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Intermediate Macroeconomics
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Brazil and Venezuela: Long-run effects of TFP-enhancing early industrialization and interventionist government policy

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Section 1: Introduction

Over the past century, economic power, growth, and stability amongst countries in Latin America has fluctuated in response to dramatic changes in institutions and long-term investments by the bodies in charge of these institutions. Among these countries, Brazil and Venezuela are two worthy of comparison due to a breadth of similarities.

Both Venezuela and Brazil uncovered access to plentiful natural resources, particularly in lucrative petroleum markets, as well as experienced political coups that ushered in military dictatorships and stalled the movement towards local democratic institutions. Moreover, both countries faced the challenge of countering inflation and economic stagnation with the crash of oil prices in the 1980's. Starting from the year 1950, where this analysis will base itself from, towards 2014, many changes occurred at the highest levels of these countries' administration that steered them towards different paths. At the break of the 1950's, Venezuela was posited to become the economic stronghold in Latin America, as the fourth largest wealthiest nation per capita. However, throughout the turn of the 20th century, it was Brazil that underwent a more dominant growth miracle and Venezuela that precipitated into economic stagnation. Today, Brazil assumes economic hegemony over Latin America as the region's largest economy and democracy, while Venezuela suffers devastating levels of inflation (exceeding 400%) and a shrinking economy under a populist regime.

To facilitate the analysis of long-term growth, this paper divides the study into four distinct time periods, each categorized due to notable economic developments that occurred

during the period that pushed towards the divergence of Brazil and Venezuela. The first two decades following 1950 are emphasized since this period lays the groundwork for the future Brazilian growth miracle that amplifies the degree of separation of growth between the Brazilian and Venezuelan economies.

Moreover, the effects of fluctuations within the oil industry in both countries, particularly with the 1980's crash in oil prices, is inspected upon. Comparisons between the development of corresponding petroleum industries is used for this. Evolution of the composition and numbers of the labor force and population in these countries is considered, as a means to incorporate per labor and per capita terms into the investigation. Careful growth accounting with the Cobb-Douglas production function and the Penn World Table data set is used to base all analyses. The effects of democratic institutions versus populist regimes or dictatorships is not particularly emphasized in this paper, nor are the effects of geography.

This paper will attempt to uncover the reasons of why Brazil and Venezuela's economic trajectories diverged so radically. The main thesis that will be explored is the notion that Brazil surpassed Venezuela in economic growth since Brazil exploited the benefits of Total Factor of Productivity (TFP) amplification through early industrialization to push its GDP into sustainable long-run expansion that was later sustained with responsive inflation policy at the hands of active interventionist institutions.

Section 2: Growth Accounting Data

As a basis for this paper, growth accounting was performed with data for Brazil and Venezuela from the Penn World Table. For total output measures, Real GDP at constant national prices (in mil. 2011US$) was used. For expansion of output into variables, Cobb-Douglas production function was assumed in the following form:

$$Y_t = A_t K_t^\alpha (H_t L_t)^{1-\alpha}$$

For the year 1950 to 2014, the Penn World Table offered real values for output Y_t, capital K_t, human capital H_t and labor $L_{t,}$, but not Total Factor of Productivity (TFP), which is captured by the A_t variable. In order to calculate TFP, the Cobb-Douglas production function was expanded with discrete time approximation in the following form:

$$\frac{Y_{t+1}-Y_t}{Y_t}=\frac{A_{t+1}-A_t}{A_t} +\alpha \frac{K_{t+1}-K_t}{K_t} + (1-\alpha)(\frac{L_{t+1}-L_t}{L_t} + \frac{H_{t+1}-H_t}{H_t})$$

Taking time derivatives to yield a growth rate model,

$$g_y = g_A + \alpha g_K + (1-\alpha)(g_L + g_H)$$

And solving for TFP growth g_A, yielded:

$$g_A = g_Y - \alpha g_K - (1-\alpha)(g_H + g_L)$$

A contributing factor of capital towards output when compared to labor of $\alpha = 1/3$ was assumed to initially obtain TFP values.

To start the mechanical analysis of data, graphs of the data points offered by the Penn World Table were graphed for inspection. To pair the numbers and curves with historical economic developments, I then reviewed the literature of the political economy of both Brazil

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and Venezuela. Next, this knowledge was used to divide the analysis of data into four distinct time periods.

I identified the first timeslot as a period of salutary dictatorships, reaching from 1950 to early 1960s. During this time, President Vargas of Brazil set the stage for rapid industrialization of Brazil, while Venezuela saw noted levels of high GDP growth under the policies of Pérez Jiménez. Afterwards, I delineate the period of 1962 to around 1980 as time in which there occurs a "Brazilian Growth Miracle" and Venezuela experiences higher output levels amidst generous social spending by the government. These levels of growth are ended by the collapse of oil prices in the 1980's as both countries differentiate themselves before the challenge of inflation and economic stagnation. Finally, the most recent period is identified from 1992 to 2010 in which Brazil emerges as a prominent world leader under President Lula while Venezuela struggles to achieve growth in its petroleum-dependent government with Hugo Chavez.

With these time periods identified, I then proceed to tabulate growth accounting data for both countries. All the data points were obtained from the Penn World Table, but the assumption of $\alpha = 1/3$ was not used for all years for the sake of precision. Instead, the labor share value approximation provided by the Penn World table, and by conversion, capital share value, was used. For Brazil, the alpha value remains fairly constant throughout most of the 50-year period beginning from 1950, staying at 0.486. From 1993 onwards, the value fluctuates considerably, eventually lowering to around 0.442. For Venezuela, the alpha value exhibits a similar trend, staying at 0.577 for the most part of the 50-year period, but instead rises through oscillations to reach 0.598 towards the end of the overall analyzed time periods. Putting it altogether and

calculating contributions in labor, human capital, TFP as well as percentage growth in multiple economic indicators, I obtain the following table.

Table 1: Sources of Growth in Brazil and Venezuela by Time Period

Year Range	Time Period	Country	GDP Growth (%)	Capital Growth (%)	Output/Labor Growth (%)	Capital/Labor Growth (%)	Population in Workforce (%)	Contribution to GDP Growth			
								Labor	Human Capital	Capital	TFP
1950-1961	Salutary Dictatorships	BRZ	7.52	2.54	4.55	-0.29	36.52	0.0144	0.00367	0.012	6.26
		VEN	6.44	7.73	3.04	4.28	29.84	0.0137	0.00241	0.043	1.96
1961-1980	Growth Miracle Oil Expansion	BRZ	7.45	2.54	4.07	3.34	38.12	-0.0167	-0.00140	-0.033	6.20
		VEN	5.53	6.39	2.01	2.82	28.01	-0.0145	-0.00701	-0.037	1.84
1980-1993	Collapse of oil Stagflation	BRZ	2.23	3.91	-0.29	1.35	44.58	0.0141	0.00757	0.017	0.26
		VEN	1.54	1.98	-1.91	-1.43	31.16	0.0142	0.00234	-0.037	0.38
1993-2014	Lula and Chavez	BRZ	2.23	2.93	1.38	1.10	47.23	0.0104	0.01121	0.010	0.91
		VEN	2.17	1.98	-0.77	-0.83	35.94	0.0112	0.00669	0.011	0.98

