Sean O'Grady

ECON 481: International Finance
Final Exam

You have until Tuesday, May 4th 10:15 a.m. to complete this exam. It must be submitted as a Word file. Pay attention to what is specifically asked. Your answers must be complete, rigorous and well supported. Be sure that you justify your answers and that you show how you have arrived at them. Unexplained answers will receive no credit. Finally, this is an INDEPENDENT EXAM. Any reflection of two students working together or discussing the content of the exam will result on failure of the course.

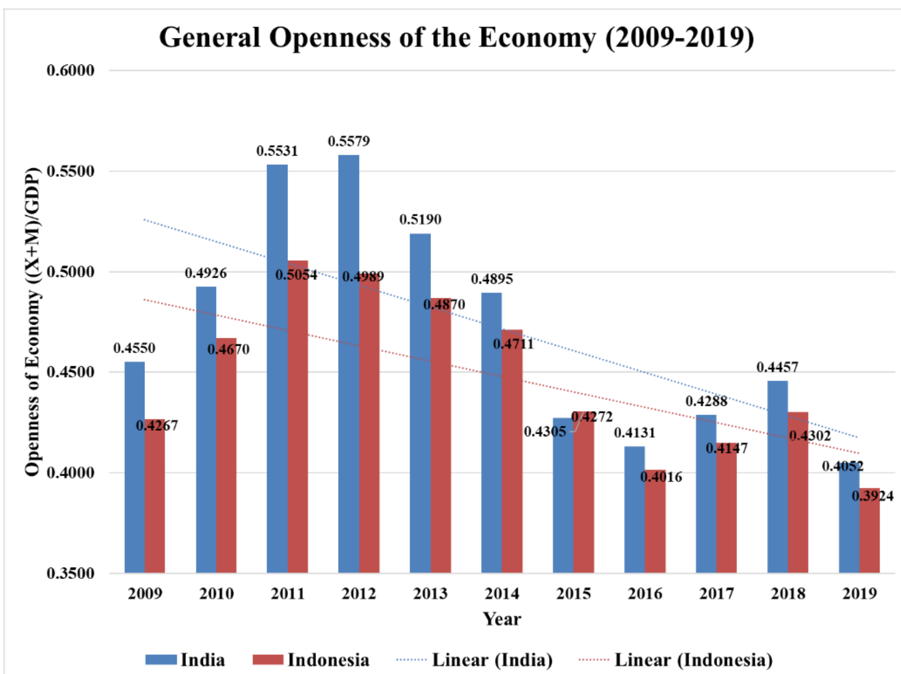
Total: 100 pts.

25 pts. 1. Globalization plays an important role in economic performance of countries. Consider two countries: 1) the economy you followed this semester, and, 2) pick another country covered this semester (China, India, Indonesia, Brazil, Mexico, Japan, Russian Federation).

1.1 Using information from the presentations and any other sources you choose to, compare these countries and explain which of them seems to be doing better in terms of:

a. General Openness: INDONESIA (my group) vs. INDIA (chosen)

To begin, the graph below shows a side-by-side comparison of the shifts in economic openness felt by India and Indonesia from 2009 to 2019….



General openness, which is a loose term to broadly describe how accepting a country is of trade, varies greatly between nations. The term has both economic and political implications. Yet, for the purpose of data collection, one can examine this formula: [Exports + Imports] / GDP in 2010 USD. From the results below, India and Indonesia both seem to be on very similar trajectories within the last 12 years. While India has experienced larger spikes overall thanks to their being a hub of the Indian Ocean economy, Indonesia mirrors India's movements well. Indonesia of course has reason to be confident in its own trade economy. As a nation situated so close to other highly populated island nations in the South Pacific, while also being close to China, and within striking distance of North and South America, it has been able to open itself to excellent trade options. Specifically, it has been able to join trade agreements such as ASEAN while also expanding its scope beyond the Asian region.

Despite this, India remains not only one of the largest nations in the world, but also one of the best situated. With direct access to shipping routes both within Asia and to Africa / Suez Canal to Europe, it has a very strong ability to maintain a competitive level of openness. This is supported in the graph below, as despite some setbacks, it is virtually always above Indonesia in openness. Additionally, India is a country that is known for being more and more accepting of Western trade. With so many U.S. companies exporting tech labor to India, it has become a vital player in the advancement of technology worldwide. Additionally, its government is working to open the country even further in order to better compete with its northern neighbor, China.

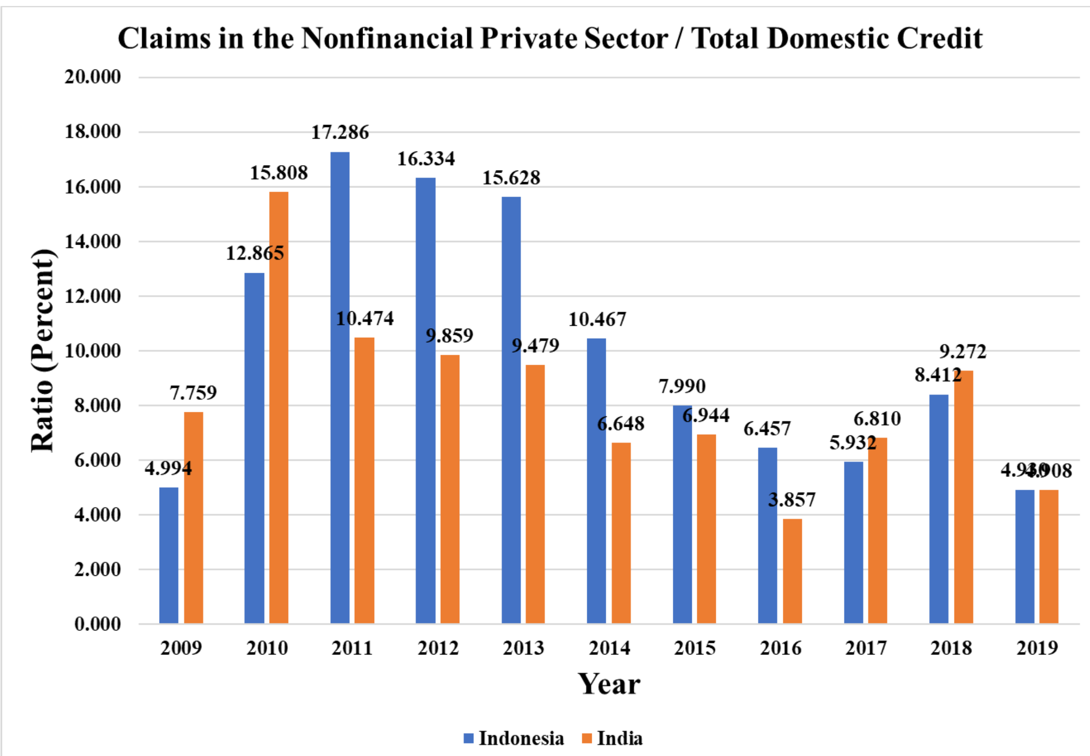
In total, both countries are very well-matched in terms of the quantitative data, but India does have a slight advantage over Indonesia because of both its political focus on opening itself to the world, and its incentive to compete with China. While Indonesia is an incredibly strong economy as well, it still is under restrictions, not only geographically, but also politically, which will make it difficult for it to move ahead of India in terms of openness.

