



AN ANALYSIS OF USA'S ECONOMIC DEVELOPMENT: LESSONS FOR CHINA

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Abstract: This study provides a comprehensive analysis of the United States of America (USA)'s economic development since 1971 using both the expenditure and the value-added approaches for GDP measurement. The regression results show that for the expenditure model, personal consumption and total investment made the most contribution to American economic growth; and for the value-added model, labor rate and service industry productivity were the most important factors for American economic prosperity. In contrast, other variables, including the productivities in the other two industries, urbanization rate and labor shares in three sectors did not have any significant effect. Next, our paper focuses on the past and future changes in all economic factors, including economic structure, labor rate, productivity, trade, investment, consumption, and urbanization, to explore how these changes have affected and will impact the US economy. We then compare China with the USA and discuss what China can learn from American experience. There are many similarities and differences between these two countries. The major difference is that the USA achieved industrialization, modernization, and urbanization when it was the largest economy in the world in the 1950s, but China has still been going through these processes and advancements even after it became the second largest economy in 2010. Therefore, China still has a large potential for continuous and sustainable growth. One of the most important lessons from the US experience is that the economic structure change from industry to service-focused may hurt the whole economy.

Keywords: American Economy, China Economy, Productivity, Economic Structure, and Labor Rate

JEL Codes: O11, O40, O51, O57, N11, P51

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1. INTRODUCTION

Since 1890, the USA has been the world's largest economy. Even though its economy suffered seriously from time to time during economic and financial crises in the past many decades, it is still strong and dominant in the global economy. Its GDP per capita was about \$81,600 in 2023, the highest among the large, developed economies. Many of its sectors and industries are among the strongest globally. Its financial market is the largest and attracts global companies and individual investors. The US dollar is a dominant currency in world trade, financial reserves and investment.

However, the US dominance in the world has been weakened in many areas. The ratio of the US GDP to the world total GDP has been decreasing generally in the past decades, from about 35% in the 1970s to 23-25% now. Figure 1 is the ratios of the USA GDP to world total GDP from 1971 to 2021. The US economy is also having many fundamental problems such as huge government debts, large outsourcing of manufacturing and reliance on huge imports of foreign-made products, and business cycles.

China's development is another challenge to the US. China's unprecedented growth in the previous two decades narrowed its gap in total economic outputs with the US. Figure 2 is the China/USA and Japan/USA GDP ratios from 1971 to 2021. Although Chinese economy has slowed down recently, it is still quite possible that China may surpass the US to be the largest economy in the coming decades [11] [27].

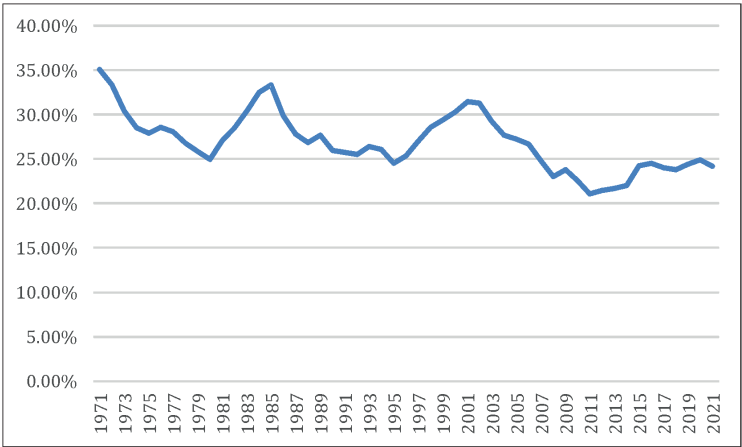


Figure 1: Ratios of USA/World GDP (1971-2021)

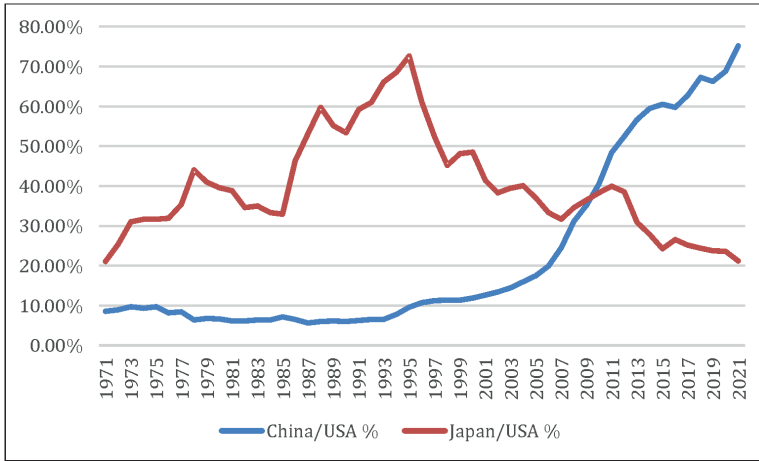


Figure 2: China/USA and Japan/USA GDP Ratios (1971-2021)

Given the above discussions, it is important to explore what caused the US economic success in the past, how the US economy has changed over decades and why the US economy has slowed down. In addition, it is interesting to explore what China may learn from the US experience. Whether China will be able to become the largest economy is an important issue to both the US and China as well as to the world. It is equally crucial on whether China can maintain sustainable and stable economic growth since it contributes to global growth significantly [11].

