Empirically Investigation of Liberalization of Trade and Economic Growth: An Efficient Regression Analysis

Rana Muhammad Sohail Jafar, Shenzhen University[1]
Ben Niu, Shenzhen University*[2]
Safdar Hussain, Shenzhen University[3]
Yuanyue Feng, Shenzhen University[4]
Wasim Ahmad, Shenzhen University[5]
Sana Ullah, Fujian Agriculture and Forestry University[6]
Waqas Umar Latif, Fujian Agriculture and Forestry University[7]
Peifen Zhuang, Fujian Agriculture and Forestry University[8]

Abstract

Trade liberalization has become a hotly debated issue around the globe following its rapid worldwide implementation. This study empirically analyzed the impact of trade liberalization on the agricultural economic growth of Pakistan by using time series analysis from 1985 to 2015. The ordinary least square regression (OLS) model is used to investigate the impacts of trade liberalization, foreign direct investment and population growth. The results derived from an empirical analysis demonstrate that trade liberalization has adversely impacted agricultural growth in Pakistan. In particular, foreign direct investment has negatively influenced economic growth. To make the statistical analysis more precise, several testing techniques have been applied, e.g., the Phillips–Perron (Oh, Labianca, & Chung) test and the augmented Dickey-Fuller test (ADF). The main finding is that there is a dire need for improving trade balance by increasing exports as much as possible. In particular, export of agricultural goods is highly recommended.

Keyword: agriculture, economic growth, foreign direct investment, OLS regression, Pakistan, trade liberalization

Introduction

International trade, which refers to the transfer of commodities and services across different countries of the world, is contributing to an increasing proportion of the Gross Domestic Product (GDP) of the countries. (Bhagwati & Panagariya, 1996) has argued that economic growth of the country is directly associated with the expansion of international trade. Pakistan is an emerging country and its economy is based on its agriculture sector because the majority of its population resides in rural areas and they depend directly or indirectly on agriculture. Since 1995, Pakistan has been a member of the World Trade Organization (WTO) and has been following the trade liberalization policies initiated by the organization. However, Pakistan's agriculture sector has not been performing satisfactorily due to natural disasters, government policies, and other environmental conditions. Therefore, the trade liberalization debate has persisted since 1950 when, at the world economic platform, it was first supported by the General Agreement on Tariffs and Trade (GATT), established in 1947. Now trade liberalization is supported by World Trade Organization (WTO), which had replaced GATT in 1993.

The main objective of removing these barriers was to strengthen economies and to achieve sustainable economic growth (Herath, 2010a). Tariff rates were reduced in developed and developing

[1]PhD Candidate, College of Management Shenzhen University, 518060. Shenzhen P.R. China; College of Economics, Fujian Agriculture and Forestry University, Fuzhou, 350002, China Email: rana.sohail.jafar@gmail.com
***Corresponding author**
[2] Professor college of Management Shenzhen University 3688 Nanhai Ave, Nanshan Qu, Shenzhen Shi, Guangdong, P.R. China, 518060 Phone: **0086-13723429521**, Email: drniuben@gmail.com
[3] Postdoctoral Candidate, College of Management Shenzhen University, 518060. Shenzhen P.R. China
[4] Assistant Professor, College of Management Shenzhen University, 518060. Shenzhen P.R. China
[5] Postdoctoral Candidate, College of Management Shenzhen University, 518060. Shenzhen P.R. China
[6]PhD candidate, College of Economics, Fujian Agriculture and Forestry University, Fuzhou, 350002, China
[7] PhD candidate, College of Economics, Fujian Agriculture and Forestry University, Fuzhou, 350002, China
[8]Professor, College of Economics, Fujian Agriculture and Forestry University, Fuzhou, 350002, China

