Analysis of France's Economic Growth from 1960 to 2005 using Growth Accounting Methods

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Abstract

We use growth accounting to explain the sources of French economic growth. Specifically, we analyze France's growth drivers and compare the United States and France's economic growth between 1960 to 2005. Our results show that differences in investment and social policies around taxation explain differences between France's and the United States' growth rates.

1 Introduction

We follow on work from Fourastie and Carre, and Dubois and Malinvaud who drive attention to the impact of public policy on economic growth in France. They state that state intervention was the main driver for France's economic growth from 1960 to 2005. In this paper, we will use growth accounting to compare France's growth to the United States and will relate fundamental features of the French economy to policy and institutional changes in the country. We find that French growth is primarily driven by policies that drive FDI and increase social welfare. We also find that French growth is similar to the United States with FDI and employable population driving differences. We also find France an interesting case study of progressive social policies and hope to provide an example to generalize for other countries around Europe. To analyze these drivers and differences, we will give a brief overview of French history, then present growth accounting methods and results, and then provide an analysis of conclusions.

2 Background Information

France's economic history from 1960 to 2005 can be split into two periods: the high growth "Les Trente Gloreiuses" from 1945 to 1973, and the slow growth period from 1973-2005.

In France, the thirty years after the postwar period from 1945 to 1975 are referred to as "Les Trente Gloreiuses", or the Thirty Glorious Years. This was a period of high growth driven by four

main factors: first, support by the United States through the extension of the Land-Lease Agreement and subsequent implementation of the Marshall Plan ("European Recovery Program"), an American rebuilding initiative in which the United States gave over $13 billion USD, valued at $135.4 billion USD at current PPP, to Western Europe (State); second, the baby boom after World War II; third, the re-establishment of links to colonies within the French Union; and fourth, a renewal of ideas and institutions building the French Welfare State (Schulze, 2014). For context, 'Capital in the Twenty-First Century' cites that normal growth in wealthy countries is about 1.5-2.0%, while in Europe during 1913 to 1950 it was 0.5%, after which it caught up with a growth rate of 4.0% between 1960 and 1970 (Pikkety, 2014).

In the 1960's, there was educational, labor, governmental, and cultural reform driven by the students' revolts and subsequent labor and mass strikes. There was also an opening up of the economy. Tarriffs and quotes were reduced to implement the Treaty of Rome and public infrastructure, housing, and agricultural and manufacturing efficiency were priorities. In 1968, the Granelle Agreements gave citizens more freedoms and less social control as over half the country had stopped working believing that the government would fall. University reforms, an emergency building program, a 10% wage rise for all workers, and increased rights resulted from these agreements. Although these social reforms reduced the effective labor in the country, productivity improvements fueled growth.

This rapid economic growth continued till 1973, when France entered a period of economic instability precipitated by OPEC oil price hikes and instability caused by the Granelle agreements. Consumer prices increased by more than 10% per annum till 1983 due to economic policy choices fueled by borrowed investments into government led nuclear power-station and economic recovery programs. Subsequent devaluations of the currency and exchange-rate uncertainties because of the collapse of the Breton Woods agreement and lack of credit worthiness decreased investment, and consequently growth. By the mid 1970s, France nationalized the steel industry which had a significant glut due to state subsidies and soft loans. This was followed by a period of low growth, liberalization, and persistent unemployment from 1980 to 2005 starting with the 2nd oil crisis.

The 2nd oil crisis started in 1979 and lasted to the mid 1980s. It catalyzed the election of a socialist government. In the mid 1980s, the elected Socialist government nationalized banks such as Paribas and Rothschild giving France one of the largest public sectors in the world. In the late

