculated by the difference between loan and deposit interest rates (%), physical capital is measured by gross fixed capital and secondary school enrolment rates were proxy for human capital. The financial depth and financial efficiency were taken from Global Financial Development, physical capital and human capital were taken from WDI Database.

2.2. Model specification

For our model, we restructure the model form [23]. But our study used more specific financial development indicators. So, we can restructure the model from [23]:

We used the production function from Cobb Douglas in the statistic equation:

$$Y_{it} = K_{it}^{\alpha} L_{it}^{\beta} e^{\mu_{it}} \quad (1)$$

Where Y is the production function of the agricultural sector that consists of capital (L) and Labor (L) with their marginal effects. Because our study will examine the impact of financial development on agricultural productivity, so we enter financial development (F) in equation 1:

$$Y_{it} = K_{it}^{\alpha} L_{it}^{\beta} F_{it}^{\gamma} e^{\mu_{it}} \quad (2)$$

The parameter γ was the marginal impact of financial development on agricultural production. After changing to natural logarithms, equation 2 is changed to:

$$y_{it} = \delta_0 + \alpha k_{it} + \beta L_{it} + \gamma f_{it} + \mu_{it} \quad (3)$$

In this case, the financial development was an approach in two kinds of variables, namely financial depth and financial efficiency. Financial depth draws the size and liquidity of financial institutions. In while, financial efficiency explained the ability of the financial institution to provide financial service for customers at low cost. In addition to financial development factors, several other economic factors also affect agricultural productivity which includes physical and human capital [13]. Then the function can be written:

$$gtfp = f(fin\_depth, fin\_eff, physical\_cap, human\_cap) \quad (4)$$

Several previous studies have analyzed the effect of financial development on agricultural productivity using various methods, such as panel cointegration, OLS, GMM, and so on. They do not accommodate the possibility of different lags in each variable. Both the dependent and independent variables may not be able to influence the dependent variables at the same period, so there is a need for a variable lag in the model. So, our study applies the panel ARDL method. The panel ARDL method was chosen to investigate cointegration relationships in the short and long run. To identify short-term panels utilizing estimates from ECM. In addition, our panel sample has 35 countries (5 and 11) and 26 years. It means that we have more series than cross samples. Our model used panel ARDL from [18].

Equation (4) can be rewritten in the ARDL (p,q,q,…,q) model specifications:

$$gtfp_{it} = \theta_i (\Delta gtfp_{it-1} - \lambda_i^{'} Xit) + \sum_{j=1}^{p-1} \xi_{ij} \Delta gtfp_{it-j} + \sum_{j=0}^{q-1} \beta_{ij}^{'} \Delta X_{it-j} + \varphi_i + e_{it} \quad (5)$$

Where X is the vector of explanatory variables:

$$X_{it} = fin\_depth_{it}, fin\_eff_{it}, physical\_cap_{it}, human\_cap_{it} \quad (6)$$

$\theta_i = -(1-\delta_i)$ as the group-specific speed of adjustment coefficient [it is expected that $(\theta_i < 0)$]. $\lambda_i^{'}$ as the vector of long-run relationships. $ECT = (gtfp_{it-1} - \lambda_i^{'} X_{it})$ as error correction term and the last $\xi_{ij}, \beta_{ij}^{'}$ is short-run dynamic coefficients.

2.3. Data Generating Process

2.3.1. Panel unit root test

We used Im, Pesaran, and Shin (IPS) test in panel data to test unit root (or stationary). The important consideration is a sample size and asymptotic characteristic from the test. The IPS test is based on the average paired correlation coefficient of the OLS error from the standard ADF (Augmented Dickey Fuller) regression. The H0 is cross sectional independent and is asymptotically distributed as a two tail normal distribution. So the H0 for IPS is all the panels have a unit root. Stationary tests for three groups are presented in Table 2.