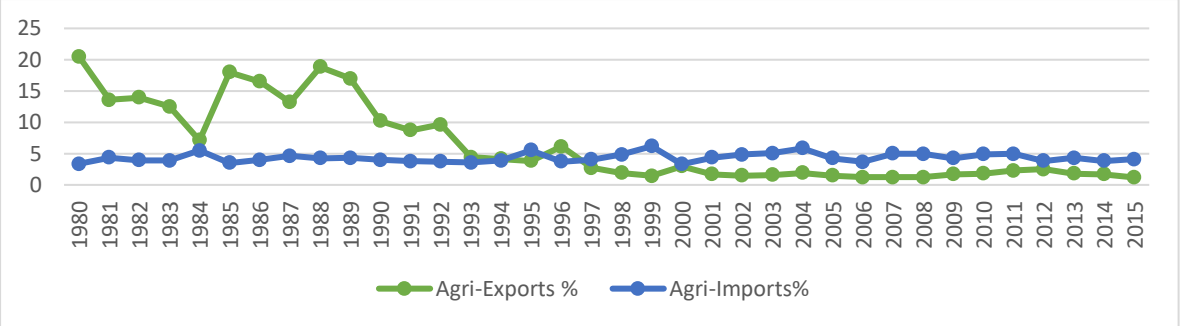
countries by an average rate of 4 to 20 percent (Thirlwall, 2000). Trade liberalization has, however, become a big challenge in most of the countries that liberalization has an encouraging impact on economic growth (ECG). Most researchers believe that trade liberalization leads to the economic development of the nations. Policy makers need to keep in mind all the economic situations of the country so that the policies they adopt would benefit economic development. The International Monetary Fund (IMF) considers that the countries with no trade or low trade level are more unstable to debt crises because they have low export revenue (Spanu, 2003). In the early 1990s, politicians around the world sensed that just trade within the country is not enough. They, therefore, stressed open trade and reduction of trade barriers to be able to face foreign competition. It was realized that trade liberalization in developing countries enhances their productivity and strengthens their economies (Edwards, 1993).

Agriculture accounts for almost 20% of Pakistan's GDP and about 44% of the nation's working population are employed in agriculture. Yet, Pakistan as a net importer of agricultural goods and nutritional development has remained crucial to the rural economy in terms of living conditions, food safety and development. Keeping in view the past and present global economic situation and the speed with which Pakistan is opening its product market, there is extensive distress about the belongings of trade liberalization and growth, improving Pakistan's economy, achieving self-sufficiency in all sectors and improving per capita income has become the major priorities of the country. Presently, Pakistan's export destinations include only a few regions such as the Middle East, European Union, and North America, while sidelining new African, Eastern Europe, Russia and South American countries. In 2014-15, while all major groups of exports recorded negative growth, 2% was recorded by the food group. The highest deterioration was in the food-category has been due to a decline in the export of Basmati rice; it observed a 22.5 percent decline in terms of quantity, in contrast to other varieties of rice which showed a growth of 7.1 percent (Jafar, Rabnawaz, Hussain, Ahmed, & Zhuang, 2015). According to several economic surveys, the agriculture trade of Pakistan is declining while imports are increasing and vice versa. Meanwhile, there are numerous external factors, such as the elasticity of international demand for Pakistani agricultural produce, affecting the export performance of individual commodities.

The share of Pakistan's Agricultural Imports & Exports in the Merchandise Imports & Exports Sector of Pakistan

In Figure 1 we analyze the performance of Pakistan's agriculture sector over the last 35 years. We see that, frequently, imports have increased and exports decreased. This is an eye-opening fact for the government of Pakistan because it means that its agriculture sector has not been performing in accordance with expectations. Clearly, the government of Pakistan needs to focus on the agriculture sector because this sector is the backbone of country's economy.

Figure-1 Share of Agricultural Imports & Exports in Merchandise Imports & Exports



Source: World Bank data (www.worldbank.org).

Many studies have been conducted in other sectors such as industry, finance, and service to check the impact of trade liberalization on the economic growth (M. A. Khan & Qayyum, 2007; Rehman, Fatima, & Ahmad, 2011; Munir, Chaudhry, & Akhtar, 2013). However, the majority of these studies have been either limited to a descriptive analysis or suffers from the problem of limited data and omitted variable bias. Q. M. A. Hye and Wizarat (2013) and (Q. Hye & Wizarat, 2010) checked the impact of financial liberalization on economic growth and industrial growth in Pakistan. They found an insignificant impact of financial liberalization on economic growth and a negative impact on industrial growth. Thus, the empirical studies have been unable to provide an unambiguous picture of the actual relationship between financial liberalization and growth. This may have been due not only to the choice of the specific techniques and variables used to measure financial liberalization matters, but also the presence of other favorites that is conducive to the successful implementation of reforms

and hence vital. Pakistan has become an interesting case in the analysis of agricultural trade liberalization. Other studies have however refuted the existence of a positive link between trade and economic growth e.g. (Musila & Yiheyis, 2015; Polat, Shahbaz, Rehman, & Satti, 2015; and Ulasan, Yavuz, Bagriacik, Cengeloglu, & Yavuz, 2015). The contradicting results from the empirical literature might be attributed to the econometric techniques used, the sampled countries, and the indicator used as a proxy for trade openness.

