
An Analysis of China's Economic Growth: The Effects of the WTO and the RCEP

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Abstract

Using econometric models based on the expenditure approach for Gross Domestic Product (GDP) measurement, our research examines the main factors that significantly contributed to China's economic growth from 1978 to 2020. Our study investigates the impact of accession to the World Trade Organization (WTO) on China's economy through a comparison of the pre-WTO period (1978-2001) and the post-WTO period (2002-2020). The regression results demonstrate that government consumption, total investment, and total exports contributed more to China's GDP growth after China entered the WTO. The estimated coefficients for total exports were four to five times larger in the post-WTO period. Our research provides evidence that the WTO accession positively affected China's economic development and strengthened the effect of exports on GDP growth in China. We find that marginal investment return did not decrease when capital investment increased during the post-WTO period. In addition, we examine the WTO's effects on China's economy during the five-year periods before and after joining the WTO. The results show that the WTO helped China stabilize its economy and contributed 2.01-2.37% to China's average annual GDP growth in the five years after WTO entry. Based on our findings for the WTO, we predict that the Regional Comprehensive Economic Partnership (RCEP) could potentially increase China's annual GDP growth by 0.62-0.73%. Finally, we discuss our research's policy implications for China regarding consumption, capital investment, exports and imports, foreign direct investment (FDI), and research and development (R&D).

Keywords: China economic growth, GDP, expenditure approach, WTO, RCEP.

I. Introduction

China adopted its openness and reform policies in 1978. Since then, China has experienced extremely high economic growth for more than two decades with average annual growth rates close to 10%. China joined the World Trade Organization (WTO) in 2001, which helped further grow exports and promoted stable economic development. However, China's economic growth has been slowing down in the past decade even before the COVID-19 pandemic. Signed by fifteen Asia-Pacific countries, the Regional Comprehensive Economic Partnership (RCEP) took effect in early 2022. As a RCEP member, China can significantly benefit from this new trade agreement.

The question is whether the RCEP will help stabilize or reverse China's slowing economic growth. In order to explore this issue, our research analyzes how the WTO has affected China's economic growth. Through a comparison between the WTO and RCEP, our paper can estimate how the RCEP will impact China's economy.

Our paper first investigates the impact of accession to the WTO on China's Gross Domestic Product (GDP) growth. An economy's total GDP can be measured using the expenditure approach, the value-added approach, or the income approach. Due to the limits of the study, this paper only uses the expenditure approach. Based on the expenditure approach, we create six econometric models to examine the variables that significantly affected China's economic growth from 1978 to 2020. The regression results from the pre-WTO (1978-2001) and post-WTO (2002-2020) periods are compared to study the effects of the WTO on China's economy. Our results find that government consumption, capital investment, and total exports had a greater effect on Chinese GDP growth after China entered the WTO. The WTO positively affected China's economic growth.

Next, we compare the five-year periods before and after joining the WTO to determine the WTO's impact on China's average GDP growth. We find that China's average GDP growth was 2.01-2.37% higher in the five-year post-WTO period than the five-year pre-WTO period. Since there are many similarities between the WTO and the RCEP, we extrapolate the potential effects of the RCEP on China's economic growth based on our findings for the WTO. We estimate that the RCEP could potentially increase China's annual GDP growth by 0.62-0.73%. Finally, our paper discusses the policy implications of our study and suggests what China should do to maintain steady economic growth.

There have been numerous studies on China's fast economic growth and the effects of the WTO on China's economy. Our paper is unique from other papers and contributes to the literature in a number of ways. First, we use the latest data from 1978 to 2020 to analyze China's economy. Secondly, since China has joined the WTO for more than 20 years, our research is able to run regression models for the periods before and after the WTO. As a result, we can compare the estimated coefficients between the pre- and post-WTO periods. These comparisons demonstrate how our relevant variables affected China's GDP differently between these two time periods. Third, our research studies the five-year periods before and after joining the WTO to determine the economic effect of the WTO and predict the potential impact of the RCEP for China.

Finally, based on our findings, our study addresses policy implications for China in terms of consumption, capital expenditure, exports and imports, foreign direct investment (FDI), and research and development (R&D).

The rest of the paper is organized as follows. Section II reviews the literature. Section III specifies the econometric models. Section IV explains the data and variables. Section V examines the regression results. Section VI investigates the effects of the WTO. Section VII estimates the potential effects of the RCEP. Section VIII discusses policy implications. Section IX concludes the paper.