Table 2. Unit Root Test with IPS

Variable	High		Middle-Upper		Middle-Lower	
	Level	First diff	Level	First diff	Level	First diff
Gtfp	-0.3249	-12.314***	2.5461	-7.7467***	3.7266	-6.2942***
Fin_depth	0.6801	-6.9001***	0.6713	-5.8376***	-0.6833	-4.3917***
Fin_eff	-2.1067**	-	-1.8437**	-	-3.5192***	-
Physical_cap	0.8729	-9.6093***	1.1820	-6.8883***	2.6351	-7.5296***
Human_cap	-1.8603**	-	1.7022	-6.5359***	2.9529	-5.4150***

Table 2 show the results for panel unit root test. In some variables, there is doubt about the existence of the unit root. In this case, only financial depth and financial efficiency in some groups rejected the unit root test hypothesis. It means that some of the variables have unit roots in levels. When we used the first differences test, the result show that all variables were stationary. So we know that our model was a mixture between I(0) and I(1). Those conditions reveal cointegration in the model and which is a characteristic of panel ARDL estimate.

2.3.2. Panel Cointegration Test

If the variables aren't stationary at the level, then the results may be biased so their conclusions are misleading. Therefore, the data can be changed in the form of the first difference. When data are formed in the first difference, they can be estimated if they are cointegrated or have a long-term relationship. In the Panel ARDL estimate, the cointegration test might not too important. But, we tried to test cointegration in this model to know there are stronger long-run estimates are common across all countries.

To find cointegration among variables, we apply the [16], [17] test. He introduces a cointegration test using seven statistic tests. The null hypothesis was no cointegration in models. In the seven statistic test, we might allow heterogeneity both in the short and long-run coefficients and also their intercept. [16] and [17] classified the seven tests into two groups: group means statistics and panel statistics. Two groups were contained nonparametric (p and t) test and parametric (ADF and v) test.

Studies from [16] and [17] constructed the seven statistics test as:

Panel v: $T^2 N^{\frac{3}{2}} (\sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1}$

Panel ρ: $T\sqrt{N} (\sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1} \sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$

Panel t: $(\tilde{\sigma}_{N,T}^{2} \sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$

Panel ADF: $(\tilde{s}_{N,T}^{*2} \sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*2})^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*2} \Delta \hat{e}_{i,t}^{*}$

Group ρ: $T \frac{1}{\sqrt{N}} \sum_{i=1}^{N} (\sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$ ss

Group t: $\frac{1}{\sqrt{N}} \sum_{i=1}^{N} (\hat{\sigma}_i^2 \sum_{t=1}^{T} \hat{e}_{i.t-1}^{2})^{-\frac{1}{2}} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i))$

Group ADF: $\frac{1}{\sqrt{N}} \sum_{i=1}^{N} (\sum_{t=1}^{T} \hat{s}_i^{*2} \hat{e}_{i,t-1}^{*2})^{-\frac{1}{2}} \sum_{t=1}^{T} \hat{e}_{i,t-1} \Delta \hat{e}_{i,t}$

Table 4 shows the results of the cointegration test for each group of countries.

Tabel 3. Panel cointegration test

Test statistic	Pedroni residual cointegration test common AR coefficients (within dimension)		
	High	Middle upper	Middle Lower
Panel v-statistic	-0.0551	-0.4801	0.6505
Panel rho-statistic	-4.032***	-2.931***	-6.286***
Pamel PP-statistic	-15.81***	-17.67***	-22.04***
Panel ADF-statistic	-10.01***	-9.979***	-13.75***
	common AR coefficients (between dimensions)		
Group rho-statistic	-3.235***	-1.968	-5.695***
Group PP-statistic	-20.85***	-22.2***	-30.03***
Group ADF-statistic	-10.28***	-11.67***	-13.22***

t table is 2.07387 and alpha 5%

The results show that any combination of the variables are cointegrated. 6 out of 7 statistical tests in all groups are significant at alpha 5%. From stationary and cointegration test had qualified to our model estimated with panel ARDL. We also tried to interpret the coefficients as long-run and short-run impacts.