Table 1: Summary of US Economy (1971-2021)

Year	1971	1981	1991	2001	2011	2021
GDP per capita (\$)	5,609	13,976	24,342	37,133	50,066	70,219
Population (million)	207.66	229.47	252.981	284.97	311.64	332.03
Labor Rate (%)	38.32	43.27	50.71	51.65	50.52	50.05
Total GDP (trillion \$)	1.16	3.21	6.16	10.58	15.60	23.32
Total Export (billion\$)	62.96	305.23	594.93	1,026.81	2,115.86	2,539.65
Total Service Export (billion \$)	12.80	57.250	164.26	284.03	644.67	801.14
Total Import (billion\$)	62.34	317.76	623.54	1,403.56	2,695.48	3,401.36
Total Manufacturing Imports (billion\$)	45.58	265.10	491.02	1,153.70	2,239.88	2,849.39

Data source: World Bank

The above table gives a general summary of the US economy in the past 50 years. It shows that the US GDP per capita has been rising significantly

over decades, its total population has been increasing, and the labor rate and the percentage of people working have been stable in the past 30 years. One weakness is its trade; and especially its import has been increasing substantially over decades. Therefore, the US economy is relying more on other economies since 1980s.

In this paper, we apply the expenditure-based and value-added measurement for US GDP to set up relevant econometric models. Then, the World Bank (WB) data are used to identify significant variables in these two models and discuss how these variables have affected US's economic growth in the past decades.

There have been numerous studies on the US's economy, but this study contributes to the literature in a few ways. First, we use the latest data for the US up to 2021. Second, both expenditure-based and value-added models for GDP measurement are applied to analyze relationships among variables. Third, the value-added model is unique, different from other previous studies. Finally, we give a comprehensive comparison between China and the US to explore their similarities and differences and discuss what China can learn from American economic development.

The rest of the paper is organized as follows. Section II reviews literature. Section III presents econometric models. Section IV discusses data and variables. Section V explains the regression results. Section VI illustrates the changes in the US economy and policy implications. Section VII compares China and the US and explores what China can learn from US experience. Section VIII concludes the paper.

2. REVIEW OF LITERATURE

There have been enormous studies on the US economy. This literature review first focuses on the effects of consumption, investment and trade on developed economies and then discusses the relationship of the US economic growth with productivity, economic structure, labor participation, and urbanization.

Consumption, especially private consumption, is essential to the developed economies. In the US, personal consumption contributes about 70% to the total annual GDP. Gualerzi [16] developed a framework to analyze consumption's impact on advanced market economies. Foster [14] used the half century data in its econometric models and concluded that the increasing of

the ratio of consumption to GDP in the US reflects the diffusion of a "culture of consumerism" since the 1960s, but the limit to this process is now being approached and that consumption will be no longer the main growth engine to the US economy. Therefore, in order to maintain growth and employment, larger expansions of money and credit will be necessary and major structural and policy changes will also be needed. Chen and Qiao [13] studied Japan's economy from 1970 and found that personal consumption made the most contribution to Japan's economic growth, but the personal consumption annual growth has slowed down significantly over the past decades.

Kliman and Williams [18] noticed that the US capital accumulation has fallen markedly in recent decades, and they examined the data and concluded that the decrease of the return on investment in fixed assets fully accounts for the fall in capital accumulation. Chen *et al.* [9] examined the US manufacturing growth and found that the investment was one of two factors that significantly affected the manufacturing industry's growth. Caunedo [4] summarized that investment shocks accounted for about 30-70% of US output volatility.

Trade is important to all economies. Chen and Qiao [13] analyzed Japan's data and showed that the net export significantly raised Japan's GDP growth. The US has had huge trade deficits for many decades. One popular explanation for increasing US trade deficits is the rise of the US dollar value against other currencies. Krugman and Baldwin [20] explored the relationship between the exchange rates and US trade deficits and explained why the US trade deficit rose when the US dollar was appreciated but its deficits did not come down when the US dollar was depreciated against other major currencies. Mann and Plück [24] compared income and relative price elasticities of U.S. trade with trading partners or commodity categories to demonstrate how import and export were affected differently in countries and why the US has had persistent large trade deficits.

Productivity is the key to an economy's competitiveness and success. Chen, *et al.* [7], and Qiao & Chen [27] showed that the productivity improvement, especially in the industrial industry, significantly contributed to China's fast economic growth. Chen & Qiao [13] illustrated that Japan's economic development significantly benefited from its productivity progress. Le *et al.* [21] concluded that improvements in labor quality and product innovation raised the total factor productivity (TFP) in middle-income countries and so

contributed to their economic growth. Based on the study of five advanced economies, Goldin *et al.* [15] identified factors attributed to these countries' labor productivity decline since 2005. Lee and McKibbin [22] stated that service sector productivity improvement led to persistent economic growth in Asian countries. IMF [17] projected weaker global economic growth in coming five years and explained that slow growth of the TFP across economies is the main reason.

The US dominance in the world economy has definitely benefited from its productivity and strong competitiveness. As Qiao & Chen [27] demonstrated that the US labor productivity has been the highest among the developed economies. However, the US productivity has slowed down in the past decade. Syverson [28] stated that U.S. labor productivity growth declined from 2.85% per year in 1995-2004 to just 1.27% per year in 2005-2015. This slowdown is statistically significant and leads to enormous amounts of US GDP loss.

Chen & Qiao [13] summarized that the economic structure is essential to an economy and its growth. Baek [2] compared a few Eastern Asian economies and described that China and Taiwan economies had the dual economic structure that divides the public and non-public sectors. Qiao & Chen [27] concluded that the shifts of labor forces from agriculture to industrial and service sectors significantly improved Japan's annual GDP growth. The US has changed from agriculture-focused to industrial-oriented and then to now service dominant economy. Its service industry accounts for more than 80% of the annual total GDP. What caused such changes in the economic structure and why has its structure not changed much in the past decade? Caunedo [4] used the cost shares of intermediate inputs in different sectors and substitution elasticities in intermediate inputs across sectors to explain the relationship between aggregate outputs and economic structure changes.