1980s, as the crisis subsided, France's economy was characterized by a rapid increase in FDI, propelled by the construction of the Single Market in Europe (Baldwin) as well as financial deregulation: removing exchange controls, credit restrictions, and restrictions on capital movements and investment. There was a significant surge in inward and outward direct investment flows, coming in to capitalize on the EU single market. France took a significant share of this capital, averaging $12.6 B USD between 1984 to 1994 as opposed to $2 B USD between 1973 and 1983. These trends would eventually slow down in the 1990s, but in 1994 France still had the 3rd most FDI inflows and 6th most FDI outflows in the OECD. As proved by Edwards in 1998, Baldwins in 2003, and reconfirmed by Abdouli and Hammami in 2017, FDI improves economic growth. This was the case as the economy regained economic trajectory in the 1990s, almost matching levels of growth experienced in the 1970s. This was further compounded by economic growth policies from the government which experienced some amount of success. This was slowed down by the early 1990s economic crisis which hurt the socialist government in power. In 1993, the liberal Balladur government resumed a privatization process started by the centre-right government in 1986, and Jospin since 1997 continued it. In 1995, there was an effort to reduce workers rights and improve efficiency which was met with widespread revolts, as the population was not willing to accept social benefit trade-offs for stronger growth. Instead, the government reduced working time to 35 hours to reduce unemployment. These policies strengthened the economy, reaching peak growth in 2000. The period from 2000 to 2005 was characterized by a few key events. Notably, the Euro replacing the France in 2002, and widespread public sector strikes over government privatization and labor rights. This five-year span had the lowest growth rates in the period (OECD, 2017).

3 Growth Accounting

Production is modeled as:

$$\mathbf{(1)} \qquad \boldsymbol{Y_t = K_t^{\alpha} \, (A_t H_t)^{1-\alpha}}$$

Where: Y_t is output; K_t is physical capital; H_t is effective human capital = h_t*N_t , where h_t is average level of human capital of workers and N_t is the effective labor modelled as the average number of hours worked by the employed population; A_t is TFP; and α is constant at 1/3.

It should be noted that N_t uses the recorded paid number of hours worked rather than actual number of hours worked. The difference in these two values is that employees often work more than their recorded working hours. K_t is measured using the perpetual inventory method, assuming a constant and fixed depreciation rate d.

Take output as income. Then, using (1), income-per-capita can be modelled as:

$$(\mathbf{2}) \qquad \frac{\boldsymbol{Y_{it}}}{\boldsymbol{L_{it}}} = \boldsymbol{A_{it}} \left(\frac{\boldsymbol{K_{it}}}{\boldsymbol{Y_{it}}}\right)^{\frac{\alpha}{1-\alpha}} \boldsymbol{h_{it}} \frac{\boldsymbol{N_{it}}}{\boldsymbol{L_{it}}}$$

Where, at time it: Y_t is income; L_t is population; Y_t/L_t is income-per-capita; A_t is total factor productivity; K_t/Y_t is capital-per-capita; h_{it} is human capital; N_t is effective labor; N_t/L_t is effective labor-per-capita; and α is constant at 1/3. These factors are accessible through the Penn World Table Version 3 (Heston, Summers, Aten) and were graphed from 1960 to 2005 by taking the natural logarithm of function (2) and re-arranging (see Graphs A).

$$(\mathbf{3}) \qquad \boldsymbol{ln}\left(\frac{\boldsymbol{Y_{it}}}{\boldsymbol{L_{it}}}\right) = \boldsymbol{ln}(\boldsymbol{A_{it}}) + \frac{\boldsymbol{\alpha}}{\boldsymbol{1-\alpha}} \boldsymbol{ln}\left(\frac{\boldsymbol{K_{it}}}{\boldsymbol{Y_{it}}}\right) + \boldsymbol{ln}(\boldsymbol{h_{it}}) + \boldsymbol{ln}(\frac{\boldsymbol{N_{it}}}{\boldsymbol{L_{it}}})$$

Total factor productivity, A_{it}, was determined by rearranging the production function (1).

$$(\mathbf{4}) \qquad \boldsymbol{A_t} = \frac{\boldsymbol{Y_t}^{\frac{1}{1-\alpha}}}{\boldsymbol{K_t}^{\frac{\alpha}{1-\alpha}} \boldsymbol{A_t H_t}}$$

N/L, effective employment-per-capita, was noted to be significantly different between USA and France. To further analyze this, effective employment was regressed. To extend the analysis, population and average hours worked are graphed (see Graph B).

The ratio of each of the above terms, their contribution to growth, and their contribution to differences between the USA and France was calculated as for each decade between 1960 to 2005 inclusive. Growth contribution from 1960 to 2005 was also calculated for both countries. (see Tables A).

Some key trends between 1960 and 2005 include: the difference between France's and USA's N/L decreasing and K/Y increasing, the closing of the total factor productivity gap between the USA and France, and the gap between France and US income-per-capita closing till 1980 and then expanding again after the 2nd oil crisis.