2.3.3. Lag optimum test

One of the characteristics of ARDL is an optimum lag for each variable. This accommodates the possibility of different lags in each variable. Therefore, the next step is to determine the optimum lag for each variable in the three models. To determine the optimal lag from panel ARDL, first determine the optimal lag for each time series using the AIC criteria. Choose the most lag commonly used in time series as the optimum lag for panel data. The best ARDL combination was chosen based on the smallest AIC value for each country. After comparing values in each country, this study used panel ARDL (2,3,3,1,2) in the high-income class group, ARDL (1,2,3,2,2) in the middle-upper income class, and ARDL (0,2,2,3,3) for low-income class country group.

3. Result and Discussion

3.1. Long-term Analysis: Relationship between Financial Depth and Financial Efficiency on Agricultural Productivity Growth

This study uses the Panel ARDL to examine the long and short-term relationship between financial development and agricultural productivity growth. Panel ARDL can be estimated in three ways: pooled mean group (PMG), mean group (MG), and difference fixed effect (DFE). We used Hausman test to determine the best estimate of the three models.

Table 4. Long Term Results in Panel ARDL Estimation

Variable	High	Middle upper	Middle lower
Fin_depth	0.003***	0.037***	0.001**
	(0.000)	(0.000)	(0.009)
Fin_eff	-0.039***	-0.065**	-0.0119
	(0.000)	(0.003)	(0.123)
Physical_cap	0.647***	0. 383***	0.634***
	(0.000)	(0.002)	(0.000)
Human_cap	-0.007	-0.008*	0.024***
	(0.559)	(0.071)	(0.000)
ECT	-0.607***	-0.065	-0.396***

	(0.000)	(0.323)	(0.000)

Based on the Hausman test, the p-values are 0.61, 2.41, and 0.62. This means that all values are not significant at 5% alpha. Therefore, the estimation of PMG in the long term is better than MG and DFE. Table 4 shows the long-term relationship between financial development and agricultural productivity during 1991-2017 across country groups with PMG estimates.

The results of the long-term analysis show that financial development has a significant impact on agricultural productivity. Financial development creates investment through efficient allocation of funds and strengthens trade and business relations as well as the diffusion of technology and investment. The mobility of savings for productive investment can accelerate the growth. One of its transmission can be seen through its role in technological progress and innovation [11].

First, financial depth has a positive impact on agricultural TFP growth. These results can be found in all groups. When financial depth increased by 1%, agricultural productivity increased by 0.31%, 3.74%, and 0.14% in the high, middle, upper and lower classes. Based on the coefficients of the three groups, middle-upper countries have the highest scores. This study concludes that countries with larger total credit sizes provide a better support system in creating productivity growth. Several studies from [5] provide support for these results. The amount of credit extended to farmers affects the productivity of farmers and their income [8, 9]. But when finances get bigger, there may be negative side effects on growth. This indicates there may be a threshold. For example, when the financial sector grows too large, it can lead to inefficient allocation of resources and diseconomies of scale which eventually lead to a financial crisis. Allen and Carletti [3] stated that "too little finance is undesirable, but too large a financial market is also undesirable".

Second, another important analysis is financial efficiency. Financial efficiency helps assess the efficiency of financial markets in providing funds for investment. The results study from Dadson [5] also show that farmers' decisions to invest in agriculture are strongly influenced by the efficiency of financial markets. Financial efficiency and access to financial services affect productivity in the sector. The estimation results show that financial efficiency has a negative effect on agricultural productivity. This means that the smaller the difference between interest rate on savings and loans, the cheaper the costs for farmers to borrow. This creates a force for investment. One of them is through a more efficient allocation of funds. This in turn will accelerate the process of productivity growth. Research from Zakaria et al. [23] confirmed the same results as this study. However, the results of this study provide additional information that each development indicator has different sensitivity and effects in influencing productivity growth.

An increase in financial market by 1% has improved productivity growth by 3.9% in the high income and 6.5% in the middle-upper. The coefficient values for all groups indicate that financial efficiency has the greatest influence on the high-income group compared to other groups. This shows that the more developed a country's financial system creates more efficient financial markets. Therefore, the cost for investment funds is getting cheaper which has an impact on increasing the number of loans. In the group of countries with capital-intensive characteristics, these funds are used for innovation and new technologies to encourage increased productivity. As found in Li et al. [11] that financial efficiency has a negative impact while the financial scale has a positive impact.