CONCLUSION: India has a slight advantage over Indonesia in general openness.

b. Financial development: INDONESIA (my group) vs. INDIA (chosen)

Moving on to financial development, the graph below shows the comparison between Indonesia and India on the Claims of the Non-Financial Sector divided by Total Domestic Credit. This measurement is important to understanding financial development because it shows how a country is able to freely balance the transfer of claims from the buyer to the seller. For this statistic, the higher the value the better because if most of those claims happen in other sectors rather than simply the financial, it means that most domestic credit transactions are occurring in activities which benefit the domestic economy, such as manufacturing, business dealings, and entrepreneurship. A higher number out of the total amount of domestic credit is a positive sign for a healthy economy. In this sense, both countries are again evenly matched, with Indonesia finding a slight advantage in some parts from 2011 to 2016. Yet, India's strength is in its long game. One of the reasons why India had that slow pace was because it was trying to catch up from decades of inequality within its private sector. As the country becomes wealthier however, those non-financial sectors will make up a larger and larger part of the total domestic credit. Thus, India is on pace to not only match, but greatly exceed Indonesia. Over the las three years particularly, India has seen positive gains in this statistic compared to Indonesia.

Part 1 Conclusion: India has a slight advantage in long-term.

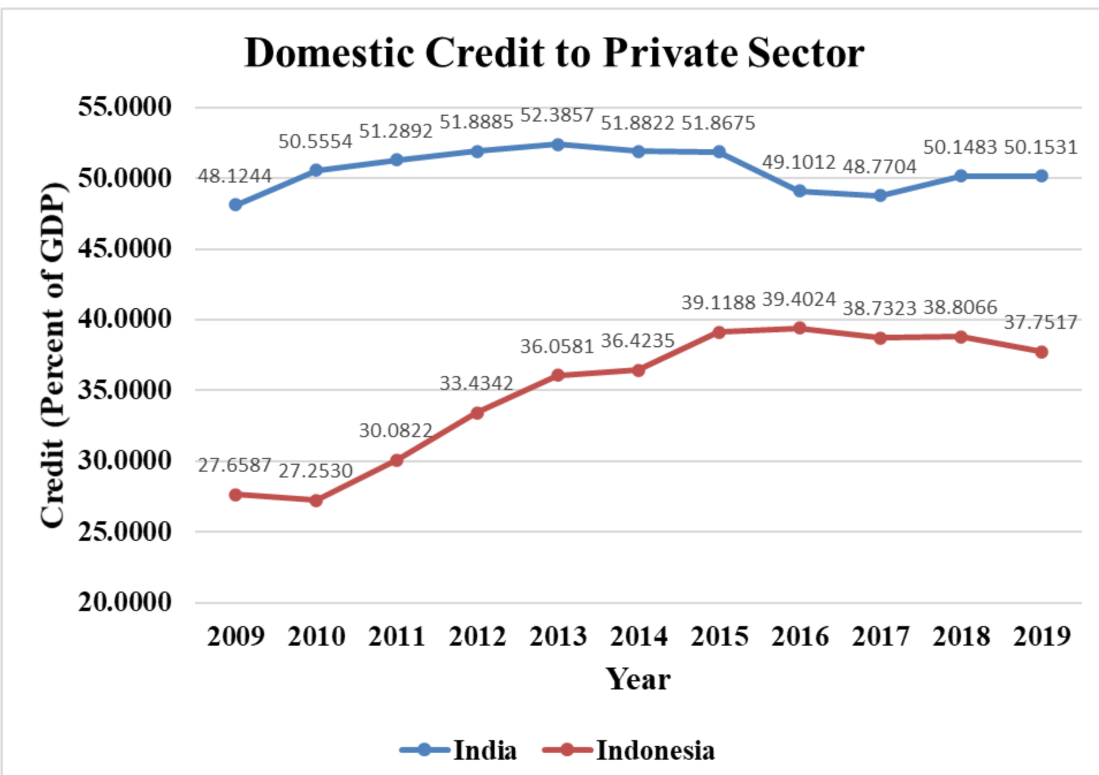


Now, another intriguing idea the concept of domestic credit to the private sector. This statistic is basic, but essential part of understanding the role of financial activities in boosting the economy of a country. It calculates the amount of credit, as a percent of GDP which the private sector is receiving through loans and lines of credit. These loans, upon repayment reenter the financial sector, but the business activities which the private sector uses help to boost the economic growth of said nation.

For this example in particular, both countries are finding themselves inching closer to each other, while India has mostly remains the superior one nonetheless. The Indian economy, as being of a semi-developing country, relies on investment in domestic business in its private sectors. While it is not fully developed with such large portions of the populations living life in destitute poverty, the sheer size of the country has made it able to build up its infrastructure, trade system, and manufacturing sectors.

Yet, as seen below, growth in domestic credit to the private sector has mostly been stagnant over he last several years. Meanwhile, Indonesia has seen considerable gains, at least up until 2016. This is because Indonesia growth has been on a steady rise for much of the last 10 years, and it actually is on pace to becoming one of the Top 10 economies by 2030.

Conclusion 2: For this statistic, Indonesia does have a slight advantage in the more long term concept of growth, despite India owning a higher statistic.

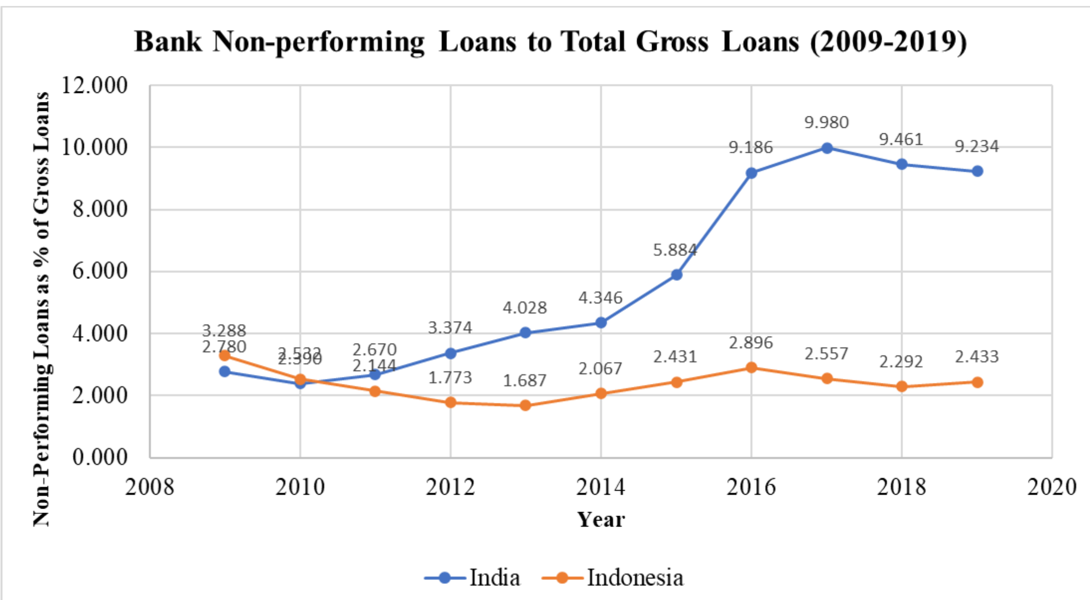


Shifting toward non-performing loans to total gross loans, this is a statistic which shows how many loans have defaulted or are not able to be paid back as a segment of the total amount of loans given out. The graph below shows how India's non-performing ratio has been steadily increasing since 2010, with only very small dips in recent years. This is a worrying sign which puts the future of banking at risk for the world's second most populous country.