Figure 1: Log GDP per capital of Brazil and Venezuela
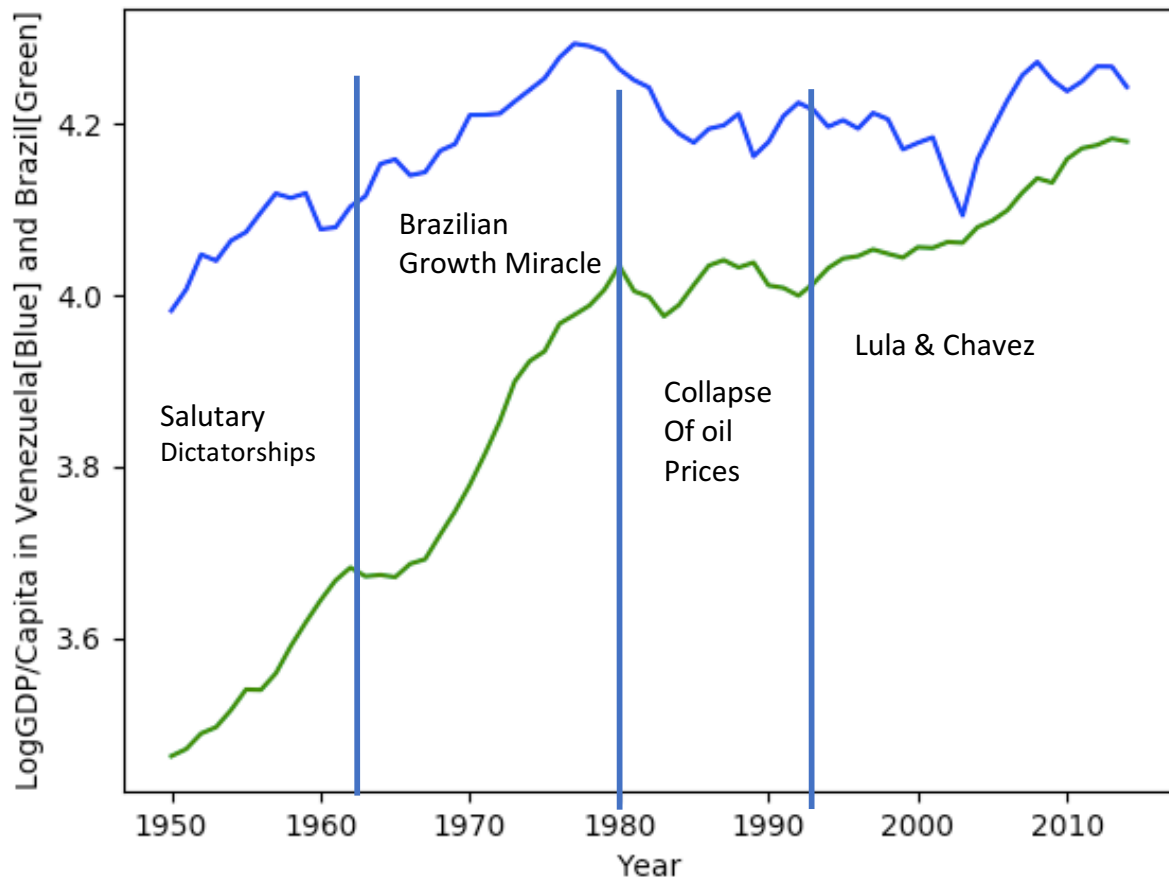
Data obtained from Penn World Table

At first glance of Figure 1, which displays output per capita in log form for both countries, Brazil always seems to have an increasing upward trend. Venezuela, on the other hand, experiences inconsistent low magnitude growth. Starting from 1950, log GDP per capita growth is somewhat parallel among both countries. However, once the 1960's arrive, this trend is broken as Brazilian output catapults into high growth levels, overtaking Venezuela's highest growth rate period considerably. Measures of capital stock demonstrate a similar trend, pointing towards a divergence that occurred near the end of the 1960's. Even the total Brazilian labor force experiences a spike in growth close to 1970, insinuating that magnifying the context of this

period could be valuable in determining the cause of Brazil and Venezuela's divergence in overall economic character.

Per Labor and Per Capita Terms

Before we dive into the circumstances surrounding the deviation of the Brazilian and Venezuelan economies that began in 1970, it is worth noting a valuable difference between Venezuela and Brazil, which is their difference in population and by conversion, labor participation. If not taken into consideration, this could lead towards biases in data observation. Thus, I calculated and graphed output and capital in per labor terms, as well as yielded GDP per capita.
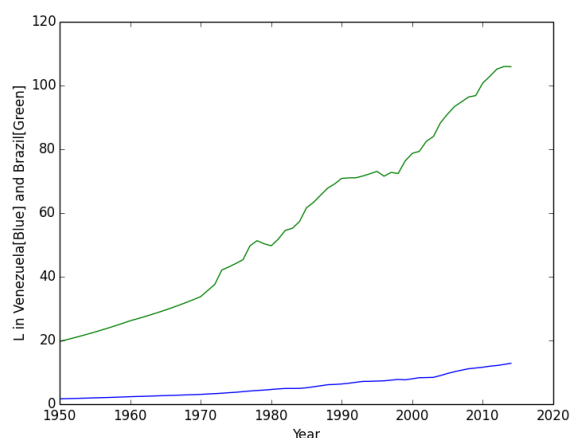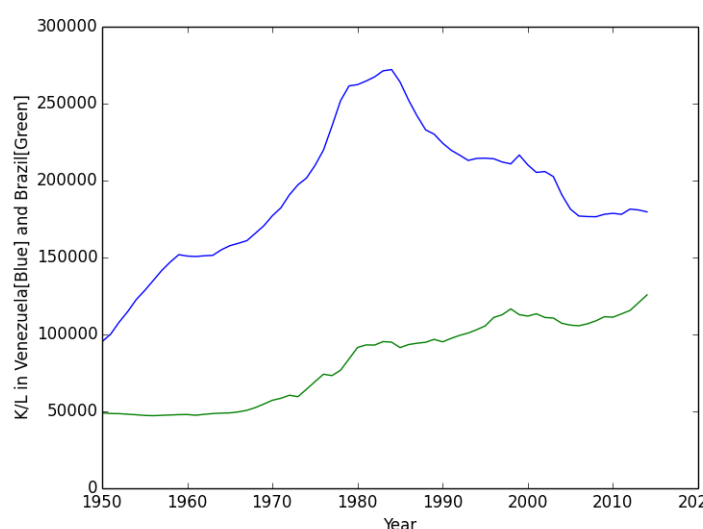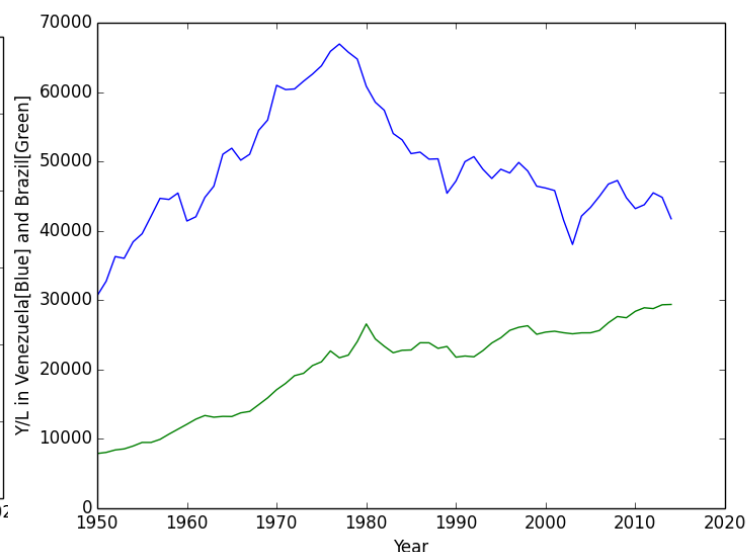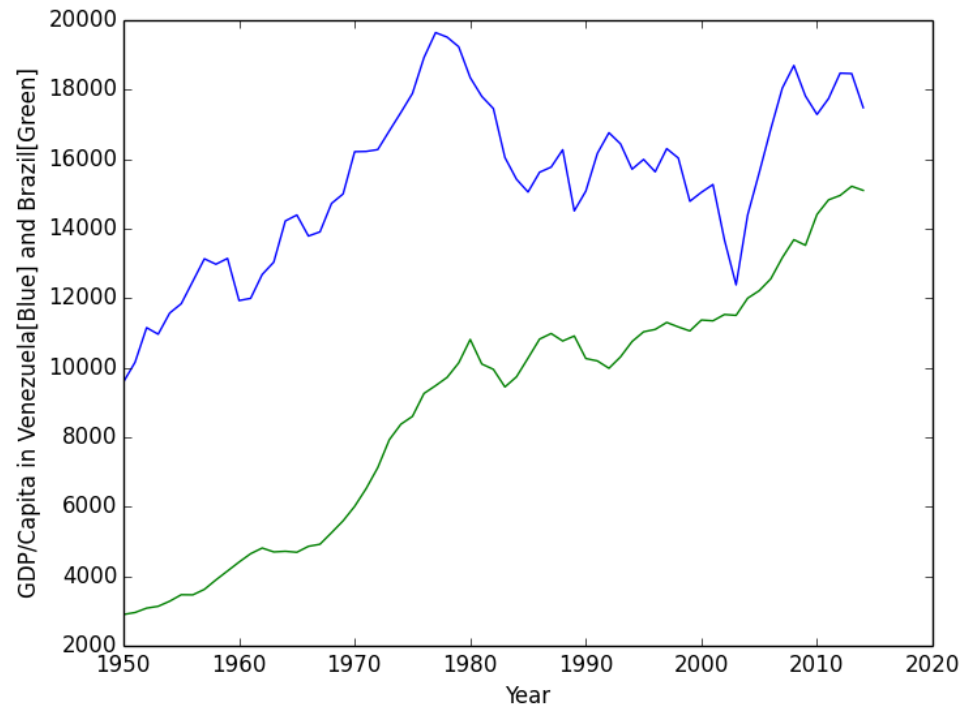
Figure 2: Labor force