Thus, considering the purpose for which the liberalization policy was adopted as well as the growth performance of the economy and the trade/GDP ratio over the past two decades, Pakistan has not achieved its objective of reducing overall balance of payment deficits, with a view to stimulating economic growth by adopting the liberalization policies recommended by WTO. Owing to this, there seems to be a dire need to investigate the impact of trade liberalization on Pakistan's economic growth. Hence, this study analyzes the impact of trade liberalization on agricultural value added growth in Pakistan. Although the immense literature is available on this topic, numerous empirical studies have not come to similar conclusions. Rodriguez and Rodrik argue that the literature is largely uninformative, and there is a significant gap between the conclusions derived from theory and the facts of trade liberalization. Therefore, the current study focuses on the agricultural growth of Pakistan by the value added by agricultural products as the proxy of agricultural growth.

In addition, this study is unique among existing studies because most previous researchers had used GDP to measure the impact of trade liberalization on economic growth in a general manner while not distinguishing between the impacts of sector-wise trade liberalizations. The paper proceeds as follows. In the next section, we examine literature to come up with certain insights concerning the impact of trade liberalization on economic growth from national and international perspectives. This is followed by a description of the material and methods used for data collection and analysis. The next section describes the results and findings of the study. Finally, we conclude this paper with a discussion of the contributions and implications of the findings.

Literature Review

Impacts of Trade Liberalization on Economic Growth

Greenaway, Morgan, & Wright, (2002) analyzed the impact of trade liberalization on economic growth in developing countries and found it unsatisfying. Thirlwall (2000) Deliberate the effects of trade liberalization and EcG in African economies and found that it plays an important role in their economy. He mentioned that there exist static and dynamic gains from trade liberalization; the theory of customs unions suggests that gains from trade liberalization enhance the well-being of the society. This study investigated the negative effect of the regional trade agreement on EcG and the positive effect of generalized trade liberalization on EcG.

Rahimi and Shahabadi (2011) Studied the impact of trade liberalization and GDP growth in Iran's economy and found a positive relationship between trade and EcG. Similarly, (Yavari & Mohseni, 2012) estimated the relationship between EcG and found a long run relationship between economic growth and its main determinant. Herath, (2010b) investigated the impact of trade liberalization on the EcG of Srilanka and found positive relationship. Another analysis conducted by (Falvey, Foster, & Greenaway, 2012) noted how trade reforms affect EcG during economic crises. They found that trade liberalization increases EcG in the long run and growth can be experienced during both crisis and non-crisis regimes.

Yanikkaya, (2003) analyzed the effect of trade liberalization on per capita income growth and concluded that trade restrictions in developing countries can cause faster GDP growth. Initially, developing nations of the world had followed restrictive trade policies but, with the passage of time and emergence of globalization, all nations realized the need for openness. (Parikh & Stirbu, 2004) investigated the relationship between trade liberalization, EcG, and Trade balance in 42 emerging countries of Asia, Africa, and Latin America; they examined the impact of trade liberalization, trade balance and current accounts as a percentage of GDP. Domestic EcG was positively related to liberalization in many countries. Trade liberalization can lead to faster growth of imports which had serious implications for the balance of payment and this could constrain EcG in some developing countries. Therefore, they suggested that liberalization promotes growth but growth itself has a negative effect on trade balance for the majority of countries.

Viewpoints about Pakistan's Trade Liberalization

In economic literature, there has been much work highlighting the causality between trade liberalization and GDP growth of Pakistan. R. E. A. Khan and Sattar (2010) Examined the relationship of trade liberalization with poverty and EcG in Pakistan. They found that trade and growth had a positive relationship in the long run but no causality was found in the short run. This showed that growth has a positive effect on trade but not on poverty. Ahmad et al. (2011) suggested that income

inequality and PG had a positive relation with poverty and trade liberalization had a negative effect on poverty.