Meanwhile, Indonesia has been able to keep its number of non-performing loans as a percentage of gross loans quite low since 2009. So, they are ahead in that respect. One reason for the large gap shown below is that as India has experience such stark a start economic boom in the 21st Century, it still struggles with ensuring that its poorer populations are not left behind. So, when poorer individuals or businesses, who have been somewhat alleviated from their economic hardships, try to suddenly acquire loans for the first time, they soon realize they are not able to pay back those loans in full. As a result, many Indians are watching as the elimination of economic disparity is simply not able to keep up with the pace of rapid economic growth.

Indonesia, on the other hand has been able to find an upward trend of economic growth without leaving behind its less financially sturdy populations. By developing a robust financial and banking system that benefits the entire country, It has been able to keep its number of non-performing loans low, thus giving it an advantage over India in this category.

Conclusion 3: Indonesia has a strong advantage in this section over India.

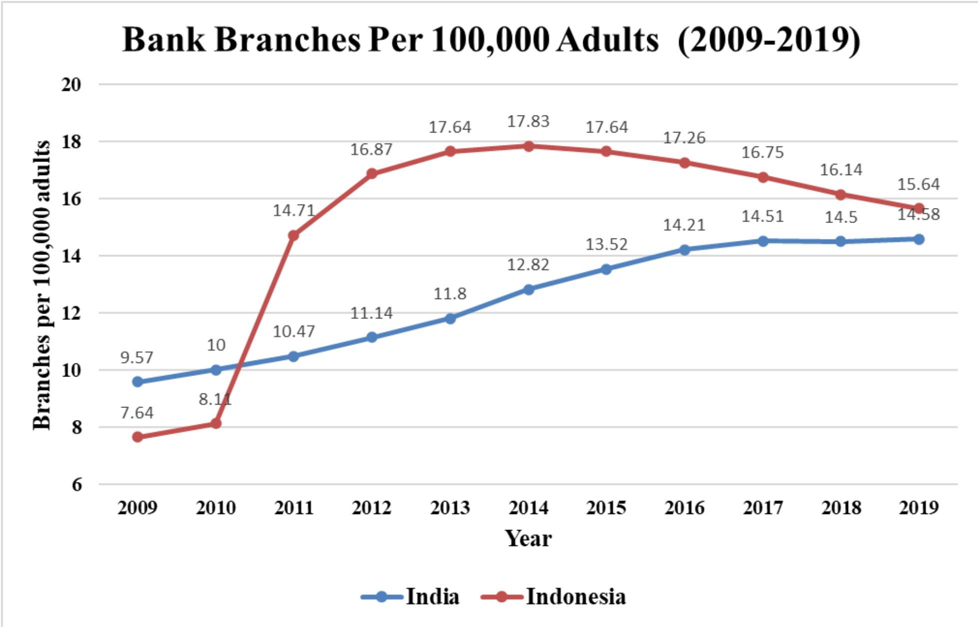


The last statistic examined in this section is "bank branches per 100,000 adults. This measurement indicates exactly that, and while the population may vary, a country should try to keep up with the demand for banking, regardless of how many people live within said country.

As seen below, Indonesia has been much farther ahead in this statistic than India, but recently, India has been on a slow, but steady upward trajectory. In fact, despite India reaching almost 18 branches per 100,000 people, India has virtually caught up by 2019, with 14.58 branches per 100,000 vs. Indonesia's 15.64.

As seen here, even though India has been slow to ensure that it reduces inequality within the country, it has been successful in terms of building up infrastructure for banks over time. So, for this statistic, the two "winning" factors essentially cancel out.

Conclusion: No clear winner for this statistic, and thus, it is a tie here.



Given the displayed results, with Indonesia showing stronger data for two categories, India showing stronger data for one category, and one category being considered a tie, Indonesia should be given the upper hand. However, this is mostly due to the fact that Indonesia has focused its efforts in becoming a much more equitable economy rather than the best in the world. While India, by 2030 is estimated to be the #2 economy on Earth while Indonesia is projected to be at #4, India has a problem that GDP cannot solve: a vast amount of people that are simply too poor to take part in robust economic progress. While Indonesia does have poor citizens as well, it has turned its cities into international hubs for business and investment, thus allowing for it to build up its financial development at a steady rate, but also one that is equitable throughout the country.

CONCLUSION: Indonesia is doing better in financial development compared to India.

1.2 What would you suggest as effective policies to improve the situation of each country? Be very specific and explain according to the conditions of each economy.

Considering that I focused on my country, Indonesia, throughout this semester, I found it very intriguing to see not only where the South East Asian nation currently is in relation to these economic measurements, but also where they are headed. From the results, it seems that

Indonesia can improve in a number of areas, both in trade in financial development. These improvements are as follows:

1. **Labor:** In these results, Indonesia is still a country projected to become the #4 economy in the world. Yet, recent setback during 2018, 2019, and the pandemic of 2020 have made some economists worried that they are not moving fast enough. One way to combat this according to the World Bank, World Economic Forum, and developmental economists worldwide is to reinvest in the greatest resource that any country can have: people. While Indonesia is still a conservative Muslim country, it can tap into the potential of all citizens, from women, to minority groups, to even immigrants in order to boost its economic potential. This way, there can be a renewed emphasis on education and training for workers as smart technology becomes the norm in virtually every modern sector. One important aspect noted by the World Economic Forum is that Indonesia should invest not just in using its labor force to build infrastructure projects in cities like Jakarta, but also should work to expand infrastructure in rural areas, thus allowing all citizens of the country to take part in Indonesia's economic development through their labor.

2. **Diversification of Sectors:** As an sprawling island nation, Indonesia stretches from the Pacific to the Indian Ocean. It thus has access to many different areas of land, and thus different economic sectors. Mineral fuels, agriculture, services, and industrial production make up the bulk of Indonesia's current GDP. Yet, one way that Indonesia can boost its economic potential in the long term is to look beyond these classic sectors, and expand its sectors dealing with technology and skilled manufacturing. Yet, Indonesia does have vibrant electronic manufacturing sector, an auto production sector, and information technology sector. By diversifying its economic sectors and finding a renewed focus on more modern economic components, Indonesia can prepare for a future in which they are not only a strong economy, but one that adapts well to change.

3. **Expanded trade partnerships:** Invoking again Indonesia's incredible geographic position, trade is a key reason why Indonesia is projected to be one of the top ten economies in the next 10 years. Yet, a cause for concern is the expansion of other Asian

economies such as China and India. Once these nations take over spots one and two on the largest economy list, they will be mostly unstoppable if trade agreements are not in place to compete with them. ASEAN is perhaps Indonesia's most important agreement, yet, by joining ones such as the "Comprehensive and Progressive Agreement for Trans-Pacific Partnership" and strengthening its ties within the "Regional Comprehensive Economic Partnership," Indonesia can both expand its reach of trade outside of the Asian region, and also create necessary allyships to compete against the possibility of a Chinese or Indian monopoly on certain products. By taking action on trade now, Indonesia can prepare for future trade changes to come.