Figure 3: Capital per labor

Figure 4: Output per labor

Source: Penn World Table

Figure 5: GDP per capita

After factoring in per labor terms, interestingly enough, Venezuelan curves are now always above the Brazilian ones in output per labor, capital per labor, and GDP per capita. Brazil has a much larger population and total labor force than Venezuela, so this make intuitive sense since when dividing by a large denominator will lower the overall magnitude of output or capital when compared to output or capital per labor/per capita. These curves, however, seem to be converging; if they continue at their current trends, Brazil is slated to succeed Venezuela in both capital and output and in total and per labor/per capita terms. This could mean that productivity for every unit of output, labor and capital productivity is increasing in Brazil at a higher rate than Venezuela.

Nonetheless, it is still true that Brazil's growth in output and capital stock has been, for the most part, strictly increasing in all graphical analyses when compared to Venezuela's respective data measures. In all presented figures, especially in absolute capital and output

measures, the data points towards a phenomenon close to the 1970 that contributed towards the

divergence of the economies. But which specific economic factors fueled such a change? I begin

analysis in the years of 1950-1961.

Figure 6: Absolute output levels in Brazil and Venezuela
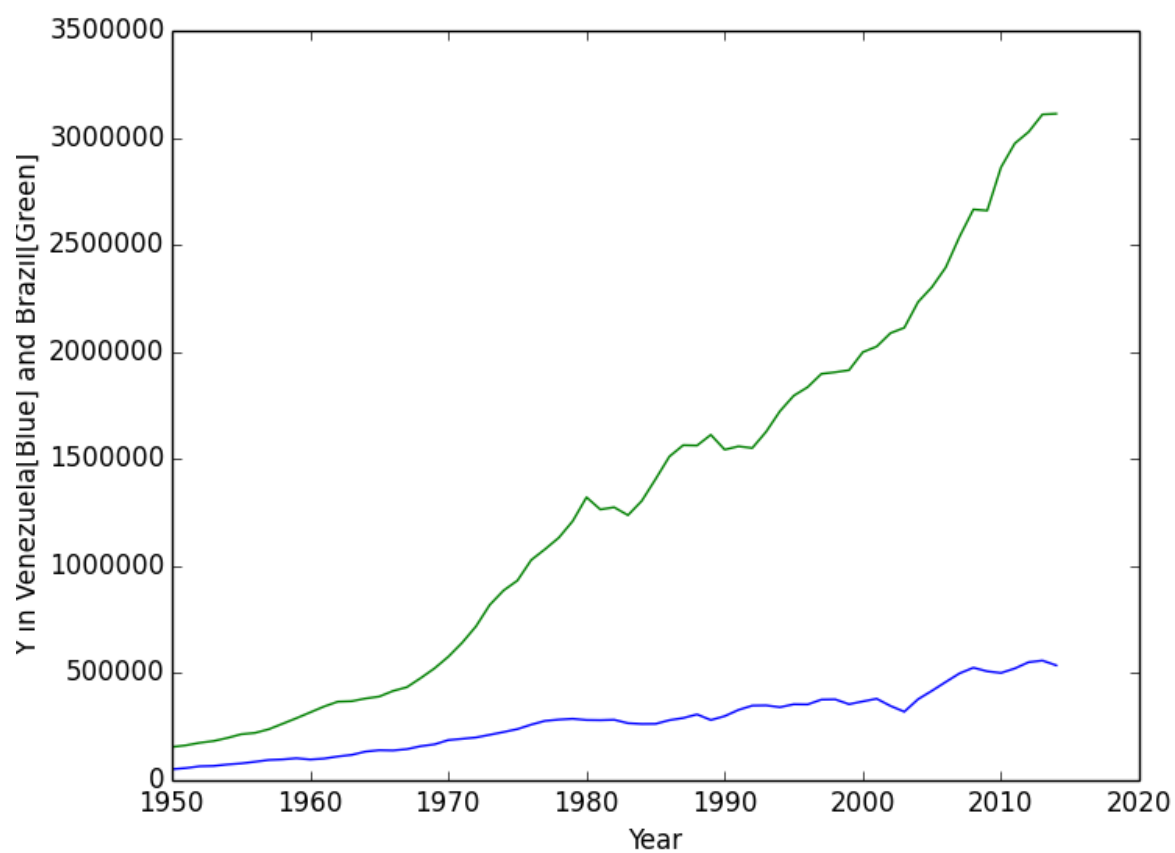
Brazilian and Venezuelan economy through the years of salutary dictatorship (1950-1961)

Venezuela

With a cursory analysis into the specific output data presented in Table 1, one can see that the highest levels of output GDP growth for both Venezuela and Brazil occur during the period of 1950 to 1980. The highest magnitude of growth, however, is placed during the formative years of 1950 to 1961. In this eleven year period, Brazil experiences a 7.52 percent growth in GDP, while Venezuela undergoes a growth of 6.44 percent. Factoring in per labor terms, output per labor in both Brazil and Venezuela also grew at high levels, reaching 4.55 percent and 3.04 percent, respectively. After these years, GDP growth decelerates in both countries to varying degrees. To explain such a boon, I explore the political contexts of both countries and relate the growth accounting data.

In the year 1914, the first oil reserve of importance in the long petro history of Venezuela was discovered (Martínez 1969). Afterwards, additional oil reserves were discovered in multiples areas of the northern South American country, accelerating the development of this resource as an export good in Venezuela, with a noticeable stall during World War I due to difficulties in the purchasing of machinery and tools for the refinery process. However, after 1919, the industry took off, taking advantage of foreign investment into the trade and increased flexibility in the importation of productivity enhancing technical assets and machinery. The government generated income from the oil industry mostly in the form of revenue taxes and the continuous streams of income derived from selling rights or concessions from private companies

that pushed into the burgeoning Venezuela oil industry. (Bello, Blyde, Restuccia 2011) Foreign investment increased especially since the government used the capital generated by the trade to pay off foreign debt, promoting the Venezuelan economy's attractiveness. Capital accumulation accelerated and a process of introduction into international markets ensued. The Venezuelan economy matured and strengthened itself under the auspices of an export-based economy. (Tarver, Frederick 2006)

Propelled by years of renewed growth with the petroleum trade, in 1950, the Venezuelan economy was the world's wealthiest nation per capita. By comparison, Brazil ranked 30 in such a scale (Nation Master Database). During this decade, President Marcos Pérez Jiménez enacted various policies that promoted a diversity of projects investing in the infrastructure of the country in projects such as roads, highways, seaports, construction, tram systems, public housing, and government office buildings. Development of electrical power infrastructure was especially vital in the growth of the Venezuela manufacturing industry. The military government invested heavily into the construction of electrical power plants to such a scale that Venezuela transitioned from being among the South American countries with the lowest capacity of electrical generation to being the second highest in 1959 (Bello, Blyde, Restuccia 2011).