Similarly, Ellahi et al. (2013), explored the empirical relationship between trade liberalization, industrial value added and EcG of Pakistan. Kemal, Siddiqui, & Siddiqui, (2001) suggested that the impact of tariff rate reduction lowers the price of imported goods, which affected the domestic output price and input price structure. The consumption of each household increased. Tariff reduction increased the gap between the rich and poor. Thus, this policy change favored the rich class and benefited the rich more as compared to the poor in terms of income as well as consumption. Qayyum & Mahmood (2013) advocated that Pakistan should promote foreign trade with its trading partners. Likewise, (Atique, Ahmad, Azhar, & Khan, 2004) showed that the liberalization of industrial policy contributes to productivity and EcG due to its positive effects on exports and imports of industrial capital goods. Fatima, (2010) examined the impact of trade changes in Pakistan on income and potential consumption. The results point out that worsening of terms of trade had a negative impact on EcG of Pakistan.

Overall, to the best of our knowledge, there is no article endeavoring to explain the effects of trade liberalization on the specifically agricultural economic growth of Pakistan and other developing countries. Many studies have tried to describe the relationship between trade liberalization and economic growth but there is a continuing need to further understand the relationship between the different sectors of the countries. Owing to this, we have tried in the current study to explore the relationship between trade liberalization and economic growth and its impacts on agricultural growth.

Material and Methods

This section summarizes the procedure followed for the investigation of trade liberalization's impact on agricultural economic growth.

Theoretical Framework Foundation

A theoretical framework assisted us developing a model describing the relationship between trade and GDP growth. Trade liberalization's effects have been acknowledged widely. The Heckscher-Ohlin factor endowments theory and Ricardo's neoclassical model clearly defined the benefits of trade between countries. The human capital model of endogenous growth' developed by Lucas (1988), reflected upon the engines of economic growth. One of the essential features of the model is the dual role of human capital, internal and external. The internal role is associated with the effect of an individual's human capital on one's own productivity, while the external role refers to the productivity of all factors of production. The suppositions concerning the liberalized trade model are that all countries gain from trade and therefore world output is increased; because the country tends to specialize in products that use their resources in abundance and have the same technology and production worldwide. While the immediate impact is likely to be negative as resources become redundant in areas of comparative disadvantage. This, increased trade (exports and imports) with advanced economies raising growth indirectly by facilitating knowledge and technology spillovers. This study uses multivariate time–series data and incorporates them into dynamic models. Dynamic time–series models used typically consider the impact of present and past values of endogenous (y) and exogenous (x) variables when explaining the impact on the endogenous (y) variable (Gujarati, 2009).

Methodology

This study is based on secondary data collected from different web-sources of World Bank (WB), State Bank of Pakistan (SBP), Pakistan Bureau of Statistics (PBS) and an economic survey of Pakistan to investigate the relationships among "agricultural growth", trade openness (TOP), foreign direct investment (FDI) and population growth (PG). The variables cited in the main objective of the study are tested theoretically, and quantitative investigative methods are applied to make precise and trustworthy conclusions. For that reason, certain simple statistical techniques, as well as innovative statistical methods, are applied in the study. Many studies which have implemented regression analyses are identified in Table 1.

Table 1 Studies Using OLS Regression Modeling

Model	Key Variables	Sample Period	Major Findings	References
OLS (Regression)	Real Gross Domestic Product TOP, FDI	1975-2010	FDI and inflation have negative while TOP have positive relation with GDP	Modak and Mukherjee (2014)
VECM, OLS (Regression)	CO_2, GDP Per-Capita TOP	1971-2013	The results showed that trade liberalization has a negative impact on the environment.	Hakimi and Hamdi (2016)
OLS (Regression) analysis	GDP growth, Investment and Trade	1960-1989	Found a positive and robust correlation between the share of investment in GDP and the average share of trade in GDP	Levine and Renelt (1992
OLS (Regression) analysis	Human Capital and EcG	1960-1985	Found negative relationship between human capital and EcG	Kim, Lin, and Suen (2016)
OLS (Regression) analysis	EcG, Human development TOP	1970 - 2011	TOP has a positive impact on both EcG and human development	Mustafa, Rizov, and Kernohan (2017)