The US labor participation rate had been steady from 1990s to 2000 but this rate declined significantly after 2000 as Perez-Arce and Prados [26] described. Apergis & Arisoyb [1] used the data from 1976-2014 and proved that unemployment rate significantly affected the US labor force participate rate.

As Qiao & Chen [27] and Chen & Qiao [13] emphasized, urbanization has played important roles in global economic development. Leyk [23] showed that US population increased from an estimated 5.3 million in 1800 to 309

million people in 2010 and its urbanization rate grew from 6% to 81% over this period. Urbanization results from population growth and the transformation of physical landscapes and ecological systems into developed land. Bloom *et al.* [3] demonstrated that there is a high correlation between urbanization rate and its level of income. But rapid urbanization also generates problems of crowding, environmental degradation, and other impediments to productivity. Overall, there is no evidence that the level of urbanization directly affects the rate of economic growth. Chen & Qiao [13] stated that urbanization significantly improved Japan's economy in the past, but this impact is diminishing. Nguyen and Nguyen [25] concluded that the effect of urbanization on economic growth has its turning point and above that, the net impact could be negative.

This study aims at finding out the significant factors that resulted in US past economic development and analyzing the changes in the factors that led to American economic troubles. We then compare China with the USA and explore the lessons China can learn from American experience.

3. ECONOMETRIC MODELS

Based on models used by Chen & Qiao [13] and Qiao & Chen [27], the following expenditure and value-added measurements of the GDP are applied to establish relevant econometric models for the US economy and then the World Bank data are applied to test which variables are significant in each model.

3.1. Expenditure-based econometric model

According to the expenditure approach of GDP measurement, total investment, total consumption, and net exports decide an economy's total GDP in a year. Since the total consumption includes government consumption and personal or private consumption, one has the following econometric model:

$$\text{GDP}^r = c_0 + c_1 * \text{Investment}^r + c_2 * \text{Governmental-Consumption}^r + c_3 * \text{Personal-Consumption}^r + c_4 * \text{Change in Net-Export} \quad (1)$$

where c_0 , c_1 , c_2 , c_3 and c_4 are coefficients; GDP^r is the annual GDP growth rate, Investment^r is the annual investment growth rate, $\text{Governmental-Consumption}^r$ is the governmental-consumption growth rate, and $\text{Personal-Consumption}^r$ is the annual personal consumption growth rate. The change

in net-export is used, instead of net export growth since net export growth changes dramatically and has outliers while change in net-export is smoother over time as Chen & Qiao [12] explained.

The multicollinearity problem is avoided in our model since the annual growth rates of these variables are used, instead of the original annual values.

3.2. Value-added econometric model

According to Chen *et al.* [7], the value-added method for GDP measurement can be expressed as the sum of the GDP in three sectors, GDP_A , GDP_M , GDP_S ; here A, M and S indicate agriculture, industrial and service sectors. Then, GDP per capita or gdp can be expressed as the sum of the ratio of each sector's GDP to the total population,

$$\frac{GDP}{Population} = \frac{GDP_A}{Population} + \frac{GDP_M}{Population} + \frac{GDP_S}{Population} \quad (2)$$

However, each $GDP_i/Population$ will have the following:

$$\frac{GDP_i}{Population} = (\frac{GDP_i}{Li}) * (\frac{Li}{Population}) \quad (3)$$

where i is A, M or S and Li is the labor/employees in this specific sector. After taking the natural logarithm on both sides of the above equation and combining (2) and (3), one has the following econometric model:

$$\ln(gdp) = c_0 + c_1 \ln(LA) + c_2 \ln(LM) + c_3 \ln(LS) + c_4 \ln(PA) + c_5 \ln(PM) + c_6 \ln(PS) + c_7 \ln(LR) + c_8 \ln(UR) + \quad (4)$$

where $c_0, c_1, c_2, c_3, c_4, c_5, c_6, c_7$ and c_8 are coefficients; LA, LM and LS are the labor shares in the agriculture, industrial, and service sectors. PA, PM and PS are the productivity per employee in the agriculture, industrial, and service sectors, accordingly and LR is the labor rate (total employees/total population) and UR is the urbanization rate; both are added to see whether these factors significantly affect economic growth.

4. DATA AND VARIABLES

All data used in this study is from the World Bank, unless otherwise mentioned. The data from 1971 to 2021 was used since some variables did not have complete data before 1971. Also, when this study was initiated, the only available data was up to 2021.

Table 2 provides the summary statistics for the key variables used in the expenditure model. The total investment and personal consumption have higher annual growth than other factors. The average change in net export to GDP ratio was negative.

Table 3 provides the summary statistics for the key variables used in the value-added model. The standard deviation for agriculture labor was small. US agriculture productivity is low, compared with the other two sectors. US's urbanization rate is about 78% during 1971-2021, on average.

Table 2: Summary Statistics--Expenditure Model Variables (%) (1971-2021)

	<i>Average</i>	<i>Standard Deviation</i>
GDP Growth	2.76%	2.11%
Total Investment Growth	3.61%	6.90%
Total Consumption Growth	2.70%	1.60%
Governmental Consumption Growth	1.47%	1.61%
Personal Consumption Growth	2.99%	2.02%
Change in Net Export / GDP %	-0.08%	0.59%

Data Source: World Bank (2015 Constant \$)

Table 3: Summary Statistics --Value-Added Model Variables (1971-2021)

<i>Variable</i>	<i>Average</i>	<i>Standard Deviation</i>
GDP per Capita (\$)	32,476	18,683
LA (Agri Employee %)	1.34	0.42
LM (Ind Employee %)	19.99	5.25
LS (Service Employee %)	78.67	5.66
PA (Agricultural Productivity) (\$)	49,661	15,831
PM (Industry Productivity) (\$)	66,770	31,742
PS (Service Productivity) (\$)	66,485	36,400
Labor Rate (%)	45.81	6.64
Urbanization Rate (%)	77.59	3.25

Data source: World Bank and GGDC (University of Groningen)

5. REGRESSION RESULTS

Table 4 and Table 5 give the results for the US from the expenditure and value-added regression models.