These investments in infrastructure as an output augmenting measure are captured by a high level of Total Factor of Productivity as a component of GDP growth in Table 1. A high degree of industrialization took place in Venezuela during this period, buoyed by confidence in oil markets. The degree of industrialization, with the general working population moving away

from agriculture related occupations towards manufacturing, is well-presented in Table 2. From 1950 to 1957, the growth of manufacturing output in Venezuela essentially tripled from its given measure of 538 in 1950 to 1446 in 1957 (Salazar-Carrillo 1976).

Table 2 *Growth of Manufacturing Output in Venezuela, 1948–1957*

Year	Output
1948	350
1949	413
1950	538
1951	650
1952	716
1953	880
1954	1000
1955	1165
1956	1273
1957	1446

Source: Salazar-Carrillo (1976), p. 119.

Note: The index is based on 1938 equaling 100.

Brazil

During the period of 1950 to 1961, the Brazilian economy exhibited certain similarities to the Venezuelan economy. Most apparently, both countries had an authoritarian government invested in expanding the local economy through rapid industrialization. Nevertheless, the unique actions that the Brazilian government took during this period that the Venezuelan government did not reproduce set the stage to Brazil's subsequent growth miracle and the ever-accruing divide in growth measures that set the countries apart in the long run.

In the first few years following 1950, President Getúlio Vargas announced that his administration would push towards an ambitious plan of industrialization paired with nationalization of Brazil's natural resources. In fact, in 1953, the Brazilian state-controlled oil

and gas company known as *Petrobras* was founded, effectively allocating the government a monopoly on oil and gas exploration as well as their respective production activities. (Palazzo Almada, Parente 2013). It was not until almost two decades later in which Venezuela did the same.

Brazil's earlier industrialization supported by its institutions is important to note because of its role in enhancing economic growth. Industrialization incentivizes adoption and innovation of technological resources that, in turn, increase the productivity of labor and capital, allowing more units of output to be produced from the same amount of input capital or labor. This is captured by an increase in the Total Factor of Productivity (TFP) A_t term in Cobb-Douglas production function of $Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}$. TFP contribution to GDP for Brazil in highest in this time period and is the highest level observed in Table 1, which correlates with enacted industrialization policies.

With the nationalization of the oil and gas industry, many Brazilian states with oil reserves in whole benefitted from additional income from royalties. Federal Law of Brazil n. 2,004/1953 stipulated that 5 percent of the revenue from onshore oil production was to be distributed to states (80 percent) and municipalities (20 percent) in the form of royalties, an equitable allocation of wealth to a certain degree (Cavalcanti, Mata, Toscani 2016). This law is relevant to my analysis because it adds another dimension to the importance of the role of institutions in promoting nationwide economic growth. The law expanded distribution channels of wealth, allowing more groups to benefit from petroleum production sales. In the representative states of Sergipe, Rio de Janeiro, and Bahia, for example, GDP per capita

increased for oil producing municipalities within them, as opposed to the counterfactual of non-

oil producing municipalities during the range of 1950 to 1960.

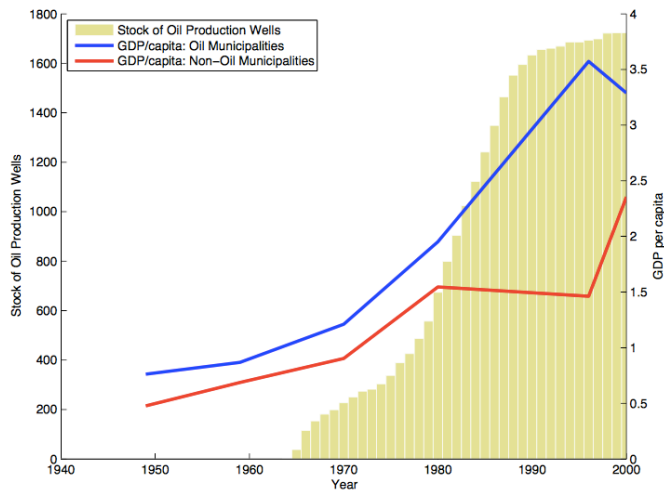Fig. 7 GDP *per capita* in Sergipe: 1940-2000

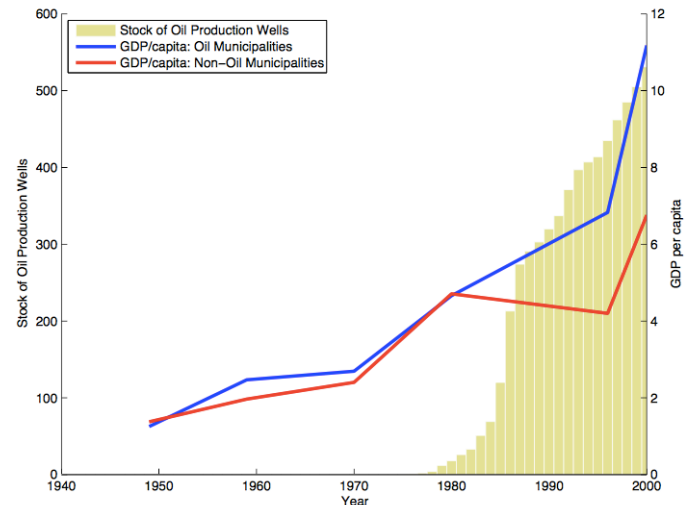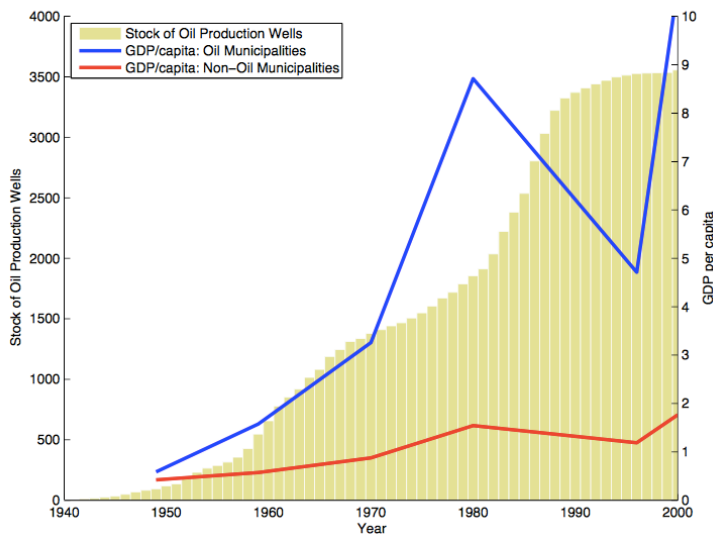Fig. 8 : GDP *per capita* in Rio de Janeiro: 1940-2000

Fig. 9 GDP *per capita* in Bahia: 1940-2000

Notes:
Source: Cavalcanti, Mata, Toscani (2014)

Figures shows the development of per capita GDP in municipalities which discovered oil and those which did not discover oil. Rio is the major oil producer in Brazil (mainly offshore production) and the first oil discovery took place in the late 1970's. Sergipe is an important onshore producer and the first oil discovery took place in the mid 1960's . The first commercial oil well was discovered in Bahia in 1941.

Moreover, once President Juscelino Kubitschek assumed power in 1956, the Brazilian government sizably invested in the diversification of the Brazilian economy along with closer integration of the Brazilian territorial mass. Like in Venezuela, during this decade, electrical power station construction was a large focus. For this, Brazil took advantage of natural resources to promote the construction of hydro-electric plants. The automotive, steel, cement, aluminum, heavy machinery, and chemical industries also experienced large expansions that contributed to an overall industrialization of Brazil. Relating to the consumer level, the Kubitschek administration pushed towards the production and fostering of demand for durables, such as air conditioners, refrigerators and cars. Demand share of non-durables, such as textiles decreased as a result (Baer 2008).