II. Review of Literature

In the past 40 years, studies on China's economy have mostly focused on what factors have led to China's unprecedented economic development and whether China will be able to continue such rapid growth (Chang et al., 2016; Chen et al., 2011; Chow, 2006; Tyers & Gollery, 2010; Zhou, 2015). Some studies have contributed China's growth to universal factors such as market-oriented reform and factor endowments such as labor and capital (Chow, 2002; Peerenboom, 2014; Yao, 2014; Zhou et al., 2021). One line of research involving the Washington Consensus attributed China's success to private entrepreneurship, financial liberalization, and political reform (Huang, 2010). Another line of research involving the Beijing Consensus accredited China's rapid growth to its unique features such as innovation in the state sector, financial and political controls, and state ownership of firms (Putterman, 1995; Ramo, 2004). Other research highlighted the Chinese government's successful and active role in its economic development through huge investments in infrastructure and strong support of selected industries (Lin, 2012; Lin et al., 2003). Chen (2015, 2016a, and 2016b) compared three different Chinese industries with developed and underdeveloped economies and advised China that further improvement to its economic structure and productivity can lead to continued steady economic growth. Chen et al. (2017) and Chen (2019) empirically and theoretically examined the causes and effects of business cycles and economic crises and concluded that China needs to further reform its economic and financial systems in order to avoid future economic crises and pass through the middle-income trap.

Previous papers have also studied the effects of China's accession to the WTO. Lai et al. (2016) examined the gains from China's entry to the WTO. Their results find that the gains from trade were greater for import industries than for export industries. Tan (2021) examined the reforms that China implemented after it joined the WTO. The paper found that the WTO initially stimulated efforts to liberalize the economy, adjusted policies to follow international rules, and encouraged foreign business in China. However, the study also found that China never fully liberalized its economy because of various factors that pushed China toward state capitalism. Ching et al. (2011) used the panel data method to evaluate the effect of the WTO. Their findings show that the WTO positively impacted the real economic growth rate, the export growth rate, and the import growth rate from 2002 to 2007.

Paul (2015) tried to determine if the WTO affected foreign trade in China and helped converge the Chinese market with the global market. The paper concluded that the WTO did not significantly affect China's exports and only partially affected China's imports.

The idea for the RCEP was conceived in 2011. Since then, many papers have studied the potential effects of the RCEP on China. Wang (2017) analyzed China's past free trade agreements (FTAs) to determine how China would approach the RCEP. The study predicted that China will have incentives to compromise with RCEP negotiations because the RCEP enables access to the markets of many countries and China has been more flexible in negotiations with the Association of Southeast Asian Nations (ASEAN). Park et al. (2021) used a computable general equilibrium model to determine the long-term effects of the RCEP and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). Their study predicted that the RCEP will increase China's income by \$127 billion. Jiang and Yu (2021) explained China's trade relationships with the other members of the RCEP and the CPTPP and compared the RCEP and the CPTPP. Their paper also discussed the advantages and challenges that China will face joining these two trade agreements and provided suggestions for how to further open up China's economy.

Our paper uses the expenditure approach for GDP measurement to study China's economic growth. Previous studies have also used the expenditure approach to study China. Perkins (2012) used the expenditure approach to break down GDP and analyze China's economy. The author concluded that China needs to solve the efficiency problem of government investments in order to maintain stable economic growth. Chen et al. (2022) used the expenditure approach and the value-added approach to investigate China's growth potential. The study posited that China could maintain an annual growth rate of 5.5-6.5% through 2030 if China is able to avoid any potential financial or economic crisis and without any disaster like COVID 19. However, the paper also postulated that China's annual growth could slow down to 4-5% after 2030 and this slower growth rate could persist for approximately ten more years.

III. Econometric Models Using the Expenditure Approach for GDP Measurement

Based on the expenditure approach, an economy's total GDP is composed of total consumption, total investment, and net exports. Some countries add government spending and investment as a fourth component in its GDP statistics, but China does not follow this methodology.

China adds government consumption into total consumption and adds government investment into total investment, so total GDP = Total Consumption + Total Investment + Net Exports. Since annual GDP growth depends on changes in consumption, investment, and net exports, our paper uses the following specification for Model 1:

$$GDP^r = a + b * Consumption^r + c * Investment^r + d * Net-Export^r \quad (1)$$

GDP^r is the annual GDP growth rate, $Consumption^r$ is the annual consumption growth rate, $Investment^r$ is the annual investment growth rate, and $Net-Export^r$ is the annual net export growth rate. The multicollinearity problem is avoided in our models since the annual growth rates of the variables are used instead of the original annual values.