As for India, it is a country which has shown itself as a vibrant economy ready to take over the number 2 GDP spot in the world. Yet, the improvements below should be made if it truly wants to take pride in such a title:

1. **Fix Inequality:** In recent years, many in the Western World have pointed to China having a false sense of economic prosperity because its GDP ignores the vast populations of the country living in poverty. Unfortunately, India is guilty of this as well. With millions of impoverished Indians living in agrarian communities and slums, India will have a major problem balancing itself as the #2 economy globally, while also having so many citizens living in improper conditions. By fixing inequality, two major progresses can be made…Firstly, those brought out from poverty can contribute to India's economic expansion through more skilled labor positions. Secondly, countries seeking foreign investment and trade in India can be confident in an economy that not only produces results for its investors and trading partners, but also ensures its labor is ethical and is in line with modern standards of economic development.

2. **Eliminate the Caste System:** One of the most fundamental lessons of economics is that growth requires widespread involvement from all members of society. While the Indian government has made progress in social issues, India itself still adheres to the Caste System, which places people in a pyramid of hierarchy from priests, to government leaders, to landowners, to peasants, to "untouchables." This system not only serves as unethical way in which people are classified, but it is holding back India's true economic

potential. Without robust social mobility, the country will continue to struggle with engaging all members of its society in bolstering economic expansion. By eliminating the caste system, true progress can be made for India's economy.

3. **Infrastructure:** India today has dozens of modern, bustling cities, such as Bangalore and Mumbai, which offer a prime chance of foreign investment and economic expansion. Yet cities such as Calcutta, small towns, and countryside villages represent a very different view of India. If India wants its country's economy to move forward in one piece each part of its large subcontinent needs to be bolstered, including these poorer areas. By offering jobs in construction and development, India can ensure that these areas grow along with the rest of the nation, and the people there are not left behind. Specifically, it will take both financial resources and political pressure to bulk up on infrastructure, but it is a necessary step that needs to be taken if India wants to consider itself a world economic leader.

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25 pts. 2. Corruption and Public Debt are threats to economic activity. Similar to the previous case, for the following analysis, use the country you followed this semester <u>and</u> pick an additional country from those followed in class (it can be a different economy than the one selected in the prior question).

2.1 From 1960 to present, compare:

a. Corruption levels: INDONESIA (my group) vs. INDIA (chosen)

Like in many countries which had been former colonies of European empires, both Indonesia and India have struggled with corruption. Indonesia's independence was recognized in 1949, while India's became an official independent republic just a year later, in 1950. Throughout the next 50 years, various political scandals, economic hardships, and domestic conflicts allowed both nations to become ripe for corruption.

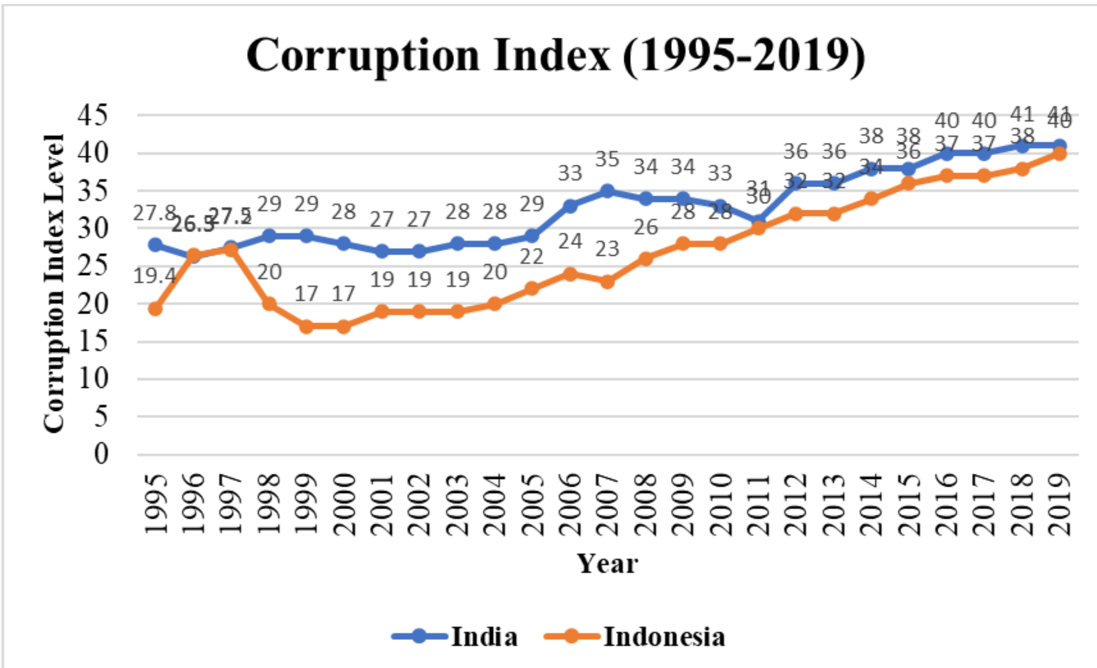
In Indonesia, corruption perhaps reached its peak during the regime of President Suharto, who not only allowed corruption to spread throughout the country, but committed it himself. Transparency International, which is an international committee dedicated to tracking corruption named Suharto the most corrupt leader in modern world history, since he had taken billions of dollars for himself while in office.

Meanwhile in India, corruption also became widespread not only at the local level, but at government level as well. That corruption trickled down into many different sectors, from licensing offices, to policing, to banking, to tax evasion. While India has improved, it is not a nation which has an upstanding history when it comes to corruption.

Now, Transparency International, the body of experts tracking corruption, was founded in 1993 and its “corruption index” list only became solidified in 1995. So, that is why the graph below shows only 1995 to 2019. From it, a number of observations can be made. To start, India has been on a steady upward trend in defeating corruption, but it is still moving at a slow pace. Meanwhile Indonesia’s corruption index used to be much worse, especially at the end of the 1990’s and early 2000’s, however, as Indonesia has become more and more of a hub for Western and international investment, it has improved greatly.

In total though, both countries are around the same in current trajectory. Yet, historically speaking, Indonesia has performed much worse over time when it comes to reducing corruption domestically.

Conclusion 1: India is doing slightly better than Indonesia in reducing corruption, but in the present day, there is no clear winner, as both are virtually neck-and-neck on the index.

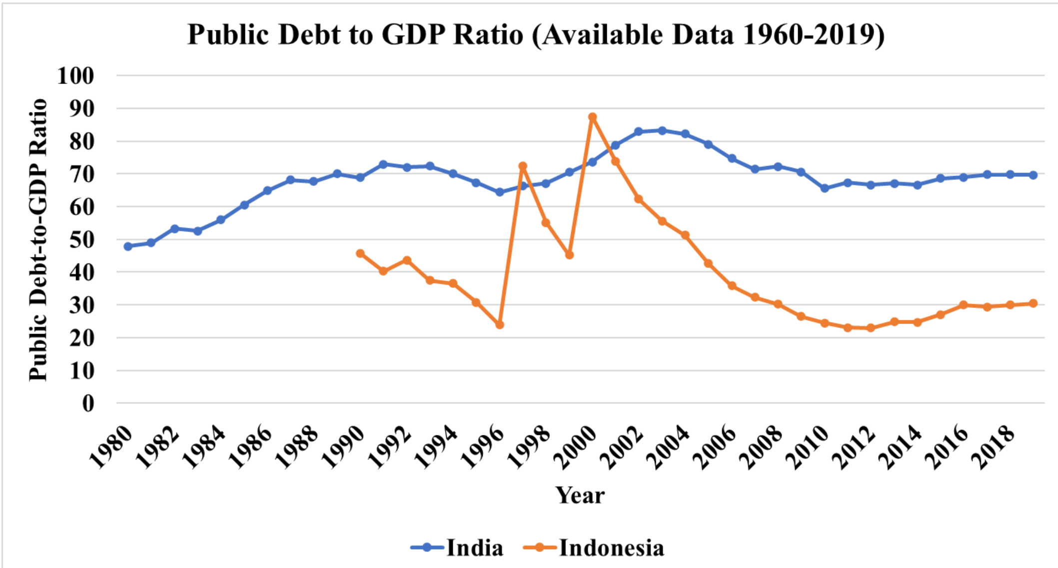


b. Public Debt: INDONESIA (my group) vs. INDIA (chosen)