Table 3: Growth Accounting for 1950-1961

Year Range	Time Period	Country	GDP Growth (%)	Capital Growth (%)	Output/Labor Growth (%)	Capital/Labor Growth (%)	Population in Workforce (%)	Contribution to GDP Growth			
								Labor	Human Capital	Capital	TFP
1950-1961	Salutary Dictatorships	BRZ	7.52	2.54	4.55	-0.29	36.52	0.0144	0.00367	0.012	6.26
		VEN	6.44	7.73	3.04	4.28	29.84	0.0137	0.00241	0.043	1.96

Referring to the growth accounting data for Brazil during this timeframe, we can therefore see that such levels of growth agree well with the relatively high Total Factor of Productivity contribution to GDP growth share of 6.26. Technology in Brazil, through the diversified channels of industrialization beyond the nationalization of the oil industry, propelled the Brazilian economy to high levels of far-reaching growth. Such diversification laid the groundwork for protection of the Brazilian economy from shocks such as crashes in the petroleum industry that later test overall market rigidities. By comparison, The Venezuelan economy certainly industrializes and benefits from a relatively high level of Total Factor of Productivity magnified by this process, but lacks in diversification. More precisely, some

scholars argue that Venezuela's government suffers from myopic views towards the petroleum

market and fails to make the policy-making and regulation efforts that Brazil conducts that

contribute towards diversification and future returns. "We find that policy distortions can

explain most of the collapse in productivity and capital accumulation observed in Venezuela

after the late 1950s." (Bello, Blyde, Restuccia 2011)

1961-1980: Brazilian Growth Miracle, Venezuelan Oil-Buoyed Expansion

After a period of rapid industrialization, both Venezuela and Brazil advanced towards

high levels of output and capital stock in their economies. By this paper's findings, the growth

experienced during this two decade long period of time is a reaping of the benefits sowed during

each country's efforts of economic development during the period of 1950-1961. A clear

divergence between the Venezuelan and Brazilian economies becomes more apparent as

mechanical variables of economic growth representing these changes, especially during

augmentation of analysis to the year 1970. This phenomenon is vividly illustrated in Figure 10.1

and 10.2. Especially in figure 10.1, both Brazil and Venezuela seem to be extending along

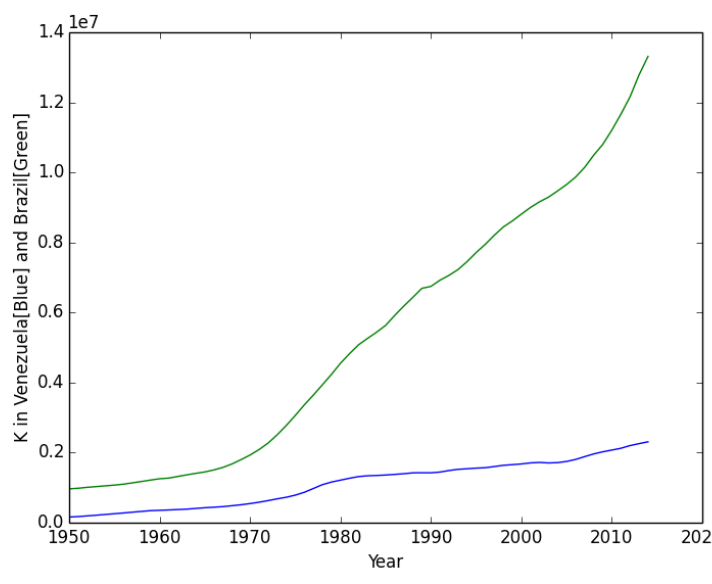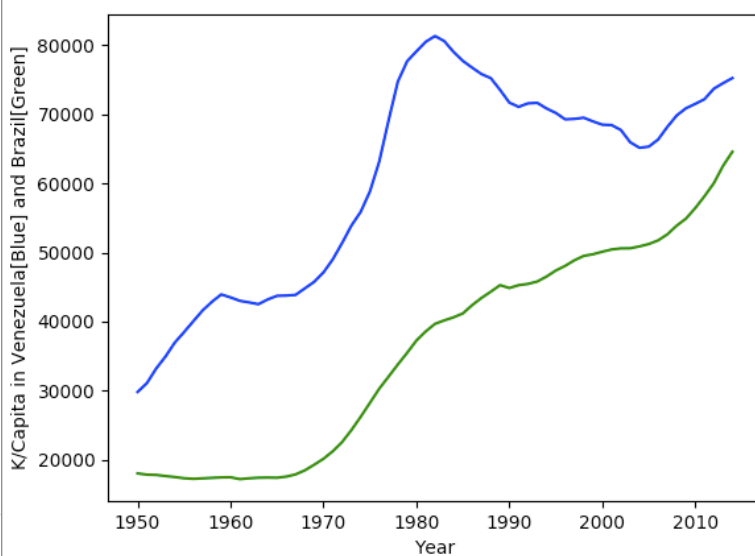**Fig. 10.1: Capital in Brazil and Venezuela**

Fig. 10.2: Capital per Capita in Brazil and Venezuela

parallel paths of absolute capital growth from the year 1950 to 1970. In the year 1970, Brazil's capital growth accelerates at a higher speed than that of Venezuela and continues in this rate throughout the following set of decades. A spike in growth is also seen with capital per capita in Figure 10.2, in which both countries' growth slumps a bit, but then picks up considerably towards 1980.

Fig. 11:

· Brazil: Rural and urban population, 1940/2000.
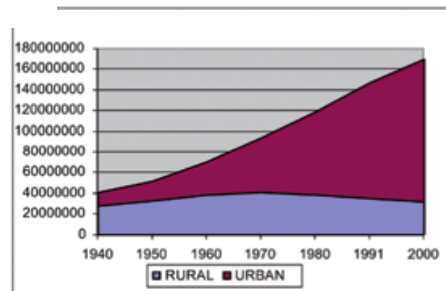
Source: IBGE, Demographic Censuses of 1940, 1950, 1960, 1970, 1980, 1991 and 2000.

Source: Brito 2006

To explain this shift in data, we can first deconstruct the economic context of this period. In Brazil, there occurred a powerful change in the urbanization levels of the population. As cities became more industrialized, offering the commodities of durable goods that were driving economic growth, they became more attractive for prospective migrants. In turn, an influx of people moving towards the cities pushed towards higher levels of the ratio between the employed population and the general population. As demonstrated in the growth accounting of population in the workforce in Table 1, between the period of 1950-1961 and the second period of 1961-1980, the percentage of population in the workforce for Brazil increased from 36.52 percent to 38.12 percent. The same cannot be said of Venezuela, of which its respective ratios of working population fell from 29.84 to 28.01.

Table 1 Reproduced

Year Range	Time Period	Country	GDP Growth (%)	Capital Growth (%)	Output/Labor Growth (%)	Capital/Labor Growth (%)	Population in Workforce (%)	Contribution to GDP Growth			
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1950-1961	Salutary Dictatorships	BRZ	7.52	2.54	4.55	-0.29	36.52	0.0144	0.00367	0.012	6.26
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1993-2014	Lula and Chavez	BRZ	2.23	2.93	1.38	1.10	47.23	0.0104	0.01121	0.010	0.91
		VEN	2.17	1.98	-0.77	-0.83	35.94	0.0112	0.00669	0.011	0.98

Throughout these years, the Brazilian and Venezuelan economies went through additional stages of diversification. In Brazil, additional investment flowed into infrastructure projects to spur growth. To diversify its energy supply and by consequence, economic channels of growth and development, Brazilian state-owned organizations also promoted the emergence of the ethanol industry. Brazil was a pioneer in this regard and its development in the ethanol industry,shielded its energy demands from complete reliance in petroleum, leading from a supportive ethanol policy environment in the government (USDA 2011). The Brazilian government even explored the usage of nuclear power in the country by opposing the Non-Proliferation Treaty and having its National Nuclear Energy Commission (*Comisão Nacional de Energia Nuclear / CNEN)*, signing contracts with other countries for the purchase and supply of nuclear power plants (Patti 2012). In synthesis, the Brazilian government played a proactive role in policy making towards the further development and burgeoning of industrialization and economic diversification.