China also reports data that separates total consumption into personal consumption and government consumption. We use the following specification for Model 2 by replacing total consumption with personal consumption and government consumption.

$$GDP^r = a + b1 * Personal-Consumption^r + b2 * Government-Consumption^r + c * Investment^r + d * Net-Export^r \quad (2)$$

China's economic reform and opening up policies have supported China's dramatic economic progress since 1978. These policies have attracted huge FDI. FDI, joint ventures, and fully foreign-owned firms have in turn pushed China to become more open and spur further reform. FDI has played an important role in China's trade and economic development. Trade by FDI firms used to be around 50% of China's total trade, but it has now decreased to around 40%. Therefore, we add a control variable for FDI in Model 3. FDI data is available starting in 1981 so Model 3 tests the 1981-2020 time period.

R&D is also essential to an economy's competitiveness and productivity. China has increased its R&D spending from 0.9% of GDP in 2001 to 2.4% of GDP in 2021. We add another control variable for R&D in Model 3 to see whether R&D spending has affected China's GDP growth. We predict that the estimated coefficients for R&D will be mostly insignificant since R&D's annual values have been very small and R&D does not immediately generate revenue. After including control variables for FDI and R&D, the specification for Model 3 will be:

$$GDP^r = a + b1 * Personal-Consumption^r + b2 * Government-Consumption^r + c * Investment^r + d * Net-Export^r + e * FDI^r + f * R\&D^r \quad (3)$$

International trade has helped advance China’s development and contribute to its economic growth. China is a global manufacturing center although some manufacturers have recently moved away from China to countries such as Vietnam and India due to rising costs in China. Trade and especially exports will still be essential to China in the future. Table 1 summarizes China’s net exports to total GDP ratio and Table 2 summarizes China’s total exports to total GDP ratio.

Table 1 Net Exports to GDP Ratio (1978-2020) (Data Source: CNBS)

	1978-2020	Pre-WTO 1978-2001	Post-WTO 2002-2020
Average	1.98%	0.79%	3.48%
Standard Deviation	2.52%	2.07%	2.25%

Note: The t-test shows that the difference between the pre-WTO and post-WTO periods is significant at 1%.

Table 2 Total Exports to GDP Ratio (1978-2020) (Data Source: CNBS)

	1978-2020	Pre-WTO 1978-2001	Post-WTO 2002-2020
Average	17.63%	11.28%	25.66%
Standard Deviation	9.34%	6.11%	5.82%

Note: The t-test shows that the difference between the pre-WTO and post-WTO periods is significant at 1%.

Chen et al. (2022) noted that net export’s contribution to China’s GDP growth was marginal. Thus, we expect that the estimated coefficient for Net-Export in Models 1, 2 and 3 will either be insignificant or near zero. However, these results do not mean that trade is not important to China’s economy. Even if net export growth does not directly contribute to GDP growth, exports are still important to the economy since they create jobs, which lead to an increase in income and personal consumption. The trade surplus increases a country’s foreign currency reserves, which allows the government to invest in public projects. Imports negatively affect GDP but are still beneficial to the economy because they provide needed products and services and improve the quality of life. The import of advanced technologies and high-quality equipment also benefit many firms and industries.

In Models 4, 5, and 6, we substitute the net export growth rates with the total export growth rates in order to capture the effect of total exports on China’s economy. We expect that this new variable will be significant in regressions.

$$GDP^r = a + b*Consumption^r + c*Investment^r + d*Total-Export^r \tag{4}$$

$$GDP^r = a + b1*Personal-Consumption^r + b2*Government-Consumption^r + c*Investment^r + d*Total-Export^r \tag{5}$$

$$\text{GDP}^r = a + b_1 * \text{Personal-Consumption}^r + b_2 * \text{Government-Consumption}^r + c * \text{Investment}^r + d * \text{Total-Export}^r + e * \text{FDI}^r + f * \text{R\&D}^r \quad (6)$$

Our paper compares the contribution of each independent variable to China's GDP growth between the pre- and post-WTO periods. Thus, the full data period (1978-2020) is divided into the pre-WTO period (1978-2001) and post-WTO period (2002-2020). For each of the six models, we run regressions for the full period (1978-2020), the pre-WTO period (1978-2001), and post-WTO period (2002-2020), respectively. As a result, we have eighteen regressions, which are presented in Section V.

IV. Data and Variables

Data are obtained from China's National Bureau of Statistics (CNBS) and cover the period from 1978 to 2020. The data values are in nominal Chinese Yuan. The full data period (1978-2020) is divided into the pre-WTO period (1978-2001) and post-WTO period (2002-2020), which provides a comparison of the estimated coefficients for the independent variables between the two time periods to show the effects of the WTO on China.