5 Discussion

Overall, France grew faster than the US from 1960 to 2005. Total factor productivity was the most important driver of economic growth for both the USA and France. Human capital was relatively consistent between both countries as expected for countries that have similar education systems and started with a similar base level of education. Capital-per-capita and effective-labor-per capita is where France and the United States differ most.

Capital-per-capita was a positive contributor to growth in France and negative for the USA. This pairs well with France's narrative, as the country experienced growth first through FDI from the USA's Marshall Plan and then through FDI from the EU single market. These were the highest periods of France, and have a heavy weighting on average growth during the period. In the future, this should be expected to reverse as the United States captures FDI from 2005 to 2016 through a flight to quality assets and through the technology and housing sector boom (see Graph C).

In France, effective labor-per-capita had a negative effect on economic growth, while in the USA, it had a positive effect. It was the largest difference in factors. From 1960 to 2005, France pursued aggressive social policies which increased social protections, reduced working hours by more than 30%, and increased median age of the population from 33.1 years to 38.9 (UN Population Division). The United States remained stable reducing working hours by about 8%, and increasing the median age of its population from 29.5 years to 36.2 years. Additionally, France pursued more progressive taxation schemes which disincentivized workers from increasing output (Piketty, 2012). As a result, France experienced a 10% decrease in effective employment hours while the United States experienced an 87% increase. At the same time, France's population grew by 35% while the United States population grew by 60%. As a result, France's effective employment-per-capita decreased while the United States effective employment-per-capita increased, driving income-per-capita. This collaborates well with France's narrative over the discussed time span.

Finally, total factor productivity drove growth in France more than in the United States. This makes sense as the FDI investments that drove growth from the 1960s to the EU open market period also drove improvements in production. While the United States already had strong productivity due to investment during WWII, France lagged with European countries due to their wartime focus. This pairs with France's narrative as well.

6 Conclusion

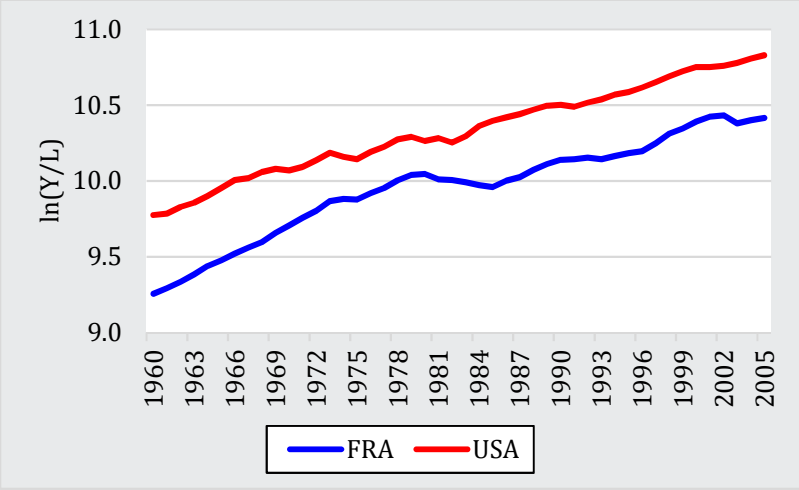
Differences between France's and the United States' economic growth can be explained by differences in their underlying factors through growth accounting.

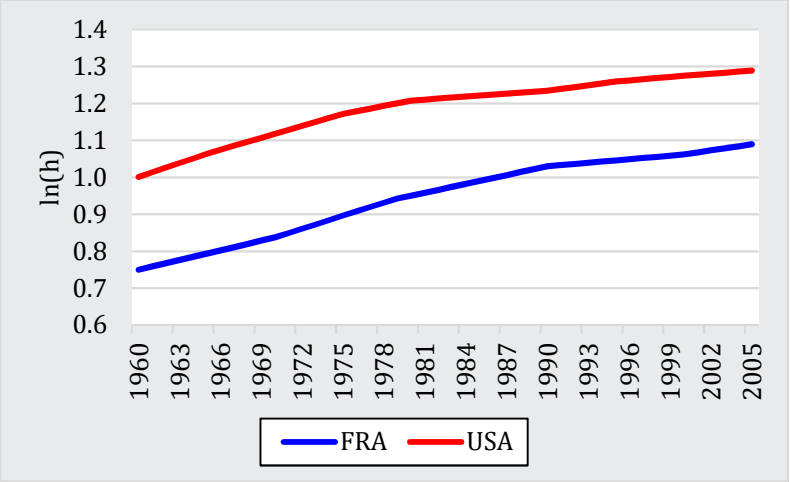
Policy changes and government intervention play a significant part in French economic history. Liberalizing and opening the economy through pro-trade and pro-union policies has proven positive for French economics, as FDI inflows have driven growth in France. Although France has less income per capita than the United States, it has a higher GDP/working hour than the United States. If France wishes to pursue higher GDP-per-capita, France should consider reworking taxation policies to incentivize workers.