By contrast, growth in Venezuela was hindered by the government's confidence in its oil industry, of which was nationalized in 1974. For example, during this same year the Venezuelan iron ore industry faced competition in the international market, which was pushing towards the lowering of prices to curb supply and demand. "In contrast to Brazil and most other developing

countries, oil-rich Venezuela had no great concern with balance of payment problems. More-over, because Venezuela perceived itself the international leader in the developing countries' drive for higher raw material prices, [it] felt much more constrained than Brazil in reducing its prices." (Vernon 1981). In additional contrast to Brazil, the Venezuelan government and policy-making channels were weak in pushing towards industrial development with institutional devices, such as long-term industrial operational contracts with foreign bodies. For instance, in 1975 the Venezuelan government suddenly decided to void long-term contracts with British and German iron ore customers by stating that prices were too low. This had damaging effects to the credibility of the Venezuelan industrial market. Towards the end of the decade, US Steel refused to follow through with a purchase of iron ore after committing to a long-term contract with Venezuela (Smith 1976). Due to such institutional shortcomings, foreign direct investment overall fell for Venezuela after 1970 and struggled to regain its previous levels towards the end of the decade. Available data for Venezuela from the World Bank for this period demonstrates visible valleys of foreign direct investment as percentage of GDP during this period. Although available data for Brazil begins in 1975, its growth rate is considerably more stable than Venezuela's, insinuating more perceived reliability of the Brazilian market by foreign investors.

**Fig. 12: Foreign Direct Investment, net inflows (% of GDP)**
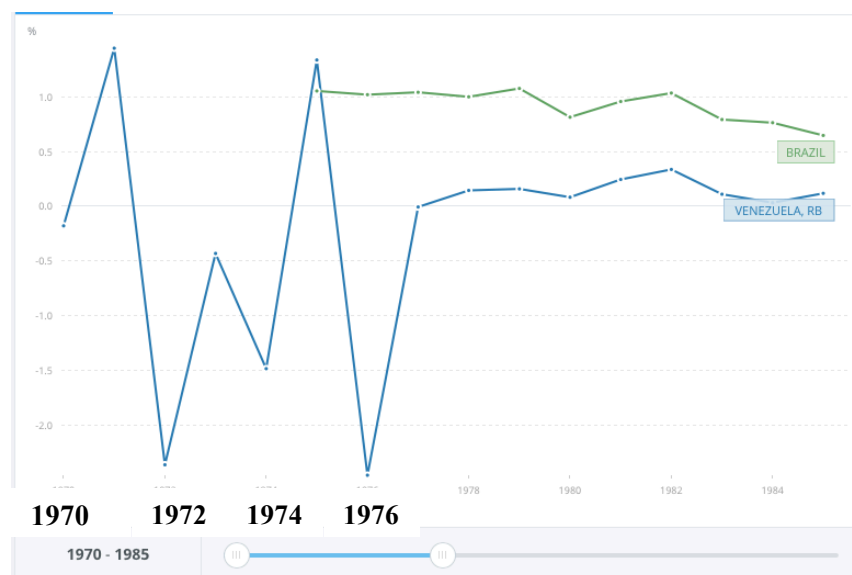
Source: World Bank

1980-1993: Collapse of oil prices, Inflation, and stagnation

With the arrival of the 1980's, oil prices collapsed at an international scale. Due to a combination of factors, including a worldwide increase in borrowing interest rates, inflation played a determining factor in stopping the series of continued growth that was previously experienced by the Venezuelan and Brazilian economies. At this time, Brazil had already gone through considerable development of the diversification of its economy while Venezuela had gone through the same process, albeit at certainly smaller scale. During this period of crisis, it is governmental policies once again that differentiate the outcome and strength between the Brazilian and Venezuelan economies.

Figure 2: Capital per labor (Reproduced):
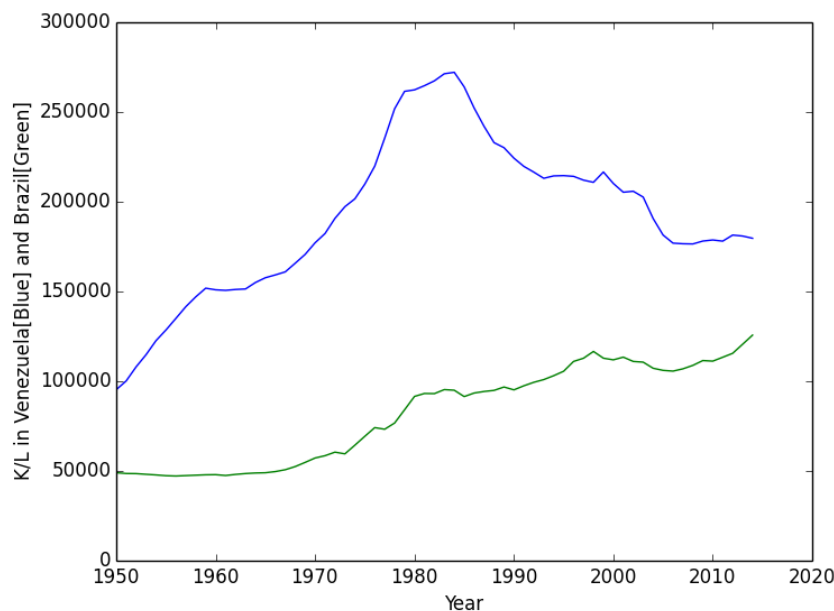
Source: Penn World Table

At a first glance, we can characterize the behavior of the capital per labor representation of the Venezuelan and Brazilian economies, with special notice to the years 1980 to 1993. As Figure 2 shows, during this period, considerable growth of capital per labor in Venezuela is

halted and reversed towards a negative trend. By contrast, in Brazil the capital per labor growth

suffers a weak decrease in expansion, but nonetheless continues in its upwards trend. Therefore,

we can attempt to analyze the policies that shaped the productivity of labor with respect to

capital in response to the economic crisis.

To counter the incoming wave of monetary inflation, the Brazilian government acted

through the implementation of policy measures that attempted to curb inflation through currency

manipulation. With experimental monetary policy, employment rates oscillated in Brazil as

wage-adjustments to the newly adopted currencies became implemented. (Cardoso, Urani, Urani

1995). The effects of inflation were uncertain and many assets were converted from liquid to

illiquid stock (Cardoso, Fishlow 1990). Considering the capital per labor ratio, $\frac{K}{L}$ such changes in

employment and capital stock generally pushed for an increase in the K capital numerator and a

decrease in the L employment denominator, overall making for an increase in the total ratio. The

could explain the upwards leveling of Brazil's capital per labor graph throughout this period, but

the dominant effect however is unclear.

Despite multiple attempts to tackle it, inflation continued to grow at high rates.

Oscillations in the 1985-1987 year frame are visible in Table 4, as well as a spike in real income

from 1986-1987 in Figure 12. It is very important to note the relevance of inflation in influencing

economic growth and stability. Inflation is defined as an increase in overall prices within an

economy. With a rise in prices from one period to another, what one unit of currency can

purchase at the first period is less than that it can purchase in the following period. With

accumulation of inflation over a subset of years, the value of unit of currency can tumble

significantly. Continuous accumulation of the effects of inflation affects the value of money

stored in banks since the cost of not spending increases with inflation, since future assets are

worth less in the future. Inflation can have debilitating effects specifically to investment, which

is directly tied to savings rate. If investment lowers, then long-run growth suffers with the

depreciation of capital and other resources that contribute to output. With expected consistent

inflation, firms in an economy can index their prices to what is expected, but with

unpredictability, inflation poses a larger challenge since firms cannot do the same. Due to these

economic channels of inflation's influence, it is important to analyze how Brazil and

Venezuela's reaction to higher levels of inflation sets these countries apart and leads to the

groundwork of their divergence.

Table 4: Inflation

Table 1.8	Inflation Rates, 1985–87, Selected Latin American Debtor Countries		
	Inflation Rate[a]		
Country	1985	1986	1987[b]
Argentina	385.4	81.9	175.0
Bolivia	8,170.5	66.0	10.5[c]
Brazil	228.0	58.4	366.0
Ecuador	24.4	27.3	30.6
Mexico	63.7	105.7	159.2
Peru	158.3	62.9	114.5
Venezuela	5.7	12.3	36.1

Source: Economic Commission for Latin America and the Caribbean (ECLAC), ''La evolucion economica en America Latina en 1987,'' January 1988.
[a]Consumer Price Index, variations of December over December of previous year.
[b]Preliminary.
[c]November to November.