In Models 1, 2, and 3, the annual growth of net exports is one of the independent variables. However, this variable has outliers. Therefore, a proxy variable to substitute for net export growth is necessary. The change in the net exports to GDP ratio is selected to replace the net export growth rate since the new variable is still related to the change of net exports and is also a percentage variable. In order to better capture the effects of net exports on economic growth, the change in the net exports to GDP ratio is used in Models 1, 2, and 3.

The dependent variable is the annual GDP growth rate. Eight independent variables in total are used in our six models. Seven independent variables include the annual growth rates for total consumption, total personal consumption, total government consumption, total capital investment, total exports, FDI, and R&D. The annual growth rates of variables are used instead of the annual values because the purpose of this paper is to identify which factors significantly affected GDP growth and not the actual values of GDP. Using the growth rates also helps avoid potential multicollinearity issues for the variables in the models. The eighth independent variable is the change in net exports to GDP ratio.

V. Regression Results

Tables 3, 4, and 5 present the regression results from Models 1, 2, and 3, respectively. The results show that most of the coefficients are significant. The coefficients for the pre- and post-WTO periods are compared to determine the effect of the WTO. In Table 3, the coefficient for total consumption growth decreased in the post-WTO period. In Tables 4 and 5, the coefficients for personal consumption growth decreased while the coefficients for government consumption growth increased in the post-WTO period. These results indicate that personal consumption had a lower effect on GDP growth while government spending had a greater effect on GDP growth after China joined the WTO. The estimated coefficients for capital investment growth increased in the post-WTO period for all three models. Total capital investment had a greater impact on GDP growth and the marginal rate of investment return did not decrease when investments increased after China entered the WTO. The coefficients for change in net export / GDP have the largest values, but did not change much in the post-WTO period.

In Table 5, the coefficient for FDI growth is significant for the pre-WTO period (1981-2001) and the coefficients for R&D growth are significant for the full period (1981-2020) and for the pre-WTO period (1981-2001). The estimated coefficients for FDI and R&D are very small. These results are reasonable because their annual values are very small compared with the other independent variables even though FDI and R&D are still important to the economy. Thus, their estimated coefficients will either be insignificant or very small.

FDI may not directly affect GDP growth significantly, but it can indirectly benefit the economy. FDI and its associated companies have helped advance China's technology and brought in modern management practices to Chinese firms. Trade by FDI firms accounts for about 40% of China's total trade. Like FDI, the total amount of annual R&D spending is small, 2.4% of total GDP in 2021, and this ratio was much smaller in earlier years. While R&D does not immediately generate GDP, R&D is still crucial to a country's international competitiveness. R&D is especially important to China's manufacturing industry and its technology advancements.

Table 3. Model 1 Regression Outcomes

	1978-2020	1978-2001	2002-2020
Intercept	0.00	0.00	0.00
Consumption Growth	0.62***	0.64***	0.60***
Capital Investment Growth	0.38***	0.35***	0.42***
Change in Net Export / GDP	1.18***	1.15***	1.16***
Observations	42	23	19
F-Statistic	6,141.05***	12,412.08***	2,131.28***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

Table 4. Model 2 Regression Outcomes

	1978-2020	1978-2001	2002-2020
Intercept	0.00	0.00	0.00
Personal Consumption Growth	0.48***	0.50***	0.37***
Government Consumption Growth	0.14***	0.14***	0.22***
Capital Investment Growth	0.38***	0.35***	0.41***
Change in Net Export / GDP	1.19***	1.14***	1.11***
Observations	42	23	19
F-Statistic	3,551.19***	5,969.88***	1,803.03***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

Table 5 Model 3 Regression Outcomes

	1981-2020	1981-2001	2002-2020
Intercept	0.00*	0.00	0.00
Personal Consumption Growth	0.48***	0.49***	0.37***
Government Consumption Growth	0.12***	0.14***	0.22***
Capital Investment Growth	0.37***	0.35***	0.41***
Change in Net Export / GDP	1.18***	1.11***	1.11***
FDI Growth	0.00	0.01***	0.00
R&D Growth	0.03***	0.01*	0.00
Observations	39	20	19
F-Statistic	2,903.00***	4,934.52***	1,031.65***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

Tables 6, 7, and 8 present the regression results for Models 4, 5, and 6, respectively. In order to show how exports directly affect China's economic growth, Models 4, 5, and 6 use the total export growth rate as an independent variable instead of change in the net export / GDP ratio.