For this measure, Public Debt to GDP, Indonesia’s data does not extend as far back as India’s data does, but it does show that Indonesia has been successful for the most part in reducing its public debt. As seen, there are two major spikes, once in 1997 during the Asian Financial Crisis and then again during the 2001 recession and subsequent shocks that affected Indonesia’s economic situation directly. After these spikes however, Indonesia has managed to utilize foreign investment, trade agreements, and debt refinancing to successfully reduce their public debt to GDP ratio down to the 30% range.

This success is something that India has not been able to achieve. While India’s ratio is much more stable than Indonesia’s graph, it is very difficult for India to mobilize its banking system to reduce public debt at a corresponding rate to shifts in GDP. While India only experienced minor changes in the 1990's and early 2000's, it has been unable to reduce its ratio down to below 60% in recent years.

Conclusion 2: As a result of this analysis, Indonesia is clearly doing much better than India in terms of reducing its public debt to GDP ratio.



c. External Debt: INDONESIA (my group) vs. INDIA (chosen)

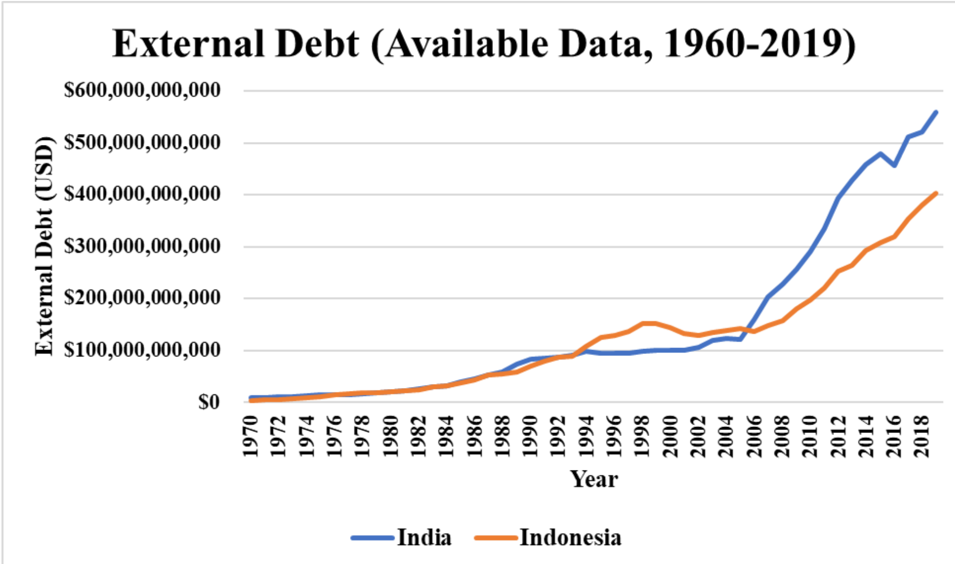
Moving on, External Debt is a topic which both countries are continuing to struggle with. External debt is of course the debt which people within a said country owe to creditors of other countries. As both nations have been more open in their economic dealings recently, it is natural to see increases in external debt. However, the rate for both countries has an alarmingly steep upward slope.

India especially has been doing poorly at reducing its external debt in recent years. Ever since the start of the global financial crisis, India has had an upward trajectory in terms of its external debt. While there was a small momentary decrease in 2016, India continues to a mounting level of money owed to foreign creditors. This is problematic for a number of reasons. To start, it will make it difficult form India to manage having the second highest GDP globally while also being indebted to so many foreign countries. It also strains the relationship that India has with its foreign counterparts, both economically and politically. Despite this however, much of the debt that India acquired throughout this period was due to its investments in infrastructure and energy projects, as well as boosts to its private sector. Even so, India's debt trajectory should not be so steep as it is now.

Indonesia meanwhile also is has undergone and is continuing to undergo major increases to its own external debt. Like India, it has made a number of infrastructural and industrial upgrades to its economy, but still should work to reduce external debt so that when that debt is called upon by foreign creditors, too much money does not leak out of the country all at once. Nevertheless, it is still better than India.

Conclusion 3: Indonesia is doing better than India when it comes to external debt.

(Graph corresponds to previous page)



2.2 What country seems to be managing better its public finances? What could each do to improve its situation?

From these measurements, it seems that Indonesia is doing a much better job when it comes to it public finances. While Indonesia still has improvements to make on external debt, overall it has done an excellent job in recent years at managing its public finances so that it does not find itself on the wrong end of a national debt crisis.

Now, in order to solve Indonesia's problem with rising external debt, it may be helpful to shift mor of its borrowing toward the domestic side. As the rate as a percentage of GDP for public debt is very low compared to external debt, Indonesia could benefit from trying to tap into more of its successful domestic companies. By offering more bonds to these companies and even the citizens of Indonesia, the government can ensure that its money is dept within the country, instead of leaking out. In total, this will, over time, reduce external debt and promote more investing in the domestic Indonesian economy.

On the other hand, while India's public finance situation is not showing signs of turning into a Greek-level debt crisis any time soon, it is well known that the Indian government, as well as the private sector, has been largely unsuccessful in reducing debt. There are solutions available for improving this situation, however. They include raising taxes, cutting spending, and manipulating the interest rates.

However, the list of solutions above is not sensible for India's current situation. Many Indians are poor, so cutting spending or raising taxes to tackle debt may cause more problems in the long run. There is a solution that may be more fruitful however…If both the Indian government and Indian companies, instead of just using simple borrowing techniques, issue re-financed bonds instead, they can satisfy their investors both domestically and abroad through not only giving them back the money they own, but offering interest on the bonds. This way, India can keep up with the spending it needs to accomplish in business, infrastructure, and other economic areas, while also ensuring that they do not drown in debt.

2.3 What country seems more affected by corruption? Is there something each country can learn from the other in terms of corruption control)?

Historically, India seems to have done slightly better than Indonesia in terms of tackling corruption. This is in may ways, the result of Indonesia having the most corrupt leader in modern history (President Suharto), as stated. Yet since Suharto's leaving office and Indonesia's opening more and more to foreign investment, the nation has improved greatly in its reduction of corruption.

For India, its handling of corruption has been stronger historically than Indonesia, but it has not reduced corruption at as fast a rate. Put simply, India's corruption problem has been bad, but not too terrible as to raise a national alarm. Much of the corruption is entrenched in India's culture, and it makes it very difficult to publicly extinguish.

As for lessons that each country can learn from one another, they are as follows:

Indonesia can look upon India and learn from the dangers of culturally-entrenched corruption. When it becomes too much part of daily life, it is very easy to ignore it, and act like it is not a problem. So, Indonesia should be aware of corruption on all levels and not become complacent if it spikes again.