Table 4: Regression Results Summary-Expenditure Approach Model (1971-2021)

<i>Variable</i>	<i>Estimated Coefficient</i>
Intercept	0.0131***
Total Investment Growth	0.1446***
Governmental Consumption Growth	-0.2940***
Personal Consumption Growth	0.3366***
Change in Net Export / GDP	-0.2482***
Observations	51
F-Statistic	35.3561***

***: 1% significant

Table 5: Regression Results Summary-Value-added Approach Model (1971-2021)

<i>Variable</i>	<i>Estimated Coefficient</i>
Intercept	6.2255
LN(PA)	0.0161
LN(PM)	-0.0369
LN(PS)	0.8921***
LN(LR*100)	1.6839***
LN(UR*100)	1.2447
LN(LA*100)	-0.0765
LN(LM*100)	-0.8212
LN(LS*100)	-3.4533
Observations	26
F-Statistic	1674.2988***

***: 1% significant

The results for the expenditure approach show that all the coefficients for the independent variables are significant. Personal consumption and total investment growth have positive impacts on economic growth but government consumption/spending and net export change to the total GDP have negatively affected the economy. In other words, the US economic growth in the past decades has been mainly from private consumption and total investments.

The results for the value-added approach indicate that the productivity in the service sector and labor rate significantly affected US economy. But other variables, including urbanization rate, did not significantly impact the US economic growth. Also, the coefficient of the labor rate is almost twice the one for the productivity of the service industry. Therefore, the stable US labor supply has contributed to its economic development importantly.

The relevant robust tests of above two models were conducted using sub-data sets of 1971-1999 and 2000-2021. The main results have not changed. Each variable's estimated sign and its statistical significance are the same although its estimated coefficient value is slightly different.

6. CHANGES IN THE US ECONOMY AND POLICY IMPLICATIONS

In this section, we discuss in detail how these economic variables have been changed since 1971 and its effects on the US economy.

1. Variables in Value-added Model

Economic structure

Table 6 is the US economic structure from 1971-2021. The result shows that the US economic structure has been toward a more service-oriented economy since 1971. US labor share and GDP share in the service sector have been increasing since 1971. But over decades, this growth rate has slowed and now the US economic structure has been stable. It is worthy of notice that in the past decades, US industrial sector has been shrinking. It is also important to point out that although the US agriculture sector's shares of total labor and GDP have been incredibly low and now are only about 1%, this sector still is crucial to the US economy. It feeds not only all US people but also exports significant amounts of agricultural products to the world.

As stated before, the US economic structure has been steady since 1990s. Therefore, there will be no significant changes in the economic structure in the future. This also means that the US economic growth in the future will not come from the movement of the labor in three industries like many developing countries have had.

Population, aging and labor rate

Table 7 shows American population growth, aging rate, and labor rate from 1971-2021. US population growth has slowed down substantially from 2001.

Table 6: USA Economic Structure (1971-2021) (%)

<i>Time Period</i>		<i>Agriculture</i>		<i>Industrial</i>		<i>Service</i>	
		<i>Labor Share</i>	<i>GDP Share</i>	<i>Labor Share</i>	<i>GDP Share</i>	<i>Labor Share</i>	<i>GDP Share</i>
1971-1980	Average	1.94	2.82	27.82	29.41	70.24	67.77
	Standard deviation	0.07	0.43	1.06	0.42	1.06	0.41
1981-1990	Average	1.63	1.80	23.48	26.38	74.89	71.82
	Standard deviation	0.15	0.28	1.38	1.45	1.51	1.69
1991-2000	Average	1.33	1.34	19.57	22.83	79.10	74.37
	Standard deviation	0.23	0.14	0.73	0.29	0.94	1.70
2001-2010	Average	0.90	1.08	15.98	20.74	83.12	74.67
	Standard deviation	0.03	0.09	1.33	0.83	1.32	0.98
2011-2021	Average	0.94	1.05	13.70	18.66	85.36	76.70
	Standard deviation	0.02	0.16	0.12	0.62	0.11	0.78
1971-2021	Average	1.34	1.60	19.99	23.49	78.67	73.15
	Standard deviation	0.42	0.71	5.25	4.02	5.66	3.34

Data Sources: World Bank and US Bureau of Economic Analysis (BEA)

Table 7: USA Labor Rate, Aging Rate and Population Growth (1971-2021) (%)

<i>Time Period</i>		<i>Labor Rate</i>	<i>Aging Rate</i>	<i>Population Growth</i>
1971-1980	Average	40.79	10.57	1.03
	Standard deviation	1.82	0.51	0.10
1981-1990	Average	44.47	11.85	0.94
	Standard deviation	1.82	0.33	0.07
1991-2000	Average	51.21	12.44	1.23
	Standard deviation	0.41	0.08	0.09
2001-2010	Average	51.44	12.50	0.92
	Standard deviation	0.26	0.27	0.05
2011-2021	Average	50.33	14.64	0.69
	Standard deviation	0.29	0.97	0.14
1971-2021	Average	47.69	12.48	0.95
	Standard deviation	4.43	1.53	0.22

Data Sources: USBEA for 1971-1990 Data and World Bank for 1991-2021 Data

US aging rate (% of people over 65 or above) was 11% in 1971. Since then, the aging rate has increased to close to 13% in 2010 and 15% in 2020. Population aging affects the labor force and total demand [27].