The coefficients for most of the variables are significant. In Table 6, the coefficient for total consumption growth decreased in the post-WTO period. In Tables 7 and 8, the coefficients for personal consumption growth are insignificant while the coefficients for government consumption growth increased in the post-WTO period. The coefficients for capital investment growth did not change much in the post-WTO period. The estimated coefficients for total export growth are four to five times larger in the post-WTO period than the pre-WTO period. This result indicates that accession to the WTO substantially stimulated China's exports and promoted Chinese economic growth. In Table 8, the coefficients for FDI Growth are significant in the full period as well as in the pre-WTO period. In Table 8, the coefficients for R&D Growth are insignificant for all three time periods.

Table 6. Model 4 Regression Outcomes

	1978-2020	1978-2001	2002-2020
Intercept	0.01*	0.01	0.00
Consumption Growth	0.61***	0.67***	0.64***
Capital Investment Growth	0.27***	0.24***	0.24***
Total Export Growth	0.03***	0.02**	0.10***
Observations	42	23	19
F-Statistic	310.93***	214.02***	100.90***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

Table 7. Model 5 Regression Outcomes

	1978-2020	1978-2001	2002-2020
Intercept	0.01*	0.01	0.01
Personal Consumption Growth	0.46***	0.52***	0.08
Government Consumption Growth	0.16***	0.14**	0.52***
Capital Investment Growth	0.27***	0.24***	0.23***
Total Export Growth	0.03***	0.02**	0.09***
Observations	42	23	19
F-Statistic	222.25***	154.64***	119.73***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

Table 8. Model 6 Regression Outcomes

	1981-2020	1981-2001	2002-2020
Intercept	0.01	0.02*	0.01
Personal Consumption Growth	0.44***	0.48***	0.09
Government Consumption Growth	0.15***	0.17**	0.52***
Capital Investment Growth	0.22***	0.20***	0.22***
Total Export Growth	0.03***	0.02**	0.08***
FDI Growth	0.03**	0.03*	0.02
R&D Growth	0.03	-0.05	0.01
Observations	39	20	19
F-Statistic	159.95***	114.94***	72.32***

Notes: * 10% significant; ** 5% significant; and *** 1% significant

In summary, the regression results show that the estimated coefficients for government consumption, capital investment, and total exports were larger in the post-WTO period than the pre-WTO period. After WTO accession, government spending, capital investment, and total exports had a greater impact on China's economic development.

VI. The Effects of the WTO

To further examine the effect of the WTO on China's growth, we compare and analyze five-year time periods before and after joining the WTO. Tables 9-11 present statistics calculated based on real annual growth rate data from the World Bank (WB). WB data are used here instead of CNBS data because China's growth rates will be compared with global growth rates to study the effects of the WTO.

Table 9 compares the five-year periods before and after China's accession to the WTO. In Column 1, China's average annual growth rate increased from 8.31% in the pre-WTO period to 10.68% in the post-WTO period. The t-test shows that the 2.37% difference was statistically significant, which demonstrates that the WTO positively affected China's GDP growth. In Column 2, the world's average annual GDP growth rate increased from 3.34% in the pre-WTO period to 3.37% in the post-WTO period. The t-test shows that the difference was insignificant, which means that the world's GDP growth rate did not change between these two time periods. In Column 3, the difference between China's and the world's average GDP growth rate increased from 4.97% in the pre-WTO period to 6.98% in the post-WTO period. The t-test shows that the 2.01% difference was statistically significant. Joining the WTO positively impacted China's economic growth relative to the entire world. Based on the findings in Column 1 and 3, the WTO contributed 2.01-2.37% to China's GDP growth rate in the five years after WTO accession.

The ten-year period before the WTO (1992-2001) is divided into two five-year periods: 1992-1996 and 1997-2001. Table 10 compares the average annual GDP growth rates between these two five-year periods. In Column 1, China's average growth rate decreased from 12.40% in the 1992-1996 period to 8.31% in the 1997-2001 period. The t-test indicates that the 4.09% difference was statistically significant. The findings demonstrate that China's GDP growth rate was going downward in the ten years before China joined the WTO. Without the WTO, China's average annual growth rate could have stayed at 8.31% or decreased even further. China's actual average annual growth rate was 10.68% in the five years following China's entry to the WTO. Therefore, entry to the WTO stabilized China's GDP growth and prevented China's economic growth from further declining. The ten-year period after the WTO (2002-2011) is divided into two five-year periods: 2002-2006 and 2007-2011. Table 11 compares the average annual GDP growth rates between these two five-year periods. In Column 1, China's average growth rate increased from 10.68% in the 2002-2006 period to 10.69% in the 2007-2011 period. However, the t-test shows that the 0.01% difference was insignificant, which indicates that China's economic growth was stable after joining the WTO. In summary, the results in Tables 9-11 show that joining the WTO helped increase and then stabilize China's average GDP growth rate.