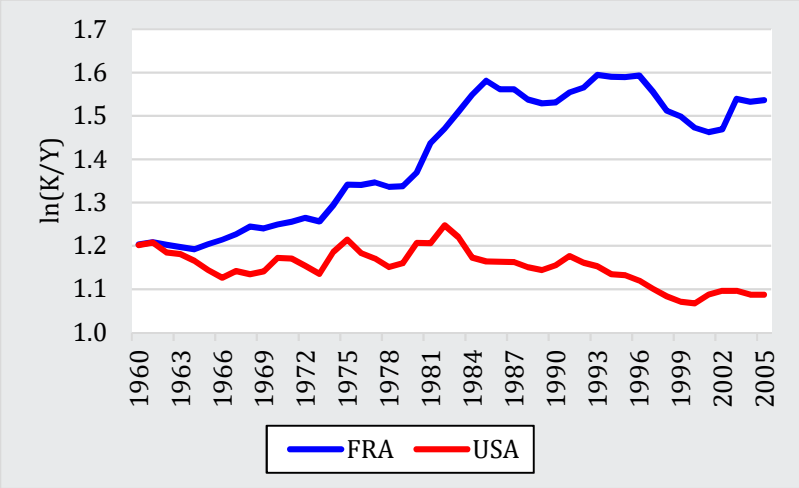
It is important to understand these factors to be able to predict and make policy decisions that will improve the countries' economic growth. For example, economists have recently stated that European countries have lagged in the adoption of technology and must increase investment into new productivity technologies to match the United States' growth in the future (Bloom, 2012). This represents an increase in the gap between United States' and France's total factor productivity growth which translates into lower per-capita-income growth.

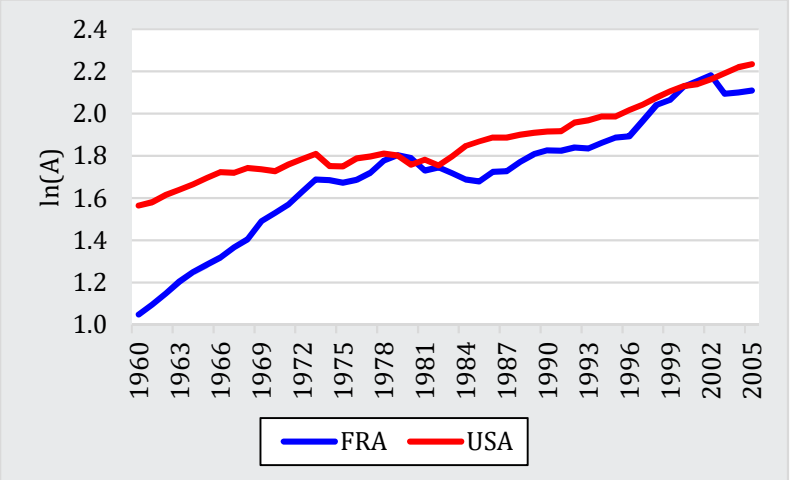
By using growth accounting and understanding history, policies such as these become easier to analyze and predict.