Econometric Model

The link between trade openness and the growth rate of agricultural production is verified by using an aggregate production function framework. Following (Lucas, 1988), we specify an agricultural production function for Pakistan in the following way:

$$Yt = f(TOP, FDI, PG)t \quad (1)$$

Where Y is the agricultural value added; TOP, FDI, and PG represent trade openness, capital and labor force, respectively. Moreover, we follow the framework of (Barro, 1996) which tested the growth determinants based on the neoclassical growth model by using OLS regression. Specifically, we run the following OLS regression model:

$$\mathrm{Yt} = \beta_0 + \beta_1 \mathrm{X}_{1t} + \beta_2 \mathrm{X}_{2t} + \ldots\ldots\ldots + \beta_p \mathrm{X}_{pt} + \mu_t \quad (2)$$

$$\mathrm{AGVADt} = \beta_0 + \beta_1 \mathrm{TOP}_t + \beta_2 \mathrm{FDI}_t + \beta_3 \mathrm{PG}_t + \mu_t \quad (3)$$

Whereas
AGVAD = Agriculture Value-Added Products/Y
TOP = Trade Openness/X1
FDI = Foreign Direct Investment/X2
PG = Population Growth Rate/X3

Here β is regression parameter and μ_t represents the error terms. In equation 4 below, AGVAD is the dependent variable, FDI, TOP and PG are taken as independent variables used to analyze the impact of TOP on agriculture value added products of Pakistan. Eviews 9.1 econometric software was used for the estimation of the regression model. All variables were changed into the logarithmic form to attain accuracy and make the testing method applicable. The objectives of the study regression model were applied according to previous studies which had analyzed the impact of TOP using different perspectives. After transforming the variables into the log-arithmetic form, the study model looked as follows:

$$LNAGVADt = \beta_0 + \beta_1 LNTOP_t + \beta_2 LNFDI_t + \beta_3 LNPG_t + \mu_t \quad (4)$$

Description of Variables

In this study, annual data for the period 1985 to 2015 were used for assessing the impacts of trade liberalization on the “Agricultural Growth of Pakistan”. A detailed description of each variable is given below.

Gross Domestic Product (GDP)

In many studies, e.g., [29], GDP has been used as the proxy of EcG. Our study used the GDP data to measure the Trade liberalization, and the data for GDP expressed in current U.S dollars in millions.

Trade Liberalization/Openness

Trade liberalization has also been called trade openness (TOP) which is currently an ardently debated topic all over the world and lots of research has been done on the topic for that reason. Several approaches have been adopted to measure TOP; the most prominent formula which has been used in many studies is the ratio of imports plus exports over GDP. This indicator has been used in a variety of research works on TOP, e.g., (Yanikkaya, 2003), (Herath, 2010b), and (Shaheen, Ali, Kauser, & Ahmed, 2013). It is defined as follows:

$$\text{TOP} = \frac{\text{Imports+ Export}}{\text{GDP}} * 100 \qquad \text{(a)}$$

Agricultural Growth

According to International Standard Industrial Classification (ISCI), the agriculture sector of Pakistan includes five divisions, namely livestock, hunting, fishing, forestry, and crops. Value-added is the net output of a sector that includes all the results but subtracting intermediate inputs. It is calculated without taking away assets or natural resource shortages and depreciation deductions. Value-added is also determined by ISIC, which is used in the current study as the proxy for the growth of Pakistan's agriculture sector. This choice of the variable was inspired by (Ceylan & Ozkan, 2013).

Foreign Direct Investment (FDI)

FDI is a major source of capital inflow. It includes all capital transactions between two units or between joint enterprises which may be incorporated or otherwise. FDI delivers the basic facilities to developing countries such as technology, capital, entrepreneurial ability and professional skills. These are essential in creating more job opportunities, therefore FDI is generally considered as a source for unemployment reduction and poverty alleviation. The objective was to check whether FDI affects EcG of the agricultural sector. As (Li & Liu, 2005) describes in his study, FDI and EcG have a positive and significant relationship. According to (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004), FDI plays a vital role in economic development. Many studies have used this variable to check the relationship between the EcG and FDI.