US labor rate had increased since 1970s but after 2010, this rate has decreased slightly. Generally, the US has had stable and ample labor supply and that contributes to the US long-term economic growth. Especially compared with other developed economies like Japan, the US has had healthy labor market to support its economy. The US opening immigration policy and its ability to attract talent people are important factors to this vital labor market. It is expected that the US population will continue to grow and its aging rate will rise, but both changes will be marginal annually in the future. Its labor rate will go down gradually as well. Thus, the overall effects of these factors on the US economic growth will be minimum.

Productivity

Table 8 compares annual labor productivity growth of the US with Japan and Germany. The US Total Factor Productivity (TFP)'s contribution to the total labor productivity was the highest since 2004, compared with other two countries; also, US capital and TFP were more equally important to the total labor productivity, compared with Japan and Germany. The unwelcome news is that the US productivity growth of capital and TFP has also decreased since 2004 as other two countries had.

Table 8: Labor Productivity Growth Comparisons of US, Japan, and Germany

<i>Country</i>	<i>Years</i>	<i>From Capital</i>	<i>From TFP</i>	<i>Total Labor Productivity</i>
US	1985-1995	0.68	0.62	1.3
	1995-2004	1.52	0.95	2.47
	2004-2016	0.55	0.47	1.02
Japan	1985-1995	1.58	1.69	3.27
	1995-2004	0.73	1.3	2.03
	2004-2016	0.52	0.27	0.79
Germany	1985-1995	1.57	0.89	2.46
	1995-2004	0.9	0.79	1.69
	2004-2016	0.69	0.26	0.95

Data source: OECD

As discussed previously, productivity, especially service productivity, is the most essential to the US economy. Improving the TFP and total labor productivity will be crucial to the future economic development in the US.

2. Variables in Expenditure-based Model

Personal and government consumption

Table 9 summarizes personal consumption and related ratios for the US. The table shows that annual growth for personal consumption has decreased over the decades while personal consumption to total GDP ratio and personal consumption to governmental consumption ratio have increased in the past fifty years.

US personal consumption to total GDP ratio is about 68%. This ratio has been quite stable over past two decades. It is anticipated that the personal consumption annual growth may further go down and the private consumption to the GDP ratio will keep constant in the future. Thus, the contribution from personal consumption to economic growth will be limited in the future. That is the main reason the fast annual economic growth in the US will be unlikely.

Table 9: USA Personal Consumption (1971-2021)

<i>Time Period</i>		<i>Personal Consumption Annual Growth (%)</i>	<i>Personal Consumption / GDP Ratio (%)</i>	<i>Personal / Government Consumption Ratio (%)</i>
1971-1980	Average	10.48	60.57	362.85
	Standard deviation	1.06	0.61	20.08
1981-1990	Average	8.09	62.65	392.41
	Standard deviation	1.53	1.08	10.67
1991-2000	Average	5.92	64.87	436.86
	Standard deviation	1.11	0.53	27.79
2001-2010	Average	4.27	67.53	437.41
	Standard deviation	2.35	0.49	17.62
2011-2021	Average	3.26	67.68	462.08
	Standard deviation	1.93	0.44	20.45
1971-2021	Average	6.53	64.73	419.41
	Standard deviation	3.18	2.88	41.21

Data source: World Bank

Exports and manufacturing product exports

Table 10 summarizes export growth and related ratios. US export annual growth has been decreasing over the decades but the export to GDP ratio has been increasing over years. The US has had negative net exports from 1971. Its merchandise/manufacturing product export growth was not stable over decades.

US needs to export more to international markets in the future. However, it is unlikely that net exports will contribute to its economic growth. Stabilizing international trade, particularly exports, should be US priority to avoid its negative effects on economic growth.

Table 10: USA Exports

<i>Time Period</i>		<i>Export Annual Growth (%)</i>	<i>Net Export/ GDP Ratio (%)</i>	<i>Export / GDP Ratio (%)</i>	<i>Merchandise Export Growth (%)</i>
1971-1980	Average	17.17	-0.26	7.62	19.24
	Standard deviation	10.67	0.64	1.38	13.99
1981-1990	Average	7.30	-1.84	8.13	6.22
	Standard deviation	8.55	0.93	0.93	10.73
1991-2000	Average	7.17	-1.50	10.28	6.03
	Standard deviation	3.86	1.01	0.55	6.45
2001-2010	Average	5.89	-4.52	10.53	8.05
	Standard deviation	10.27	0.97	1.24	11.46
2011-2021	Average	1.76	-2.98	12.54	2.07
	Standard deviation	7.88	0.33	1.09	9.88
1971-2021	Average	8.06	-2.25	9.84	8.52
	Standard deviation	9.71	1.65	2.06	11.84

Data source: World Bank

Investment

Table 11 presents summary statistics for investment. US annual investment growth was extremely low during 2001-2010. During 2011-2021, investment

growth increased to 4.72% annually from the previous decade’s 1.83%, but that was still low, compared with the ones during 1971-2000. On the other hand, the investment to GDP ratio has been steady at about 20-23% over many decades.

It’s important to notice that major investment in the US is private not by the governments. Also, foreign investors have contributed significantly to the total US investment each year. For example, foreign investors hold about 35 percent of the total US treasury outstanding bonds.

Given the significance of investment to the economy, US must maintain its high credibility of both the US dollar and its government to global investors so that it will be able to continuously attract foreign investments. Also, investors are looking for returns with anticipated risks. Reducing and eliminating unnecessary regulation and stabilizing economic and financial conditions so lowering the risk and operating cost of the investment will be decisive to future investment growth.