However, the coefficient in the lower middle group was not statistically significant. This shows that the efficiency of the public financial market in the lower middle has not been able to increase agricultural productivity in the long term. This means that in the lower middle, financial development encourages agricultural productivity, only through financial depth by increasing the number of credits, especially in the agricultural sector. It can be understood that the amount of credit provided by banks to the agricultural sector influences farmers' decisions to produce more than the cost of borrowing they have to pay [5].

The results of the long-term analysis of financial development show that financial depth and financial efficiency have an important influence on agricultural productivity in all samples. But this study shows new information, where only financial depth can affect agricultural productivity while financial efficiency does not. These results complement information from previous literature, such as [21, 15, 4]. In addition, Zakaria et al. [23] where the whole research has not been able to show more specific financial development indicators in influencing agricultural productivity. In addition, this study also succeeded to show which of the two indicators has a greater influence on agriculture.

Physical capital has a positive impact on agricultural productivity. The 1% increase in physical capital increases agricultural productivity by 64.6% in the high-income group, 38.3% in the upper-middle group, and 63.4% in the lower-middle-group. That is, continuous innovation in physical capital plays an important role in agricultural productivity. In other hand, human capital has a statistically positive impact on agricultural productivity only in the lower-middle-income class. This means that most farmers in lower-middle countries can increase their agricultural productivity by taking higher formal education. So we can improve their knowledge and skills about agriculture and technology.

But, we find that human capital have negative impact on agricultural productivity in Middle-upper-income-groups. Improving the quality of formal education for farmers tends to reduce productivity in the agricultural sector. One of the strong reasons is structural economic changes. An educated farmer decides to move from the agricultural sector to another, thereby reducing agricultural productivity. Therefore, in high-income -roups, an increase in the number of workers who move to other sectors will not affect the amount of productivity in the agricultural sector because a decrease in labor can be replaced by physical capital such as machines that can replace labor and increase the efficiency of agricultural productivity.

3.2. Short-term Analysis: Relationship between Financial Depth and Financial Efficiency on Agricultural Productivity Growth

The second part of the study examines the short-term impact of financial development on prooductivity growth. In the long term, all coefficients are similar for each country. But in the short term, the coefficients for each country are different. See Table 5 to understand the short-term relationship between financial development and agricultural TFP growth in each country. This section presents the coefficients, especially for financial depth and efficiency. The displayed coefficient values are only those that are significant at the highest lag in the model. This means Table 5 can provide information on the comparison of the impact of financial development on productivity growth for each country.

The results in Table 5 will be presented in several points. First, the high-income group in most countries shows that the impact of financial depth on TFP growth, except for Australia, Italy, Spain, and the UK, are not significant. In addition, it can be shown that the role of financial depth is found after the 2nd and 3rd periods after the improvement of financial depth. The highest coefficient was found in only two countries, namely Poland and US. Meanwhile, the effect of financial efficiency was also found in most countries except France, Japan, Italy, Spain, and Canada. The effect of these indicators also be found after a period of 2-3 after an increase in financial efficiency with the largest impact found in Australia and UK. It is interesting to understand that in developed countries, farming communities tend to be more concerned with financial efficiency in influencing their production decisions compared to the number of funds offered by banks. This shows the characteristics of advanced agriculture where the cost of borrowing funds plays an important role in influencing productivity decisions [11].

Second, quite interesting results were found in the upper middle group of countries. Both financial depth and financial efficiency indicators were found to have a significant effect on TFP growth, except for

Thailand. The highest coefficient is found in Argentina for financial depth and China for financial efficiency. It should be noted that the impact of financial depth tends to be found 1 period after the improvement. Meanwhile, financial efficiency has a longer period of influencing TFP growth, which is 2-3 periods.