Human Capital Accumulation or Population Growth

Since we know that population growth (PG) has a strong relationship with EcG, we choose PG as an independent variable to investigate the effect of PG on agricultural growth. Economic theory offers no consensus to policymakers on the relationship between PG and EcG. The supporters of endogenous growth theory claim that PG stimulates technological advancement while classical economists argue that a rampant PG possibly deteriorates GDP per capita. According to (Tsen & Furuoka, 2005);(Coale & Hoover, 2015); (Mankiw, Romer, & Weil, 1990), PG could be beneficial or detrimental to EcG.

Data Sources

The data for GDP, AGVAD, FDI, and PG have been collected from World Bank's online portal, Pakistan Bureau of Statistics (PBS), Economic Survey of Pakistan (various issues), and State Bank of Pakistan (SBP). All the variables were changed into the logarithmic form to attain accurate relationship and make testing method applicable.

Results and Discussion

The primary goal of this research was to examine the influence of trade liberalization on the growth of Pakistan's agriculture sector. Results from our regression model described in Section 4.2 were used to explain the influence of trade liberalization on agricultural value-added products growth (AGVAD) with other control variables, such as foreign direct investment and population growth. The study model also scrutinized the relationship between TOP on agricultural value-added products, foreign direct investment, and population growth.

Estimation of Models and Results

In this section, we describe the different testing approach techniques used for the estimation of the study model.

Stationarity Analysis (Unit Root Test)

Economic time series' variables can show non-stationary trends. If the variables are not stationary at zero order of integration, then they are stationary at first difference. To check the stationarities of the variables, we applied the most trustworthy and well-known tests, namely the PP test and the ADF test.

Augmented Dickey-Fuller Test (ADF Test)

The ADF test results shown in Table 2 indicate no second-order stationarity; all the variables are stationarity at first difference. The variables LNAGVAD, LNTOP, LNPG and LNFDI exhibit stationarity at first difference. Since there is no second order stationarity in the variables, we could

apply OLS regression techniques. The results show that all the tested series are not stationary in (Ulasan et al.) levels, but are so at 5 % significance level after being differenced once. All the series were therefore assumed to be integrated with order one, thereby fulfilling a necessary condition for applying a co-integration test.

Table 2 ADF Test Results

Variables	I(0)		I(1)		Decision
	t-ratio	Probability	t-ratio	Probability	
LNAGVAD	-2.21	0.21	-5.25	0.00	I(1)
LNFDI	-1.62	0.46	-4.21	0.00	I(1)
LNPG	-2.07	0.25	-5.05	0.00	I(1)
LNTOP	-1.84	0.35	-5.66	0.00	I(1)

Phillips-Perron Test (PP-test)

The Phillips–Perron test is also a unit root test that is used in time series analysis to test the null hypothesis that a time series integrated is of order 1. It builds on the Dickey-Fuller test of the null hypothesis. The results from our Phillips–Perron tests are shown in Table 3. The PP-test provided the same results as those from the ADF-test. There was no second-order stationarity between the variables which gave strong confidence in applying OLS regression.

Table-3: PP-Test Results

Variables	I(0)		I(1)		Decision
	t-ratio	probability	t-ratio	probability	
LNAGVAD	-2.27	0.18	-5.25	0.00	I(1)
LNFDI	-1.66	0.44	-4.21	0.00	I(1)
LNPG	-2.45	0.13	-5.05	0.00	I(1)
LNTOP	-1.84	0.35	-5.66	0.00	I(1)

OLS Regression Analysis

After analyzing the stationarity of variables, OLS regression model has been applied to investigate the impact of trade openness on the agricultural growth of Pakistan. As all the variables show stationarity at first difference, after transforming into first difference OLS regression equation 5 will be as:

$$\Delta LNAGVAD = \beta_0 + \Delta\beta_1 LNTOP_t + \Delta\beta_2 LNPG_t + \Delta\beta_3 LNFDI_t + \Delta\mu_t \quad (5)$$

Our study model sought to ensure the significance of TOP on the growth of value added through agricultural produce. The OLS technique was used to estimate the model. The results are shown in Table 4. With the model accounting for at least 70% of the variation in Pakistan's agriculture growth at 5% level of significance, they suggest that the model had very good explanatory power in terms of the "Adjusted R2" values, The value of R2 is 0.73. It shows that 73 percent of deviation in $LNAGVAD$ was due to $LNTOP$, $LNPG$ and $LNFDI$, and the rest 27 percent deviation due to other factors. The F-statistic equaled 23.69 and the p-value was 0.00. Clearly, these were highly significant indicating that all variables had jointly contributed to agricultural growth. The value of DW was 1.96, which indicated that there was no autocorrelation in the model so that the study model had exhibited the best fit that was significant at 5 percent level of significance.