Graph A Factors

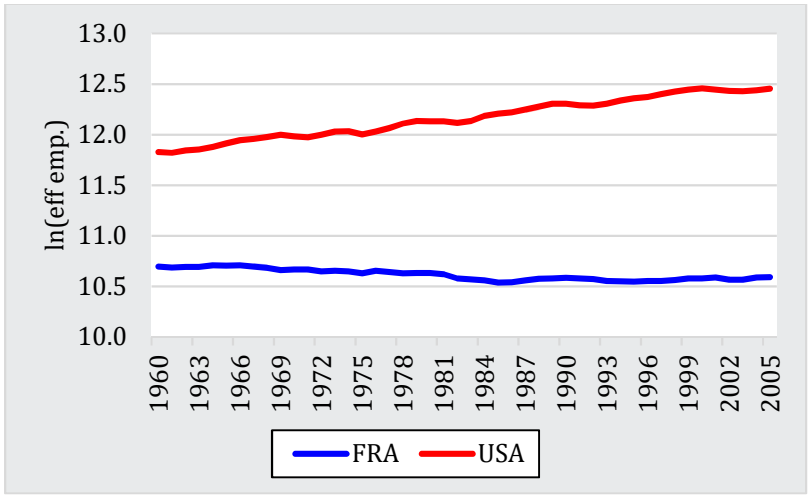


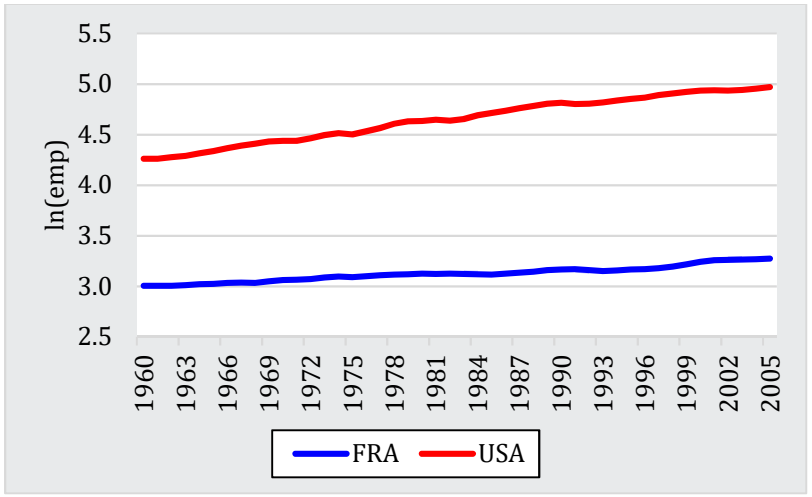


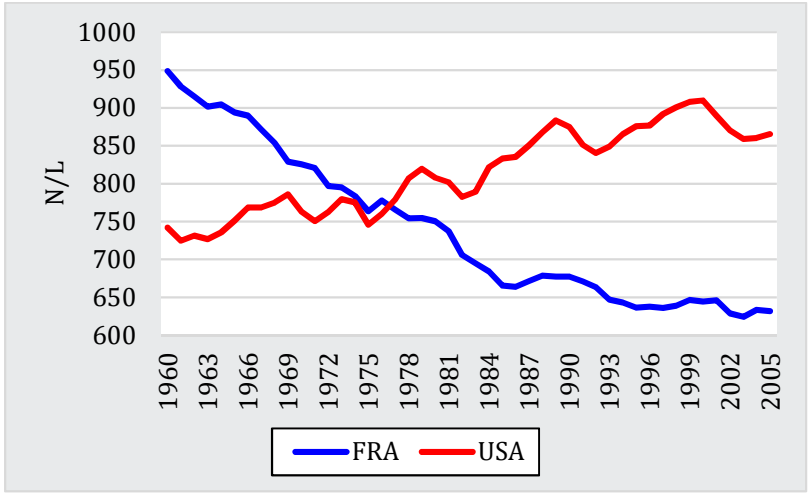


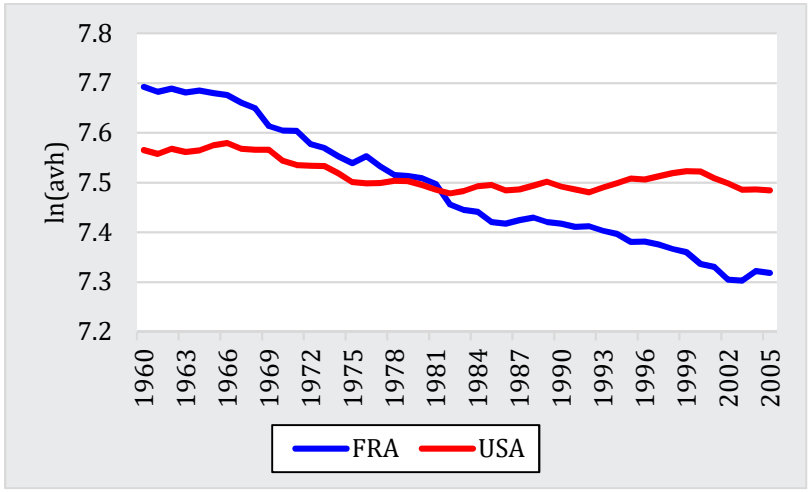


Graph A Factors, cont.