Table 9. Five-Year Differences in the Pre- and Post- WTO Periods (1997-2006)

(Data Source: WB)

	ChinaGDP Growth (1)	WorldGDP Growth (2)	China/World Difference (3)
Average (1997-2001)	8.31%	3.34%	4.97%
Standard Deviation (1997-2001)	0.62%	0.97%	0.95%
Average (2002-2006)	10.68%	3.70%	6.98%
Standard Deviation (2002-2006)	1.40%	0.94%	0.95%

Note: The t-tests indicate that the difference between the 5-year pre- and post-WTO periods is significant at 5% for China (Column 1) and significant at 5% for China/World Difference (Column 3), but insignificant for the World (Column 2).

Table 10. Five-year Differences in the Pre-WTO Period (1992-2001)

(Data Source: WB)

	China GDP Growth (1)	World GDP Growth (2)	China/World Difference (3)
Average (1992-1996)	12.40%	2.78%	9.63%
Standard Deviation (1992-1996)	1.88%	0.80%	2.58%
Average (1997-2001)	8.31%	3.34%	4.97%
Standard Deviation (1997-2001)	0.62%	0.97%	0.95%

Note: The t-tests indicate that the difference between the 5-year periods is significant at 1% for China (Column 1) and significant at 5% for China/World Difference (Column 3), but insignificant for the World (Column 2).

Table 11. Five-year Differences in the Post-WTO Period (2002-2011)

(Data Source: WB)

	ChinaGDP Growth (1)	World GDP Growth (2)	China/World Difference (3)
Average (2002-2006)	10.68%	3.70%	6.98%
Standard Deviation (2002-2006)	1.40%	0.94%	0.95%
Average (2007-2011)	10.69%	2.61%	8.08%
Standard Deviation (2007-2011)	2.04%	2.42%	2.08%

Note: The t-tests indicate that the differences between the 5-year periods are insignificant for all three columns.

VII. The Potential Effects of the RCEP

Table 12 provides a comparison between the RCEP and the WTO. The RCEP represents around 29% of the global population and 31% of global GDP. The purpose of the RCEP is to further open markets and reduce tariffs in order to promote trade and investment. The RCEP reduces tariffs by 90% for intraregional trade (Nicita et al., 2021). Park et al. (2021) estimated that the RCEP will increase the income and exports of its members by \$245 billion annually and \$514 billion annually, respectively.

China's trade with the other fourteen RCEP members represents 31% of its total trade, 26% of its total exports, and 37% of its total imports in 2021. Currently, China imports more from the RCEP members than its exports to those countries. The RCEP agreement opens up more markets for China's exports. It is expected that the RCEP will help advance China's trade, especially its exports. Park et al. (2021) projected that the RCEP will increase China's income and exports by \$127 billion annually and \$234 billion annually, respectively.

Based on our analysis in Table 9, the WTO increased China's average annual GDP growth by 2.01-2.37%. Since the RCEP accounts for about 31% of China's total trade and 31% of total global GDP, we project that the effect of the RCEP on China will be at least 31% of the WTO's effect on China. Consequently, the RCEP will raise China's annual GDP growth by 0.62-0.73%. China's total GDP in 2021 was \$17.73 trillion and thus the GDP gain from the RCEP will be approximately \$110-130 billion a year.

Table 12. Comparison between the RCEP and the WTO

	RCEP	WTO	Note
Population	2.3 billion (29% of the world population).	7.3 billion (93% of the world population).	The world population was 7.8 billion in 2021.
Total # of members	15	164	All RCEP countries are WTO members. The WTO has 25 observers seeking to join.
GDP	\$29.6 trillion (31% of global GDP).	\$94.0 trillion (98% of global GDP).	Global GDP was \$96.1 trillion in 2021.
Trade	Exports of goods were \$6.9 trillion (31% of the global total).	Exports of goods were \$21.9 trillion (98% of the global total).	Global exports of goods were \$22.3 trillion in 2021.
Tariffs	Eliminates 90% of tariffs from the current level among members.	No further elimination.	The WTO failed several times to renegotiate trade agreements to lower tariffs and further open markets.

Data sources: World Bank, WTO, and Nicita et al. (2021).