India can look upon Indonesia and learn about corruption at the highest levels of government. As Indonesia's President was the one perpetrating the worst crimes of corruption of any world leader at the time, India should acknowledge that their leaders need to be held to an extremely high standard, and any sort of corruption within government leadership could be a trickle-down effect from corruption at a higher level. By scrutinizing the government, corruption can be rooted out, and wiped from a nation entirely.

50 pts. 3. Consider El Salvador, a small open economy that is dollarized. Assume the central bank is considering whether to continue using the US dollar or switch to its own (new) currency.

3.1 Find data and run a regression for the period 1970-2019 for:

Variables:

^{y}GDP per capita growth
Gross fixed capital formation (% of GDP)
*** Openness of the economy: (X+M)/GDP**
***Exports as % of GDP**
FDI as a % of GDP
A measure of financial development (pick one from those discussed in class)

Workers' remittances as % of GDP
[a, b] Real exchange rate
[b] Inflation rate
Government expenditures as % of GDP
Dummy for dollarization
Other dummies, as needed, for major events in the country

[y]: dependent variable
*** one variable at a time in a regression.**
[a] Real exchange rate= (Nominal exchange rate * Foreign Price Level) / Domestic Price level Use the U.S. CPI for Foreign Price level, and domestic CPI for domestic price level [b] Potential source of collinearity, test and if found, have one variable at a time.

***Note*: Estimate an OLS regression where your dependent variable is GDP per capita growth, while the remaining variables are independent variables. Present your results in an organized table marking statistical significance on the way explained and shown in class. Before running your regression plot variables and if you find structural breaks, create and include a dummy variable in your regression for each break.**

STEPS:

Before beginning my regression, I first searched for my data, which I mostly from the World Development Indicators from the World Bank, but also from FRED, Knoema, and Trading Economics. From these sources, I was able to find data for each variable, except I only found data going back to 1976 for Remittances.

Once my data was found, I calculated the necessary variables, including Openness of the Economy and the Real Exchange Rate, using additional found data. From there, I also calculated the necessary variables as a percentage of GDP. Then, I made the necessary calculations to clean my data for the Claims in the Nonfinancial Private Sector / GDP (CLAIMS_DIV_GDP).

Finally, I inputted by three dummy variables: One for Dollarization in 2001 (DOLL_DUM), one for the 2008 Recession (RECESSION_DUM), and one for the economic crisis at the start of the Salvadorian Civil War in 1980 (WAR_DUM).

After this, I imported my Excel spreadsheet into EViews. Before running any regressions however, I made sure to clean my data, and ensure it matched with my data from Excel.

My first step after that, before running any regressions, was to check for any Unit Root Problems, and if needed, I would use first differences accordingly. I ran my unit root tests to the full extent, looking at each individual statistic necessary. Here is an example of the result of two tests for two different variables starting at the Level, Intercept stage:

Augmented Dickey-Fuller Unit Root Test on FDI

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.968595	0.0002
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

Augmented Dickey-Fuller Unit Root Test on EXPORT

Null Hypothesis: EXPORT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

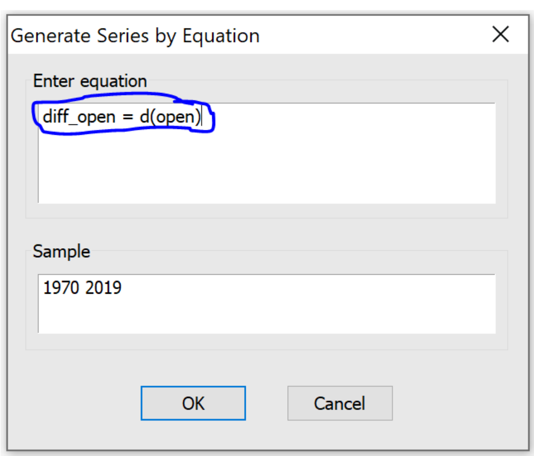
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.383701	0.9037
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

As seen from above, the first Dickey-Fuller test shows that ther is no Unit Root found, as probability is at 0.0002 (below ***), while the other test shows there is a Unit Rood found, as the probability is at 0.9037 (which is above *). So, after the full test has been completed, FDI is shown *not* to need first differencing, while EXPORT *does* need first differencing. This process is continued for each variable, with proper statistics taken on each one.

The full results are shown below:

SEAN O'GRADY	**UNIT ROOT TEST OF EL SALVADOR**				
Variables	**LEVEL 1 INTERCEPT**	**LEVEL 2 TREND & INTERCEPT**	**1st DIFF 1 INTERCEPT**	**1st DIFF 2 TREND & INTERCEPT**	**UNIT ROOT PROBLEM?**
FDI	0.0002	0.0001	0.0000	0.0000	
EXPORT	0.9037	0.2651	0.0000	0.0000	**X**
GOV_EXP	0.0693	0.1064	0.0000	0.0002	**X**
EXRATE	0.6920	0.3370	0.0000	0.0000	**X**
INFL	0.0074	0.0043	0.0000	0.0000	
OPEN	0.8414	0.8299	0.0000	0.0000	**X**
REMIT	0.9975	0.8725	0.9259	0.9943	**X (2nd)**
GFCF	0.0810	0.2614	0.0000	0.0000	
CLAIMS_DIV_GDP	0.0007	0.0017	0.0000	0.0000	

Once each statistic was done, the proper application of first difference was given to each variable that needed to be solved. An example is shown below:



After this step, I was ready to start trying regressions. I made predictions and assessments about which variables would turn up significant and which would not.

After trying in a number of tests, I ended up with several issues for my first dozen or so regressions. However, after trying repeatedly to come up with a sufficient model, I created one in which I could test perfectly.

After my regression was run, I started out by looking at my Durbin-Watson stat. While it was well bellow 2 at the beginning, I added 2 AR terms to bring it up to almost 2 exactly (**2.245848**).

After this, I did a test on the Variance Inflation Factors (VIF), which had to be below 10, for both the Uncentered and Centered VIF. The results of a sample test of my regression are below:

Sample: 1970 2019
Included observations: 42

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.370200	2.828009	NA
FDI	0.015968	1.865173	1.650115
DIFF_OPEN	49.25769	1.608444	1.444770
DIFF_REMIT	0.012842	1.792049	1.602343
DIFF_EXRATE	0.043699	1.078875	1.073951
INFL	0.003349	1.631549	1.459283
WAR_DUM	5.489744	1.305805	1.277261
RECESSION_DUM	71.17897	1.002696	1.002688
DOLL_DUM	4.903869	3.246694	2.259355
AR(1)	0.065330	6.136415	6.135548
AR(2)	0.082855	6.627454	6.599180
SIGMASQ	0.440878	1.619438	1.615116

As seen, all of my VIF values were well below 10. So, I could move onto my next test: Breusch-Pagan, which I utilized to see whether there was heteroskedasticity.

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.131403	Prob. F(8,33)	0.3687
Obs*R-squared	9.040199	Prob. Chi-Square(8)	0.3389
Scaled explained SS	5.573552	Prob. Chi-Square(8)	0.6949

As seen from above, all of the probability factors circled in blue do not fall within statistical significance. So, I failed to reject the null hypothesis, meaning that I did not find evidence of heteroscedasticity.