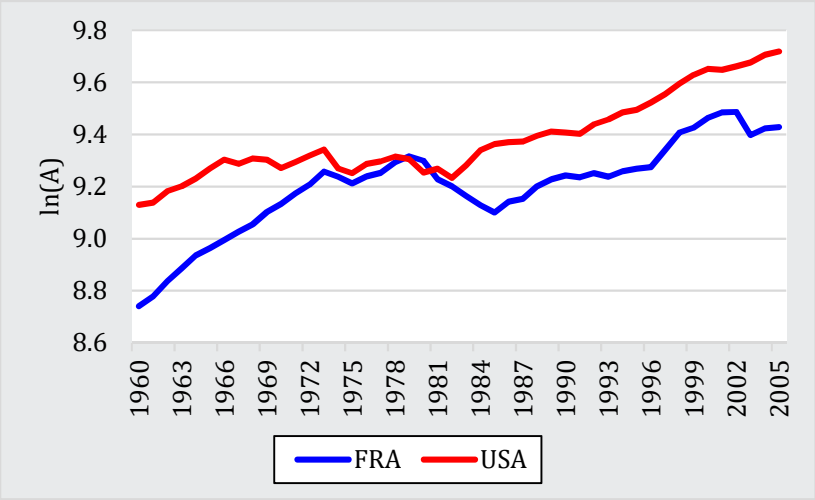


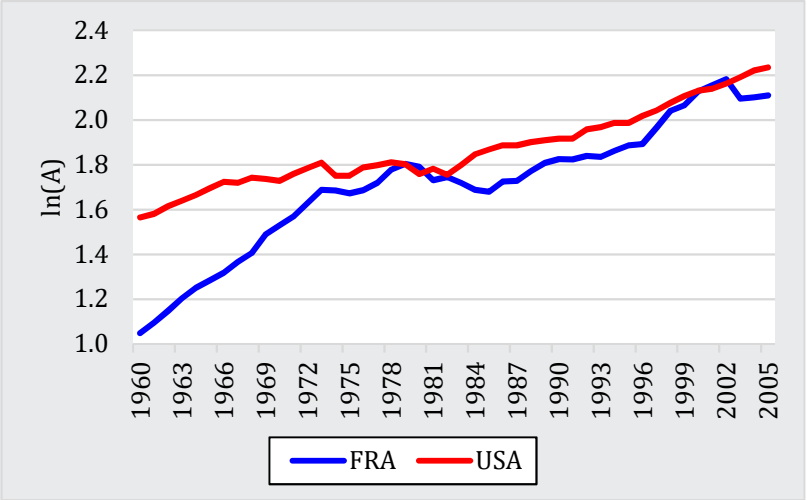


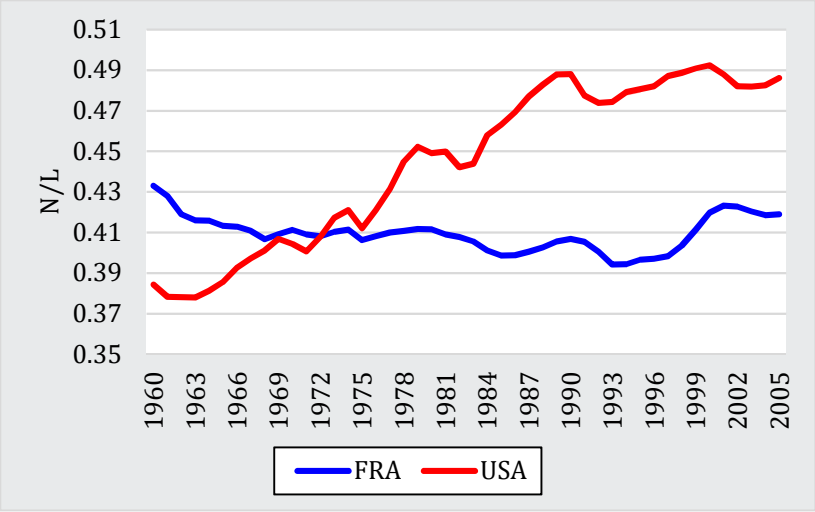


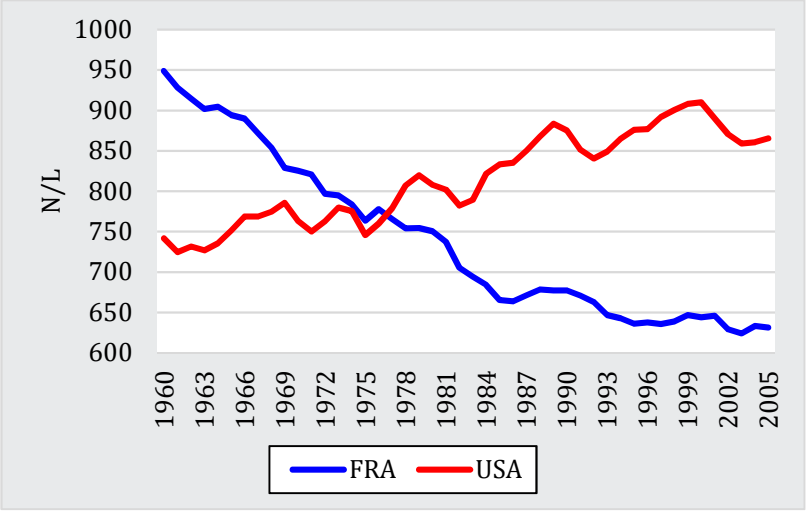
Graph B Effective Employment