VIII. Policy Implications

1. Consumption

Our findings show that total consumption significantly affected economic growth. China's total consumption to GDP ratio has been 55-60% in recent years. Total consumption is comprised of personal and government consumption. China's personal consumption to GDP ratio is 45%, which is low compared to most developed countries. For example, the personal consumption ratio is 67-70% in the United States. China still has a large potential to improve consumption's contribution to its economy.

Our regression results show that during the post-WTO period, the effect of personal consumption growth was lower while the effect of government consumption growth was higher. A possible explanation for these changes is that the Chinese government accumulated more money through taxes and trade surplus during the post-WTO period. As a result, China has been able to invest more in infrastructure and other public projects. At the same time, personal income and personal consumption have risen, but their relevant effects on economic growth are weaker compared with government spending.

China has constantly advocated for raising personal consumption, especially during difficult economic times such as the 2008 Global Financial Crisis and the COVID-19 pandemic. However, such policies and efforts have been mostly ineffective. An economy needs to raise personal income in order to raise personal consumption. The share of labor compensation in China's GDP has been 55-60%, which hasn't risen much in the past decade. In the United States, the share of labor compensation in GDP is 60-65%, which has gone down recently. Given China's high GDP, a 3-5% increase in this share will be significant to China's economy. Therefore, China's future policy should focus on increasing labor compensation in the economy, which will then lead to an increase in personal consumption.

Government consumption is essential to the economy because the Chinese government is involved in many aspects of economic activities. The Chinese government provides public goods and services to society, such as education and healthcare. However, some government spending is often associated with the misallocation and misuse of resources as well as potential bribes and corruption. Further reform of the economic system and more market-oriented policies will help reduce the role of the government and the spending in the government sector.

2. Capital Investment

Our findings show that capital investment significantly impacted China's growth. China needs to continue increasing its capital investments to stimulate the economy in the future. The big question is how China can improve its investment efficiency and particularly the productivity of government investments? Many studies have raised this issue (Pettis, 2022; Rajah & Leng, 2022). The policy implication is that China's future development needs huge private and government investment. Government direct investment in many areas such as basic infrastructure and other public projects is absolutely necessary. China also needs to provide incentives to encourage private and foreign firms to do business and invest more in China. In addition, China needs to improve its business environment by lowering the operating costs of doing business in China and raise investment efficiency by eliminating unnecessary regulations and government interventions.

3. Export and Import

Our regression analysis indicates that total export growth and the change of the net export to GDP ratio significantly affected annual GDP growth. China is the largest exporter and the second largest importer in the world. Chen et al. (2019) indicate that China's manufacturing growth mainly relied on its exports in the past decades. Trade and especially exports will remain crucial to China's future. The policy implication from this study is that China needs to improve its trade and exports and reduce the negative effects of trade on its economic growth. China should aim for both stabilizing manufacturing exports and significantly increasing service exports. Similar to the WTO, the implementation of the RCEP provides China with a great opportunity for trade. Currently, exports to the other fourteen RCEP countries account for 26% of China's total exports while imports from these countries account for 37% of China's total imports. Thus, China should take advantage of the RCEP agreement and raise its exports to the other RCEP countries.

4. FDI

The estimated coefficients for FDI are either insignificant or very small. After entering the WTO, FDI did not directly contribute to China's GDP growth. Nonetheless, FDI is still essential to China's future development because of its contribution to China's exports and the benefits from access to advanced technologies and modern management strategies. China has to further open its doors and reform its economic systems. China needs to reduce and eliminate access restrictions and open more sectors to foreign and domestic private investors. A more market-oriented economy along with appropriate government regulations will help increase FDI and drive economic growth. Outward FDI is equally important to China's future. Since 2015, total

FDI outward from China has surpassed the total FDI inward to China. China should continue encouraging companies to enter global markets and foreign financial markets.

5. R&D

The estimated coefficients of R&D during the post-WTO period were either insignificant or very small. Even with these results, R&D is still crucial to China’s future. To become the largest global economy, China must be a leader instead of a follower in many advanced technologies. In the past decades, China has substantially raised its R&D intensity (R&D to GDP ratio) to 2.4% but the ratio is still low compared with many other developed economies. For example, the ratio is 3.26% in the United States and 3.45% in Japan. China’s R&D intensity is below the world average ratio of 2.63%. Therefore; China should steadily increase its R&D spending and encourage more corporate R&D investment. China needs to devote more resources to basic science research in addition to increasing investment in R&D. Figure 1 provides a comparison of R&D to GDP ratios for China, Japan, U.S., and the world.

China also should increase the quality of R&D. China needs to develop and implement appropriate policies to reduce inefficient R&D spending. The ability to turn advanced technologies into the production of high-quality and needed products is essential to the success of R&D and the economy. Currently, the rate of technology transfer to relevant product outputs is very low in China. Thus, China needs to improve the effectiveness and efficiency of its R&D spending.