Table 11: USA Investment (%)

<i>Time period</i>		<i>Investment Annual Growth, %</i>	<i>Investment / GDP Ratio, %</i>
1971-1980	Average	11.49	22.96
	Standard deviation	7.90	1.42
1981-1990	Average	7.08	23.21
	Standard deviation	8.55	1.14
1991-2000	Average	6.65	21.73
	Standard deviation	3.99	1.34
2001-2010	Average	1.83	21.52
	Standard deviation	8.68	1.91
2011-2021	Average	4.72	20.63
	Standard deviation	3.58	0.70
1971-2021	Average	6.44	21.99
	Standard deviation	7.32	1.61

Data source: World Bank

R&D and FDI

R & D and Foreign Direct Investment (FDI) are not included in any of these two econometric models. But they are important to the US economic development. Therefore, these two variables are further discussed here.

Table 12 compares US total R&D and R&D to GDP ratios with six other countries, including Japan, China, Germany, South Korea, France, and the UK. R&D is crucial to an economy's competitiveness and long-term development. US total R&D annual spending is the highest globally and its R & D to GDP ratio has been higher than many developed economies. The US ratio in 2019 is 3.13, close to Japan and Germany, but lower than South Korea.

Innovation is the key to US companies, industries and the whole economy. The innovation, new technology and products come from R & D investments. Therefore, the US economic development in the future continuously depends on its heavy and efficient R & D investment.

Table 12: Comparison of US R&D with Other Countries (2019)

<i>Country</i>	<i>Total R&D Spending (PPP US\$ million)</i>	<i>R&D/GDP Ratio (%)</i>
South Korea	102,521	4.64
Japan	173,267	3.20
Germany	148,150	3.19
US	668,351	3.13
China	525,693	2.23
France	73,287	2.20
United Kingdom	56,936	1.76

Data source: US National Center for Science and Engineering Statistics

Table 13 summarizes US FDI and R&D annual growth. US annual R&D growth has not been stable over years, but it has been high in recent years. Its Foreign Direct Investment (FDI) to GDP ratio has a similar trend to the R & D annual growth. The FDI benefits an economy. The ability to attract FDI and the ratio of FDI to total GDP are also important signs of a country's economic overlook. US needs to keep excessive annual R&D investment growth and high FDI/GDP ratio to support its sustainable economic development.

Table 13: USA FDI and R&D Annual Growth (1971-2021) (%)

<i>Year</i>	<i>R&D Growth</i>	<i>FDI / GDP</i>
1971	2.34	0.07
1980	13.91	0.59
1990	6.95	1.19
2000	9.74	3.41
2010	1.09	1.75

<i>Year</i>	<i>R&D Growth</i>	<i>FDI / GDP</i>
2011	4.79	1.69
2012	1.04	1.54
2013	4.78	1.71
2014	4.58	1.44
2015	6.04	2.81
2016	5.04	2.54
2017	6.01	1.96
2018	9.25	1.05
2019	9.86	1.47
2020	7.34	0.71
2021	8.98	1.92
Average (1971-2021)	6.96	1.18
Standard Deviation(1971-2021)	3.69	0.84

Data source: World Bank

A Comparison of China and US and Lessons from American Experience

US has had the largest economy since 1890. China is now the second largest economy and most likely will surpass the United States to become the largest economy in coming decades.

Table 14 provides a comprehensive comparison between China and the US in terms of key economic factors. China has much more population than the US; but China is much behind the US in terms of GDP per capita and productivity in all three sectors. Also, the US has much higher arable land per capita and fresh water per capita than China; and China’s urbanization rate is significantly lower than the US.

As China often claimed, it is still a developing economy. Even if China’s total GDP surpasses the US in the future so becomes the global largest economy, its GDP per capita and productivity will still be much lower than the US.

Table 14: Comparison of China and USA

	<i>China</i>	<i>USA</i>	
<i>Variable</i>	<i>2020</i>	<i>1971</i>	<i>2020</i>
Arable land per capita (hectares)	0.0847	0.9060	0.4758
Fresh water per capita (cubic meter)	402.86	13,570.19	8,500.46
Population(thousand)	1,411,100	207,661	331,512

	<i>China</i>	<i>USA</i>	
Total GDP (Thousand \$)	14,687,673,893	1,164,850,000	21,060,473,613
GDP per capita (\$)	10,409	5,609	63,529
Total consumption (thousand \$)	8,126,754,869	908,897,000	17,254,541,000
Total consumption / GDP ratio (%)	55.33	78.03	81.93
Total consumption per capita (\$)	5,759	4,377	52,048
Total trade (thousand \$)	5,104,597,627	125,305	4,924,731
Total trade / GDP ratio (%)	34.75	10.76	23.38
Total export (thousand \$)	2,729,871,521	62,963,000	2,148,616,000
Total export / GDP ratio (%)	18.59	5.41	10.20
Total import (thousand \$)	2,374,726,107	62,342,000	2,776,115,000
Total import / GDP ratio (%)	16.17	5.35	13.18
Total investment (thousand \$)	6,369,555,704	255,333,000	4,433,432,000
Total investment/GDP ratio (%)	43.37	21.92	21.05
Labor rate (%)	53.25	34.12	49.97
Senior rate (65 and above)	12.6	9.88	16.22
Agriculture Labor (%)	24.85	1.93	0.94
Industrial labor (%)	27.73	28.86	13.94
Service labor (%)	47.41	69.22	85.11
Agriculture GDP (%)	7.7	2.63	0.95
Industrial GDP (%)	37.84	29.23	17.51
Service GDP (%)	54.46	68.14	81.54
Agriculture productivity (\$)	6,054	20,005	69,082
Industrial productivity (\$)	26,670	14,867	114,643
Service productivity (\$)	22,451	14447	131,516
Urbanization rate (%)	61.43	73.61	82.66
Core Inflation rate (%)	0.73	4.29	1.23
Stock market total value (thousand \$)	12,214,465,600	703,840,171*	40,719,661,400
Data source: World Bank; * for 1975			

The above comparisons also indicate that China has a large potential for improvement. Its productivity currently is much lower than in the US. Also, there is much room for its service industry's further growth. Third, China's urbanization rate still has large potential to rise; China's total consumption to GDP ratio is also comparably low; and finally, its stock market total value has large space for future growth.