Beyond those tests, I performed a few other tests, including the Ramsey Reset Test and Omitted Variable Test. After successfully passing these tests on my models, I successfully generated the following data table:

Table 1: El Salvador & GDP Growth

DEPENDENT VARIABLE: GDPGROWTH	Regression 1	Regression 2	Regression 3	Regression 4
C	1.049945	0.500484	-0.386557	15.07947***
	(1.254397)	(0.461171)	(0.409317)	(3.565016)
FDI	0.031378		0.062557	
	(0.031378)		(0.304788)	
DIFF_OPEN	24.27375***			
	(6.114742)			
DIFF_REMIT, 2	-0.00507		-0.011163	
	(0.290661)		(0.275758)	
DIFF_EXRATE	-0.101903			0.016224
	(0.214486)			(0.145864)
INFL	-0.224341***			-0.175862***
	(0.040106)			(0.054093)
WAR_DUM	0.040106	-12.14969***	-12.21171***	
	(2.840427)	(3.825258)	(1.514395)	
RECESSION_DUM	3.412898	1.144242	0.162389	
	(6.347217)	(8.625235)	(39.18382)	
DOLL_DUM	0.917078	0.312947	0.915537	4.136161***
	(2.133293)	(1.427156)	(1.015330)	(1.475396)
DIFF_EXPORT		0.186947	13.15962	44.01447***
		(16.86468)	(16.26224)	(13.61122)
CLAIMS_DIV_GDP		0.311044*	0.452743***	
		(0.176105)	(0.160005)	
GFCF				
GOV_EXP				-1.141577***
				(0.297174)
D(GOV_EXP)			-1.058133**	
			(0.411172)	
AR(1)	1.111410***	0.160846	-0.220182	0.883862***
	(0.170094)	(0.254504)	(0.160713)	(0.143486)
AR(2)	-0.496850***			-0.477441***
	(0.160792)			(0.142821)
SIGMASQ	2.970293	4.457306***	3.837642***	3.616330***
	(0.824691)	(0.733426)	(0.864793)	(0.680172)
R^2	0.789775	0.651934	0.727403	0.717605
Adjusted R^2	0.715179	0.592509	0.639469	0.661126
N	43	49	42	49
Durbin-Watson Stat	2.245848	2.018514	1.891046	2.121223
AIC	4.516501	4.659487	4.707728	4.510284
Schwarz Criterion	5.007999	4.968356	5.162832	4.857761

There are very strong results above, however, on a quick sidenote, there is one variable that simply could not be implemented successfully into any of the models. It was the Gross Capital Fixed formation. I tried taking each and every variable out that it was running with, but every time, it ended up having a very bad multicollinearity problem. I eventually tried another strategy: taking the first difference. When taking it on GFCF, it allowed the VIF to be well below 10, and thus, the regression was able to be run without multicollinearity. The sample regression is shown below:

DEPENDENT VARIABLE: GDPGROWTH	**Extra Regression**
C	**-0.065029**
	(1.080262)
D(GFCF)	**0.720530*** **
	(0.217283)
DIFF-EXRATE	**-0.021755**
	(0.269817)
DOLL-DUM	**1.860813**
	(2.769070)
FDI	**-0.134454**
	(0.252405)
DIFF-REMIT	**0.007213**
	(0.181668)
AR(1)	**0.809969*** **
	(0.149879)
AR(2)	**-0.250264** **
	(0.120070)
SIGMASQ	**5.223614*** **
	(1.079902)
R^2	**0.628954**
Adjusted R^2	**0.539004**
N	**42**
Durbin-Watson	**2.036559**
AIC	**4.935675**
Schwarz Crit	**4.935675**

Again, the model above only exists so that the GFCF variable can be acknowledged, and it both has a multicollinearity problem with the constant which cannot be solved by taking out other variables, and it also does not show significance on any other important variables. Now, it seems there was an unidentified unit root problem with it, but in total, it is not a variable that is useful in these regressions.

So, in the interpretation section, only the main descriptive statistics table is necessary to analyze.

3.2 Interpret the results of your regression in an economic context.

The results of the models tell us a few main points. To begin, the regressions show that there is significance in a wide variety of variables. Here is an analysis of the variables that were found to be statistically significant in at least one regression:

Openness of the Economy (First Diff): Economic openness is a vital part of any small country finding a way ahead when it does not have the ability to provide for itself. Through its trading partners not only in Central and South America, but also with the help of Mexico and the United States, El Salvador has been able to achieve better openness and is able to trade for goods to support its citizens. However, problems remain, as poverty in El Salvador is still widespread.

Inflation: Inflation has endured some very large changes since 1970, with massive spikes and falls felt, especially before 2001. However, as a graph latter in this document shows, after dollarization in 2001, the inflation rate became more stable. So, inflation changes have definitely impacted the ability for the GDP to be much less volatile and much more stable.

Claims in the Nonfinancial Private Sector / GDP: This statistic represents a very positive shift toward financial development in El Salvador. With positive growth being found in this financial development indicator, it seems that companies in El Salvador are wanting to increase their investments.

Government Expenditure: The government of El Salvador, while not as powerful as most, is still able to use money when needed through the Central Bank of El Salvador. However, this has only a small amount of significance overall, as El Salvador relies on the U.S. for its currency.

Exports (First Differences): Exports showed the most significant effect in terms of the regression 4. From this, it can be inferred that exports, along with dollarization, inflation rate stability, and more have bolstered the Salvadoran economy’s ability to respond to drastic shifts in the modern era.

War Dummy Variable: The variable, which was used to represent the Salvadorian Civil War in the 1980’s showed very strong, three-star significance on a number of regressions I ran. This told me that the war did indeed have a direct effect on El Salvador’s economy, and stifled its growth, as I could see upon graphing the GDP level.

Dollarization Dummy Variable: On the fourth regression, this variable showed three stars of significance, meaning that dollarization had a very strong impact on the GDP growth of El Salvador after 2001. This means that dollarization is at least a very essential part of understanding Salvadorian economic movements in the time periods explored.

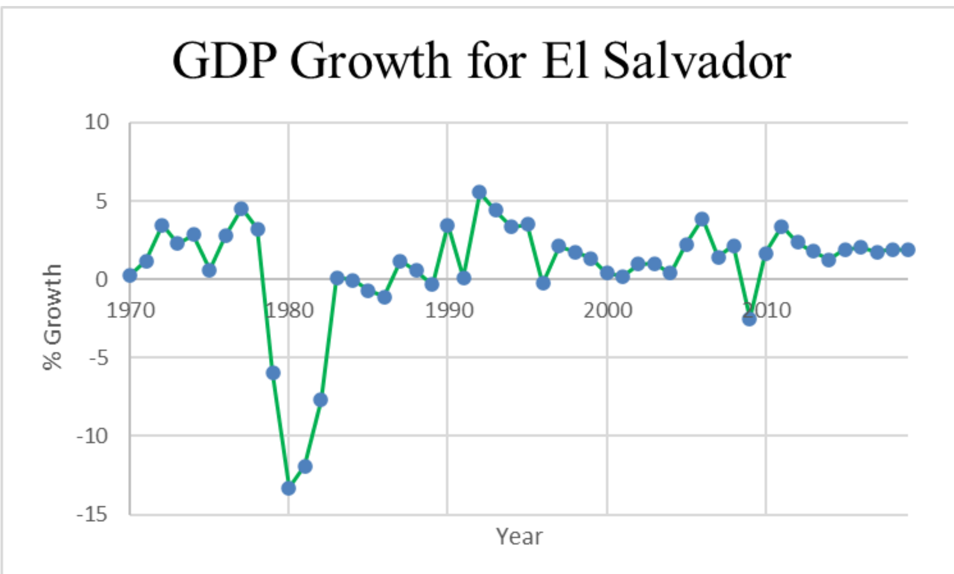
Gross Capital Fixed Formation (Diff): As stated, this variable had a severe multicollinearity problem that was not able to be fixed through variable elimination, deletion of observations, or any typical means. However, applying first differences to it alongside remittances, real exchange rate, and a few others, some significance was found. However, this variable should not bused in any true-form interpretations.