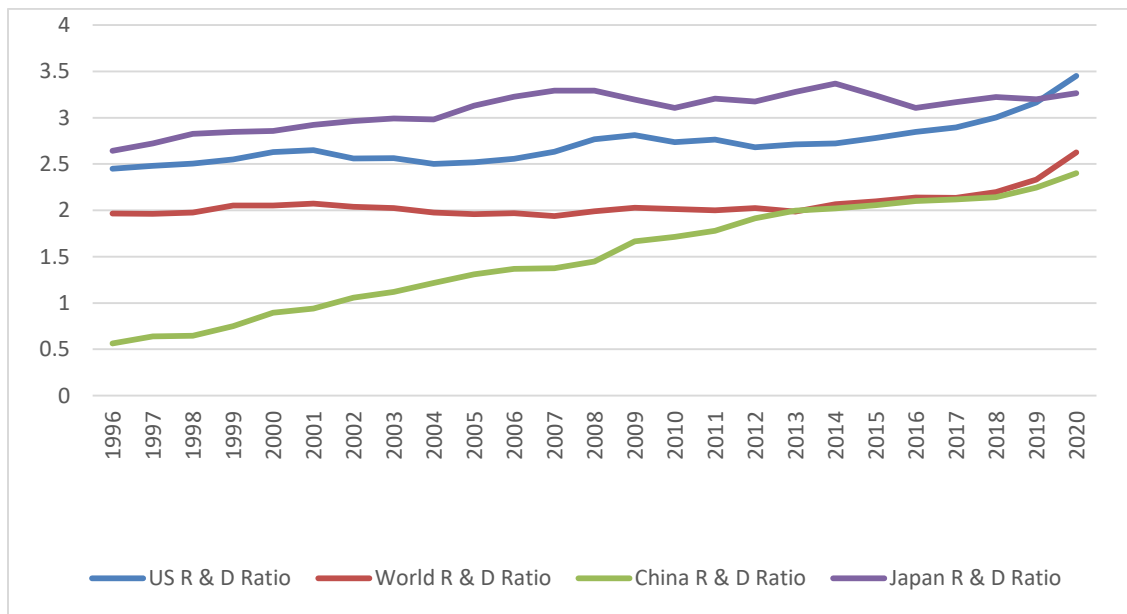


Figure 1. R&D to GDP Ratios for China, Japan, U.S., and the World (1996-2020)
(Data Source: WB)

IX. Conclusion

Using the expenditure method for GDP measurement, our research investigates the main factors that contribute to GDP growth in China during 1978-2020. To evaluate the WTO's impact on China's economic growth, our study compares the pre-WTO (1978-2001) and the post-WTO (2002-2020) periods. Our regression results show that government consumption, total investment, and total exports contributed more to China's GDP growth in the post-WTO period than the pre-WTO period, which demonstrates the positive effects of WTO accession on China's economy. The four to five times increase in the estimated coefficients for total exports in the post-WTO period indicates that joining the WTO enhanced the impact of total exports on GDP growth. Our findings also show that the marginal rate of investment return did not decrease when capital investments rose during the post-WTO period. Furthermore, our paper compares the five-year periods right before and after China entered the WTO to further examine the impact of the WTO. The WTO increased China's average GDP growth by 2.01-2.37% in the five years after China joined the WTO. China's annual GDP growth was declining before China entered the WTO. Our research indicates that entry to the WTO helped bolster and stabilize China's GDP growth.

China's economic growth has been slowing down in the past decade even before the COVID-19 pandemic. Given the similarities between the WTO and the RCEP, our study examines whether the RCEP would help China maintain its GDP growth. Based on our findings, we predict that the RCEP will increase China's annual GDP growth by 0.62-0.73% and help stabilize China's future economic growth.

Our paper discusses the policy implications of our research for China and provides insights into what China should do to maintain its stable economic growth. First, China needs to increase the share of labor compensation in its GDP to raise the level of personal consumption. Second, China should take steps to encourage more private and foreign investment in China and improve its investment efficiency by removing unnecessary regulations. Third, China needs to significantly increase its service exports as well as increase its trade with the other RCEP countries. Fourth, China should take measures to facilitate both FDI inward to China and FDI outward to foreign markets. Finally, China needs to increase its R&D spending, improve R&D quality, and encourage more corporate R&D investment. In short, China needs to further implement its reform and opening up policies and establish a more market-oriented economic system with appropriate and effective regulations.

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