Source: Sachs 1989

Figure 12: Real income in Brazil from 1982-1991
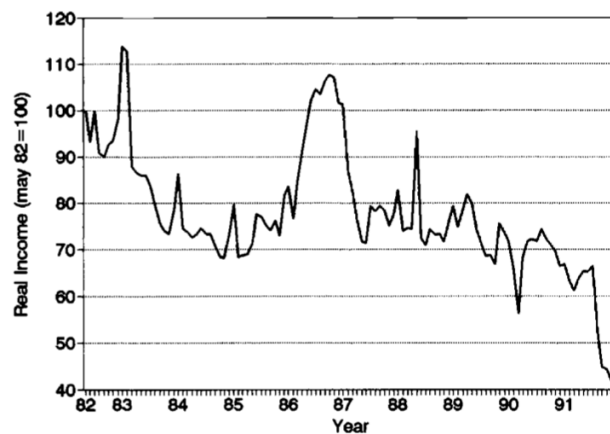

Fig. 5.2   Real income, Brazil, 1982–91
Note: Average for six metropolitan areas.   Source: Cardoso, Urani, Urani 1995

In Brazil, towards the end of the 1980s, successive governments attempted to curb

Brazilian inflation to the contempt of the population that faced unemployment and veritable

increases in the Consumer Price Index. There were multiple changes in government leadership

throughout this period, including the end of the military dictatorship in 1985 and the adoption of

the 1988 Brazilian Constitution transitioning Brazil into a full democracy, at least in name.

Among such turbulence, the Brazilian economy resisted steep drops in its overall economic

stability, potentially due to the wide degree of interventionist policies the government

implemented and the preexisting groundwork of a diversified economy that was now

experimenting endurance testing.

In Venezuela, the theory of its plentiful oil reserves being a resource curse demonstrated

signs of plausibility during the 1980s. Due to the crash of oil market, GDP per capita suffered

substantial blows to its previous rates (shown in Figure 5) along with the tumble of oil

production per capita (Figure 13). In essence, the GDP per capita level in Venezuela retracted to
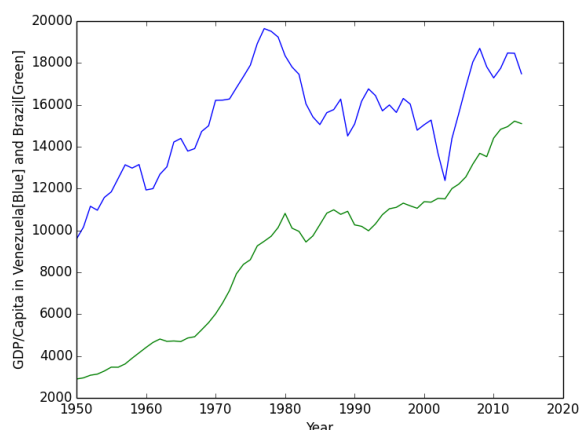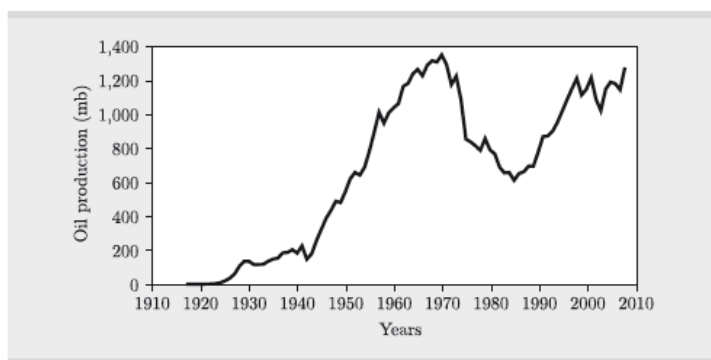
Figure 5 (Reproduced)


Figure 2. Oil production in Venezuela

Figure 13: Oil Production in Venezuela

Source: Baptista (2006)

Source: Baptista (2006).

the value it had witnessed twenty years ago, and purchasing power became a third of its 1978

value (Kelly, Palma 2006). The government, drained of its streams of revenue that would have

been coming from the petroleum industry, lacked the income and credit to invest in social

spending and growth of its economic structure. "By the late 1980s […]strains in the system

established in 1958 became apparent." (Lapper 2005). Once again, the Venezuela government

turned to its petroleum industry and as proposed policy, introducing measures that would cut

subsidies on domestic petrol and diesel prices. Opposite to Brazil's interventionist policies

during this period, the Venezuelan government leaned towards decentralizing the role of the state

in the economy. This resulted in large scale riots, in an episode particularly known as the

Caracazo during which at least 200 people were killed.

Figure 14: Price of oil during 1960-2010
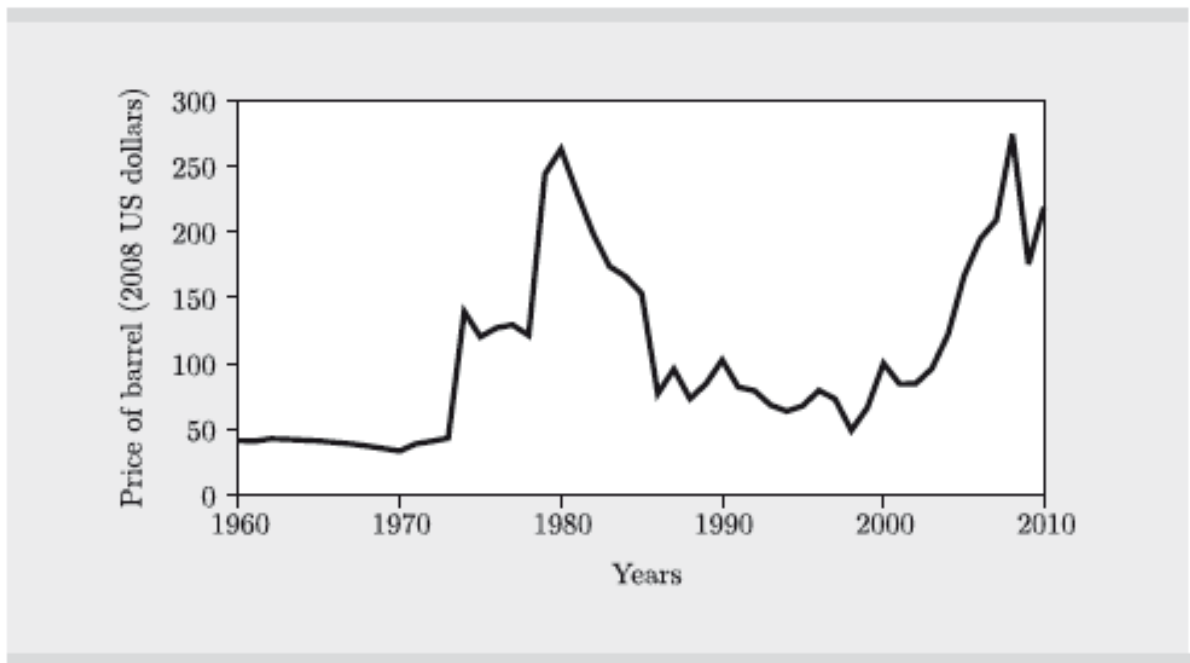
Lula, **Chavez, and beyond**

The decade of the 1980s proved to be a challenge for both Venezuela and Brazil. Both countries had to face the challenges of tackling a crash in the price of oil and leveraging governmental intervention to promote growth and mitigate inflation. It was not until the early 1990's in which the Brazilian economy would only later shows signs of further recovery with the *Plano Real*. After successive iterations of attempts to solve the problem of inflation, the *Plano Real* in Brazil introduced a new currency, the Brazilian *real*, pegged its exchange rate partially to the United States Dollar, as well as controlled the government's process of indexing inflation that had been witnessed during failed economic plans in the past. The Brazilian population was pleased with such reforms as inflation was essentially halted and economic growth, revamped. Many associated President Cardoso's administration with the success of President Kubitschek's.