As faced by Japan before, China is having serious trade disputes with the US. The US, along with other Western nations, is also taking other actions against China, such as encouraging the construction of domestic manufacturing plants by giving large subsidies and limiting advanced technology transfers to China.

China has encountered more challenges in dealing with Western countries than Japan. However, given its huge domestic market and the rising demand for foreign-made products, China should be in a better position to negotiate with other developed countries than Japan did decades ago. In addition, China's currency does not have the pressure of appreciation as Japan faced decades ago. The Chinese Yuan, in fact, has generally depreciated in the past years. It is essential that as a member of the World Trade Organization (WTO) and other internationally recognized organizations, China should follow the global trade rules. It also needs to further reform its economic system and develop and establish more effective market-oriented system and reduce government interference in the economy. It is worthwhile to notice that China's markets are more open than Japan.

Here are some lessons that China can learn from the US experience.

Personal consumption

US personal consumption has been stable for several decades and is about 67% of its total GDP. China's personal consumption to GDP is about 45% (Chen *et al.* [11]). Compared with developed economies, China's personal consumption ratio is modest. When China further develops, this ratio will rise. However, the personal consumption rise is gradual and cumulative. It will be unreasonable to expect that China's personal consumption will jump up significantly in a short-time period. Similarly, one should not expect that one's personal consumption will come out to save the economy from a recession.

As Chen & Qiao [27] analyzed, a country's culture also affects its personal consumption. Japan is a developed economy; but its personal consumption to GDP ratio is much lower than the other western economies.

Investment

The economic growth depends on investment. This is particularly true when the economy experiences recession due to lack of total aggregate demand.

The government is responsible for stimulating the economy using fiscal and monetary policies. However, the government should not overspend and overinvest in the economy since its side effects will hurt long-term economic development as happened in Japan during the 1980s and 1990s.

Private investors are more rational than the governments, so they are more efficient in investment. They make investment decisions based on the assessments of the risks and returns. A sustainable investment must be associated with the appropriate risk-based returns. The government has to rely on private sectors for investment. The responsibility of the governments is to form fair, transparent, supportive, and competitive markets so all entrepreneurs are able to compete, take risks, and obtain adequate returns if successful.

Exports

Exports of products and services help bring jobs and improve a country's foreign currency reserves, so all countries promote and support more exports. On the other hand, globalization and global supply chains mean that more imports may be associated with the exports. As a result, the effect of the net export on the economy in many countries is stable.

The US has had huge trade deficits each year; its net exports negatively affect its economic growth. China has had large trade surplus, and the significant net export positively contributes to its economic growth. As Chen [5] and Chen *et al.* [11] emphasized, China needs to maintain a strong and competitive manufacturing industry and continuously keep its major global exporter status. But it will be unrealistic to anticipate that the net export will be able to contribute to its economic growth more significantly in the future.

Population and labor rate

As our value-added econometric model showed, the population and labor rate are crucial to all economies. The US economy has been doing better than other developed economies generally. One main reason is that the US has its sufficient labor supply and stable labor force. The human capital accumulation is the most crucial to economic development. As Chen *et al.* [11] and Qiao & Chen [27] stated that China had the negative population growth from 2022. This is a serious problem to China's future economic development. To limit the adverse impacts of labor shortage in the future, China needs to extend

the retirement age gradually as well as introduce foreign workers/immigrants eventually. More importantly, China has to raise its labor quality and labor productivity as Chen *et al* [11] and Qiao and Chen [27] emphasized.

Economic policy

What Can China learn from US experience? First, the economic policy must consider its long-term effects. The business cycle is one of many serious problems that the US and other developed economies have experienced repeatedly. China eventually will experience some kind of business cycles in the future as Chen [9] stated. But China should learn from developed countries' failures, especially the business cycles and take precautions and effective measures to avoid such cycles or lower its negative effects. Stable and sustainable growth is more important than fast growth first and then big recession later.

As econometric models here indicated, a country's economic growth relies on consumption, investment and net export in the expenditure-based approach and on the labor rate, productivity and economic structure in the value-added approach. The economic policy should be used to address or solve main problems facing its economy and especially focus on these relevant variables. There are short-term problems and long-term issues. An economic policy that, to some extent, solves short-term problems but causes serious long-term negative outcomes, should be re-considered and avoided as Chen & Qiao [12] stated.

Productivity and Innovation

A company and an economy's competitiveness is based on its productivity. A successful global company must be both innovative and productive. Like other developed economies, the US has established a good manufacturing reputation for many products because of its high quality.

China has spent more on R & D in the past decades and that has led to many new scientific findings, new technologies and products. Especially since 2022, China has surpassed the US and had the most patents in force worldwide. But China needs to raise its adoption rate of innovations and patents to directly improve its businesses and economy. Also, China needs to use its innovations and new technologies to improve its productivity. Individuals, businesses, and particularly entrepreneurs are innovators. A good economic system is to motivate and support innovations.

Urbanization

China's current urbanization rate is about 62%, much lower than the US rate of about 82%. As Chen *et al.* [11] explained, China's urbanization rate will continuously rise but its annual increase will be lower in the future. Therefore, the impacts of urbanization on its economic growth will be gradually less significant as happened in other developed economies.

Besides raising its nominal urbanization rate so more people will live in cities and towns, China also needs to pay attention to solve problems for millions of farmworkers who are working and living in the cities and towns but they donot have the permanent living rights there.