Third, the lower middle group shows that the two financial indicators are not significant on productivity growth in many countries. This shows that the condition of financial development in this group has not affected productivity decisions in the short term. Farmers in most countries in this group need a longer time to adjust to financial development conditions. Meanwhile, we note that in some countries, both financial depth and financial efficiency can affect TFP growth at a lag of 1-2 periods after changes in financial indicators. These short-term findings provides many empirical contributions to previous research. We can show the short-term impact of each country in different lags. In addition, we can show that different country characteristics, can affect the effectiveness of financial development differently.

5. Conclusion

This study tries to show the impact of financial development in two indicators, namely financial depth and financial efficiency on agricultural productivity in 3 groups of countries. Other variables including physical capital and human capital. The results confirm that financial depth has a positive effect on the three groups. On the other hand, financial efficiency has a negative and significant effect on agricultural productivity growth in the high and middle-upper groups.

For all groups in the long-term analysis, it shows that the two financial development indicators have the greatest influence on the middle-upper group. Meanwhile, the short-term impact for each country shows that it takes about 2-3 periods for high income, 1-3 periods for the upper-middle, and 1-2 periods for the middle-lower for financial development can affect agricultural productivity. Another fact shows that financial development in almost all countries in the lower middle cannot affect agricultural productivity in both the short and long term.

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Table 5. Short Term Results in Panel ARDL Estimation

High			Middle upper			Middle lower		
Country	**Fin_ Depth**	**Fin_eff**	**Country**	**Fin_depth**	**Fin_eff**	**Country**	**Fin_ Depth**	**Fin_eff**
United States	Lag 2 0.032*** (0.000)	Lag 2 0.097*** (0.001)	China	Lag 1 0.014** (0.001)	Lag 3 -0.345** (0.026)	India	-	Lag 1 -0.094* (0.054)
France	Lag 2 0.013* (0.082)	-	Brazil	Lag 1 0.023*** (0.000)	Lag 2 -0.006** (0.014)	Indonesia	-	Lag 2 -0.029** (0.002)
Australia	-	Lag 1 0.279*** (0.000)	Russia	Lag 1 0.026*** (0.000)	Lag 3 -0.005** (0.020)	Nigeria	-	Lag 1 -0.029** (0.036)
Japan	Lag 3 -0.005*** (0.001)	-	Argentina	Lag 1 0.132*** (0.000)	Lag 1 -0.027** (0.017)	Pakistan	Lag 2 -0.039*** (0.000)	-
Italy	-	-	Turkey	Lag 1 0.020*** (0.000)	Lag 3 -0.014** (0.001)	Bangladesh	Lag 1 -0.035	Lag 2 0 .021* (0.052)
Spain	-	-	Mexico	Lag 1 0.021** (0.009)	Lag 3 0.006** (0.002)	Vietnam	Lag 2 0.016*** (0.000)	Lag 2 -0.003** (0.046)
Korea	Lag 2 0.003** (0.013)	Lag 3 0.067*** (0.000)	Iran	Lag 3 -0.019*** (0.000)	Lag 3 0.052** (0.001)	Phillipines	-	-
Canada	Lag 2 0.0047054** (0.048)	-	Thailand	-	Lag 1 -0.068** (0.0003)	Kenya	-	Lag 1 0.016*** (0.000)
Germany	Lag 3 0.019** (0.001)	Lag 2 -0.075** (0.077)	Malaysia	Lag 1 0.009*** (0.000)	Lag 3 -0.212*** (0.000)	Egypt	Lag 2 -0.019*** (0.000)	Lag 2 -0.035** (0.005)
United Kingdom	-	Lag 2 0.106** (0.022)	Colombia	Lag 1 -0.026* (0.075)	Lag 2 0.033** (0.047)	Morocco	Lag 2 -0.026** (0.003)	-
Netherland	Lag 2 -0.013** (0.001)	Lag 3 -0.026** (0.002)	Peru	Lag 2 0.012** (0.012)	Lag 1 0.003* (0.055)	Ukraina	-	Lag 2 -0.014** (0.001)
Poland	Lag 3 0.052*** (0.000)	Lag 3 -0.047** (0.013)						
Chile	Lag 3 0.013*** (0.000)	Lag 3 -0.018*** (0.000)						

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