Employment reached a high of 47.23 percent, contributed to in part by women entering the workforce, which occurred earlier than it happened in Venezuela, as data from the World Bank demonstrates in Figure 15.

Figure 15 : Labor force, female (% of total labor force)
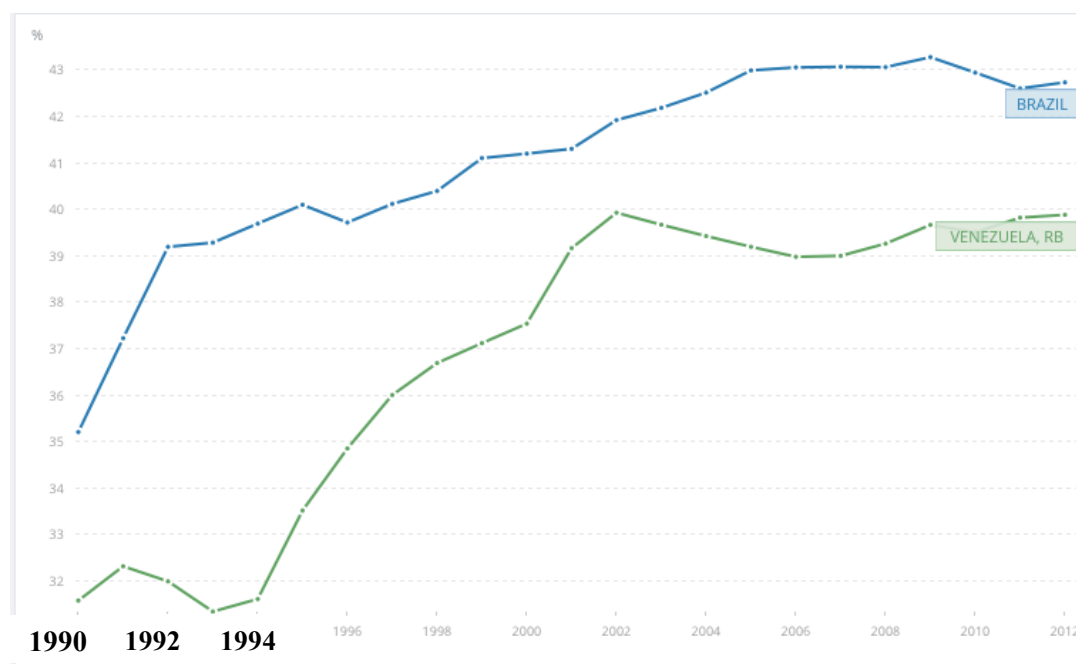
As for Venezuela, the economy suffered through a banking crisis in 1994 that aggravated the health of banking institutions in the nation. Oil prices were dragging along, as seen in figure 14, as the government experienced reduced incomes compared to previous years. Capital growth had also stopped, halting at 1.98%, along with output per labor and capital per labor had remaining negative overall according to the growth accounting exercise in Table 1. Civil unrest and dissatisfaction ultimately built the base for Hugo Chavez to assume power later in the 1990s.

Table 1 (Reproduced)

Year Range	Time Period	Country	GDP Growth (%)	Capital Growth (%)	Output/Labor Growth (%)	Capital/Labor Growth (%)	Population in Workforce (%)	Contribution to GDP Growth			
								Labor	Human Capital	Capital	TFP
1950-1961	Salutary Dictatorships	BRZ	7.52	2.54	4.55	-0.29	36.52	0.0144	0.00367	0.012	6.26
		VEN	6.44	7.73	3.04	4.28	29.84	0.0137	0.00241	0.043	1.96
1961-1980	Growth Miracle Oil Expansion	BRZ	7.45	2.54	4.07	3.34	38.12	-0.0167	-0.00140	-0.033	6.20
		VEN	5.53	6.39	2.01	2.82	28.01	-0.0145	-0.00701	-0.037	1.84
1980-1993	Collapse of oil Stagflation	BRZ	2.23	3.91	-0.29	1.35	44.58	0.0141	0.00757	0.017	0.26
		VEN	1.54	1.98	-1.91	-1.43	31.16	0.0142	0.00234	-0.037	0.38
1993-2014	Lula and Chavez	BRZ	2.23	2.93	1.38	1.10	47.23	0.0104	0.01121	0.010	0.91
		VEN	2.17	1.98	-0.77	-0.83	35.94	0.0112	0.00669	0.011	0.98

Section 3: Conclusion

As the break of the 21st , the Brazilian people elected Luiz Inácio Lula da Silva as president of Brazil in 2002. Lula's administration ushered in a period of growth of the Brazilian economy, leading to budget surplus. The Brazilian middle class also rose from 37% to 50% of population, demonstrated by increases into GDP per labor, GDP per capita (especially in Figure 5) and capital stock per labor yielded with growth accounting data.

Figure 5 (Reproduced):

GDP per Capita
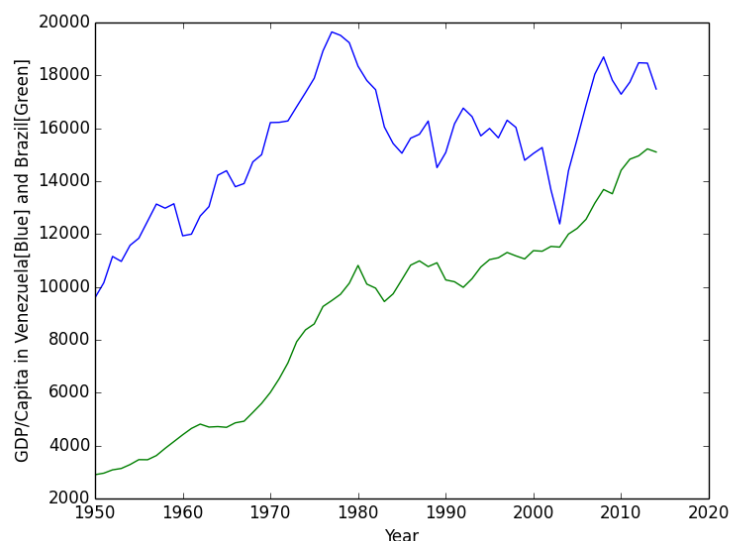
Following an unsuccessful coup attempt in 1992, Hugo Chavez became president of the Bolivarian Republic of Venezuela, to be later succeeded by Nicolas Maduro. In the early 2000s, the price of petroleum increased rapidly, which led to perceived growth of the Venezuelan economy under Chavez. However, economic progress has been continually offset by soaring inflation indices. Despite attempts of the administration to increase economic output, Venezuela has yet to offset the challenge of inflation, which Brazil successfully countered in the early 1990s, which highlights the channels of long-run growth that inflation policy contributes to.

Today, Brazil enjoys economic health as a growing economy, member of the Organization for Economic Co-operation and Development (OECD) and a member of the so-called high economic growth BRICS nations. Venezuela is currently facing what some might call a humanitarian crisis as rampant currency devaluation continues to strain the purchasing power of the Venezuelan Bolivar. What drove these nations to such different states is certainly a subject of debate. However, this paper concludes that TFP-enhancing early investment into industrialization and diversification along with responsive governmental policy-making towards inflation are the deciding factors discriminating Brazil's impressive long-run burgeoning as an economic power and Venezuela's slump into prodigious inflation rates.

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<u>Revision for Final Draft</u>

       I revised my paper in its entirety for the final version, and did multiple edits. First, I expanded the introduction of my paper as well as updated the Cobb-Douglas production function to include human capital in the equation since I used this for my growth accounting, but forgot to write it in my equations. Then, I reordered some of my graphs and tables, placing table 1 earlier and changing figure 1 to log GDP per capita, as recommended by Nicolas's helpful comments. I also elaborated more upon how industrialization is economically growth enhancing and explained why a certain Brazilian federal law was relevant in explaining GDP per capita growth in the country. Next, I added a Capital stock per capita graph aside Figure 10 and explained its relevance. Moreover, I removed a section of income inequality in my paper that deviated from my thesis statement and had flawed economic logic that I noticed with revising and was also noticed by Nicolas. Finally, I removed superfluous details towards the end of my paper and explained the economic channels of why controlling inflation is important for long-run growth maintenance.