Manufacturing industry

Table 15 compares the manufacturing value-added GDP share of the US with other three countries (Japan, China, and Germany) and for the world. The share of GDP from the manufacturing industry in US is low, compared with other ones. US manufacturing share in GDP was only 10.63% in 2020.

Table 15: Manufacturing GDP Share Comparisons (%)

Country	2005	2010	2015	2016	2017	2018	2019	2020
World	16.26	15.88	16.40	16.20	16.26	16.39	15.99	15.94
China	32.09	31.61	28.95	28.07	28.11	27.84	26.77	26.29
US	12.98	11.91	11.66	11.22	11.26	11.35	11.06	10.63
Japan	21.42	20.77	20.46	20.29	20.44	20.62	20.06	19.75
Germany	20.07	19.70	20.35	20.66	20.39	20.04	19.56	18.70

Data source: World Bank

China's manufacturing share in GDP was above 26% in 2020. China needs to keep a strong and competitive manufacturing industry. The significant rise of wages and other costs in the past years has led many manufacturers to moving out of China. Foreign investment in China has also been negatively impacted by its trade war with the US and political issues between China and other Western countries. As Chen [5], Chen *et al.* [6], Chen *et al.* [7], Chen [10], Chen & Qiao [12], and Qiao & Chen [27] repeatedly stated, the industrial sector, specially manufacturing, will decide China's future, although other two sectors are also important.

Entrepreneurship

Entrepreneurs are the key to economic development. The US has several top companies with total market values over \$3 trillion or even \$4 trillion. It is the entrepreneurship that differentiates them from other competitors. These entrepreneurs are extremely innovative and highly risk-taking, and they have great visions and strategic perspectives. As a result, these companies are exceptionally successful.

The opening and reforms in the 1980s in China generated many successful entrepreneurs. They had great visions and courage to start up their own private companies and eventually led their companies to becoming strong global competitors. But now many of these entrepreneurs have retired or are close to retirement. Therefore, China needs to call for a new generation of entrepreneurs to stand up and compete in the global stage.

Economic development mainly relies on businesses and entrepreneurs, not governments although they still play essential roles even in the market economy. The government should aim at motivating people and particularly encouraging more entrepreneurship.

Market economy and government's role

The free-market system is not perfect but generally works better than any kind of planned system. It can more efficiently allocate limited resources. Government interference in business and economy is necessary since a free-market system may fail from time to time. Also, many public goods, like public infrastructures and public schools/colleges need the government's investment and provisions. The US's free and open market system has led to its great success in the past and will continuously help it dominate the world for many decades in the future.

China's economic success since 1978 has been from its opening policy and reforms, particularly its market-oriented reforms. China needs to keep these policies and particularly further expand its deep openness and comprehensive reforms to establish an efficient market-oriented economic system.

Inflation

In western countries, inflation is often associated with the business cycle. Developing countries like China may experience inflation due to domestic or

global factors [10]. It is high inflation, especially extremely excessive inflation that seriously damages society and whole economy. Thus, all governments in the world always aim at controlling inflation.

China has not experienced significant problems of inflation in recent years, different from many other countries like the US. Oppositely, China has had some kind of deflation problems recently. As Chen [10] stated that deflation may be more dangerous than inflation as occurred in Japan. Reversing deflation often is more difficult than controlling inflation.

China needs to learn from the US and Japan experiences and develop effective measures and take appropriate and timely actions to deal with possible high inflation or deflation in the future. As Chen [8] analyzed, China eventually will experience the business cycle in the future; thus, it will encounter possible high inflation as well.

Exchange rate

As Chen *et al.* [7] explained, stable exchange rate is crucial to an economy and China's currency has potential for appreciation in the long-term. In the past years, China's Yuan has generally been depreciated mainly because of its slower economic growth. The US dollar is still a dominant global currency although Chinese Yuan's internalization has been improving gradually.

China must develop its currency strategy that balances its trade and economic goals with its global leader ambition. These two objectives could be conflicting from time to time. For example, currency depreciation is good for exports and economic development in the short term but that may hurt the country's global leadership.

CONCLUSION

We analyzed the US economy in this paper based on the expenditure and value-added GDP models. The regression results show that personal consumption and total investment positively contributed to US economic growth while all other variables had negative effects in the expenditure model. In the value-added analysis, the overall labor rate and labor productivity in the service sector were the only two variables that significantly impacted its economic development; and all other variables, including the productivity in the other two sectors, labor rates in three industries and urbanization rate had insignificant effects.

We then discussed in detail changes in these economic variables in the past and future and its effects on the US development.

Personal consumption is the most important to the US economic growth. Besides persistent rise of its GDP per capita in the future, the US needs to improve its income and wealth distribution among individuals. The gap of the income and wealth between the rich and poor people has been increasing over decades in the US. This rising disparity will hurt its economic stability and growth.

Investment contributes to the US economy significantly. Thus, the US needs to continuously attract more foreign investment. It needs to create better business environment to welcome foreign companies, especially manufacturing companies to invest in the US.

The US has had steady overall labor rate because of the ample labor supply, which depends on its birthrate, average life expectancy, and new immigrants. To maintain sustainable economic growth in the future, the US needs to keep stable labor force. Therefore, the US should persistently improve its average life expectancy by having better healthcare system and raising people's income. It needs to encourage people to marry and have more children. Also, it needs to attract immigrants.

The US and China are the two largest economies. What the US has experienced will be relevant and valuable to China. These two economies are substantially different in terms of economic systems, cultures, and development stages. On the other hand, China can learn from the US and other developed countries on how to overcome challenges and difficulties when a country goes through its industrialization, modernization, and urbanization. China particularly can learn how to take precautions and adapt firm fiscal and monetary policies to deal with high inflation and deflation and manage business cycles. Such learning and taking better and more appropriate actions can help China not repeat similar mistakes that the US and other developed countries have made.

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