Variables that I was surprised were not statistically Significant:

Personally, I was very surprised that remittances was not significant, nor was the dummy variable for the 2008 recession. As many workers have left El Salvador to work in wealthier countries, I believe they were sending money back home to their families. However, I now suspect that those leaving El Salvador want to leave for good and many times they bring their families with them. So, in the end, it does make more sense. However, I still suspected the 2008 recession to have a significant impact on the data.

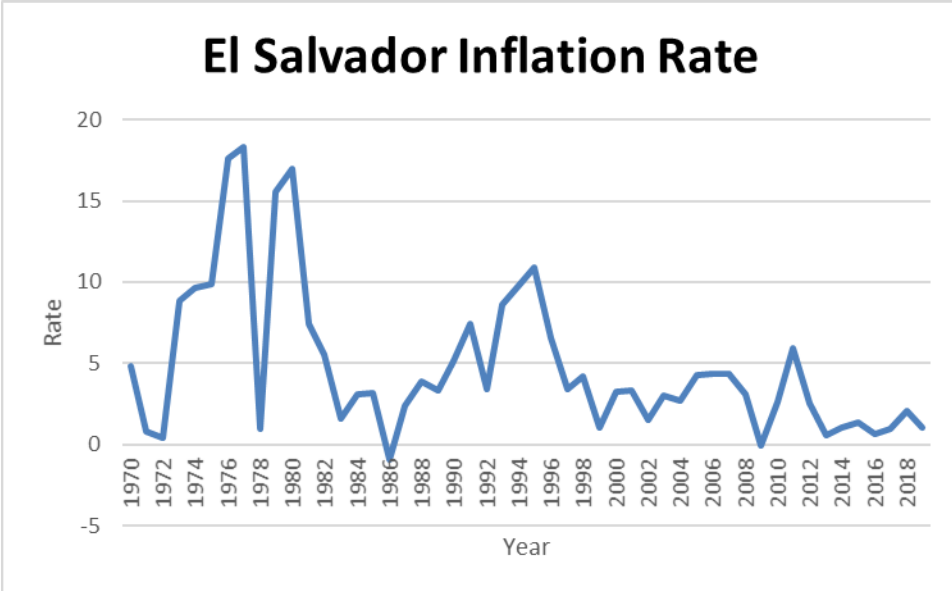
Main Conclusions:

In total, my regressions show the story of a small country that is grappling with many economic problems, but is still working to rectify those problems through financial development, better trade policy, and more involvement of the government within the economy. In total, El Salvador's economy can grow much stronger if it continues to rely on the U.S. Dollar while also diversifying its economic sectors and strengthening its most important industries.



3.3 Has dollarization been helpful to the country?

As seen by Model 4, highlighted in green, dollarization seems to have had a positive impact on the country. In fact, perhaps its greatest impact has been felt in reducing volatility within inflation rates. A graph of inflation rates corresponding to the regressions is shown below:



As seen, the period before 2001 saw many violent rises in the rate of inflation. While there are other rises after dollarization in 2001, the rate is much more stable today. This is extremely important in understanding how the economy of El Salvador is responding positively to dollarization in general. The Model 4 regression highlighted in green shows that dollarization corresponded to a variety of other positive shifts as well, from government expenditure, to the inflation rate, to even exports. Having the U.S. Dollar as its currency has given the change for El Salvador to tackle the most pressing issues facing its citizens instead of running around chasing interest and inflation rates.

So, while Dollarization has taken central control of El Salvador's currency, it has helped the country in freeing up its economic resources. Today, El Salvador can grow its economy without needing to worry about any sort of currency crises like Zimbabwe or Venezuela have gone through.

Yet, the largest way in which dollarization has helped El Salvador is in recovering from years of war, political strife, and economic devastation. Having the U.S. as a stronger economic ally and having the ability to be confident that the currency will not suddenly lose value. In total, this has shown that dollarization has indeed helped El Salvador.

3.4 Is dollarization sustainable? (Hint: look at sources of dollars' entrance to the economy)

For most countries in the world, utilizing the currency of another country can lead to high volatility that the domestic nation does not have control over. Specifically, using another country's currency opens up a great deal of new risks for the nation that adopts such a currency.

However, El Salvador represents a much different idea. It is a small nation located just a short trip south of the United States, but more importantly, its economy is not strong enough to manage a vibrant currency on its own. With so many other issues from crime, to political turmoil, to mass outward emigration, to the lack of a strong labor sector, El Salvador simply has too much on its plate to worry about sustainability or switching off the U.S. Dollar.

The being said, dollarization is very sustainable in its current state in El Salvador. It allows Salvadorans to be confident that their money will not lose value for reasons associated with El Salvador itself. Additionally, considered that so many national currencies are already pegged to the U.S. Dollar, and the U.S. Dollar is already used as the central method of foreign exchange, dollarization is an extremely important tool that El Salvador has taken advantage of.

The entrance of the U.S. Dollar into El Salvador's economy is marked by the relationship between the U.S. Federal Reserve and the Central Bank of El Salvador. While the Bank may seem less important under dollarization, it does play a vital role in ensuring that there is enough money supply from the United States in the economy at all times. Some experts point out that this is unsustainable because it is relying the bank of another country to acquire money supply, instead of being independent.

However, I believe for El Salvador's small geographic size and lack of robust financial resources, dollarization is the most sustainable and stable economic tool that is currently available to it.

3.5 Would it be a good idea to change currencies? What would you suggest the country does in this respect?

At this time, it would not be a good idea for El Salvador to change currencies. This is simply a matter of not knowing what the future holds. At least in the present moment, El Salvador can look to the United States to know how well its currency will hold up. So, it does not need to worry about printing more currency or trying to respond to inflation rate fluctuations. While the U.S. Dollar is not perfect, it is stable. Just a short plane ride away from El Salvador lies Venezuela, a nation defined by volatile currency movements. As Venezuela's currency depreciated, and inflation spiked, the cost of food became too much for normal family to bear. El Salvador should do everything in its power to avoid such a tragic fate. That starts with keeping the U.S. Dollar as the central currency for as long as possible unless a better alternative appears.

As stated, the inflation rate of El Salvador before dollarization was extremely volatile. A graph of those fluctuations is shown in question 3.3 above.

This small Central American country should do everything its power from repeating that volatility. So, if I were in charge of El Salvador's economy, I would suggest the following:

1. Hold onto the U.S. Currency for as long as possible unless a better alternative is found.
2. Implore the U.S. Federal Reserve to offer better hands-on direction about what do when inflation rates become volatile.
3. Focus on building up its main industries such as manufacturing and tourism, but also diversify its economy to better strengthen it.
4. Put political pressure on government to end violence in the country.
5. Give citizens of the country a reason to stay and not to emigrate out of it (migration out of El Salvador and to the United States is very common right now).