Before factoring in average hours worked (graphs on the left) and after factoring in average hours worked (graphs on the right) to effective employment.

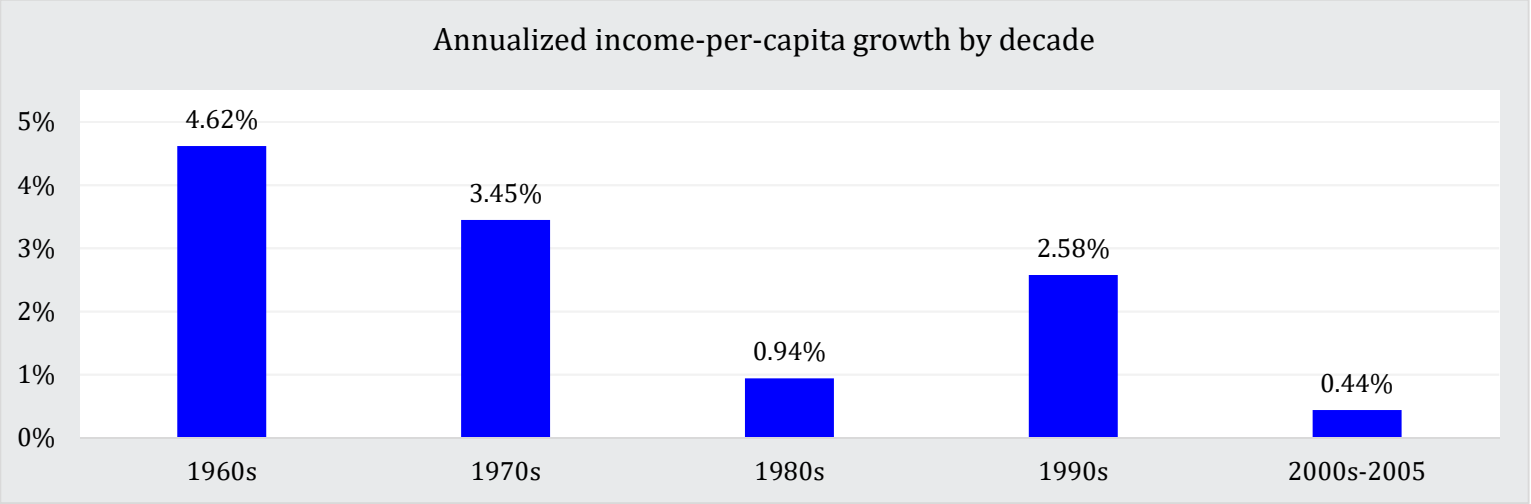








Graph C Supplemental Graphs (World Bank)



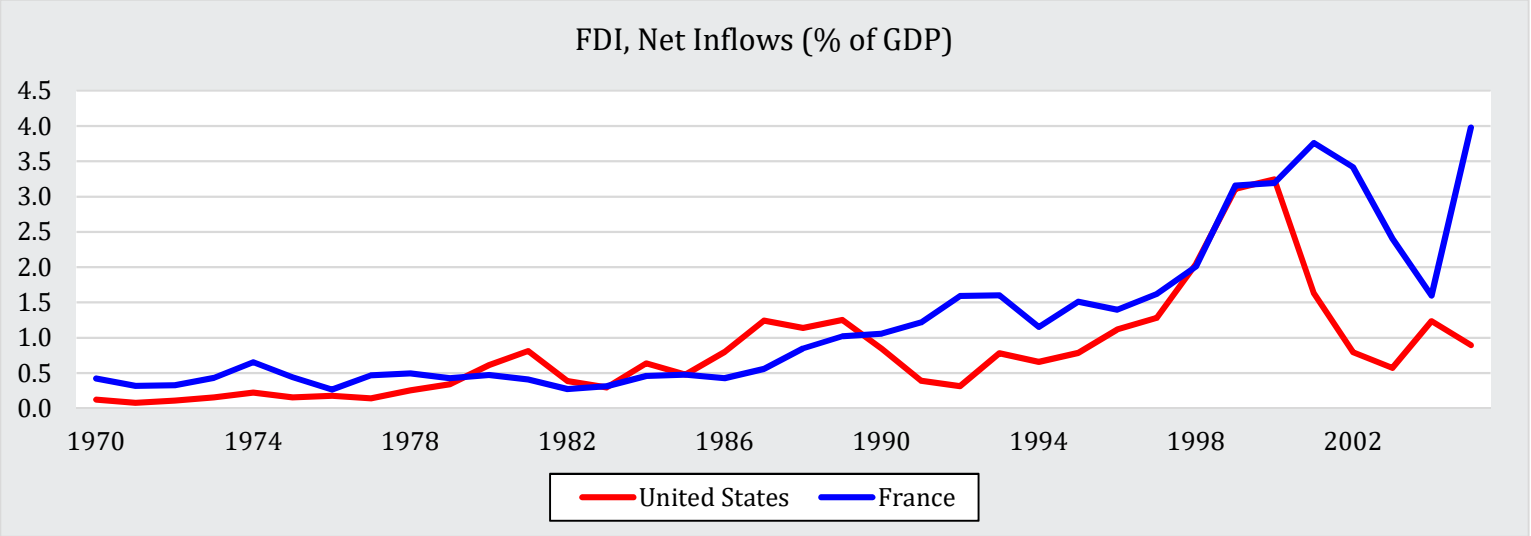


Table A Summaries

FRA/USA	Y/L	h	N/L	K/Y	A
Ratio					
1960	0.595	0.778	1.279	1.001	0.597
1970	0.696	0.756	1.082	1.080	0.819
1980	0.804	0.773	0.929	1.176	1.032
1990	0.696	0.815	0.774	1.457	0.913
2000	0.699	0.808	0.708	1.500	0.998
2005	0.661	0.820	0.730	1.568	0.882
Contribution					
1960	1.000	0.482	-0.473	-0.001	0.992
1970	1.000	0.772	-0.217	-0.106	0.550
1980	1.000	1.179	0.338	-0.371	-0.146
1990	1.000	0.562	0.706	-0.519	0.250
2000	1.000	0.595	0.964	-0.566	0.007
2005	1.000	0.480	0.760	-0.543	0.302

Growth, 1960-2005	Y/L	h	N/L	K/Y	A
Annualized Growth					
FRA	2.61%	0.76%	-0.90%	0.74%	2.39%
USA	2.37%	0.64%	0.34%	-0.25%	1.50%
Contribution					
FRA	1.000	0.293	-0.351	0.144	0.915
USA	1.000	0.273	0.146	-0.054	0.636

Citations

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