Table-4: OLS Regression Model Results

Variables	Coefficients	t-stat	Probability
C	4.9796	8.7173	0.00
LNTOP(-1)	-0.2525	-3.4741	0.00
LNFDI(-1)	-0.0023	-0.1809	0.85
LNPG(-1)	0.2916	3.5501	0.00
R-square	0.73	Durbin-Watson	1.96
Adjusted R^2	0.70	Total No. of Observations	31
F-statistic	23.69		
Prob (F-stat)	0.00		

Impact of Trade Openness (TOP) on Agricultural Growth

According to the study results, TOP has a significant but negative relationship with $AGVAD$ growth ($LNTOP = -0.2525; p < 0.00$). In case of Pakistan, the results show that if TOP increased by 1% then the growth of $AGVAD$ would decrease by 0.25 percentage point. The coefficient of LNTOP is the elasticity of too. This unusual result may have been due to the instability of Pakistan's government and the use of capital-intensive technologies. Since most of the population is unskilled, the productivity following the use of the techniques did not increase significantly. One reason for this negative effect could be that, by reducing tariff and importing such goods having low price as compared to domestic prices, the demand for imported products could be increased but, ultimately, this would harm the local markets. However, current study results show that trade openness had a negative impact on agricultural growth. Dollar (1992) and (Zakaria, 2014) indeed found negative and significant relationships among trade openness and economic growth. In our model, the coefficient of, which is the elasticity of $AGVAD$, is negative. This showed that the influence of the value added by agricultural product growth from trade openness was reversed.

This adverse effect was due to trade imbalance, a lack of technology, a lack of research in agriculture, unskilled labor, inadequate investment and poor policies of the government with respect to the agriculture sector. Similarly, (Singariya & Sinha, 2015) found a negative correlation between trade openness and the value-added share of the agriculture sector. The main reason behind this finding might have been Pakistan's trade liberalization policies. That's also why TOP was not favorable for Pakistan. This unusual result may have been due to the instability of the government and the use of capital-intensive technologies. Because most of the population is unskilled, the productivity associated with the use of these techniques did not increase significantly. One reason for this negative effect could be that the reduction in tariff could have increased the import of cheap agriculture products which have harmed the domestic market.

Impact of Foreign Direct Investment (FDI) on Agricultural Growth

Table 4 shows that— $LNFDI = -0.0023$; $p < 0.85$ at the 5% significance level—the coefficient of $LNFDI$ was not significant. In the model, FDI has a non-significant relationship with $AGVAD$ growth in the model. This result implies that FDI does not have significant influence over agricultural growth in Pakistan. We also used FDI variable as a control variable in the study regression model. Foreign direct investment showed the negative and insignificant effect on $AGVAD$ growth. This result is unexpected and is inconsistent with other studies in the same field. This result is however consistent with the study conducted by Yasmin, et al. and Sarkar (2007), who argued that FDI has different effects on growth due to different government policies and institutional effects. The introduction of certain policies about import substitution and investment did not lead to higher economic growth.

Impact of Population Growth (PG) on Agricultural Growth

As shown in Table 4 that $LNPG = 0.2916$ and $p < 0.00$ at 5% significance level, PG had a positive and significant relationship with $AGVAD$ growth. Since the coefficient of $LNPG$ is the elasticity of $AGVAD$ to if PG increases 1% then $AGVAD$ of Pakistan would increase by 30 percent. Thus, the results suggest that population enhances growth. This is consistent with the theoretical expectation that a rise in the population increases the market size and raises aggregate demand in an economy. Also, population growth adds to the total labor force. This increases the supply of labor which in turn enhances investment and hence output growth. The results obtained here are consistent with (Harrison, 1996)); (Siddiqui & Iqbal, 2005), who also found a positive relationship between population growth and GDP growth.

Structural Stability Analysis of Parameters

To analyze the structural stability in the parameters, we applied the CUSUM and CUSUM of squares test. The Figures 2 and 3 plot the results for CUSUM and square of CUSUM tests. They show that there is no structural instability in the coefficients and the data lies within critical bands.

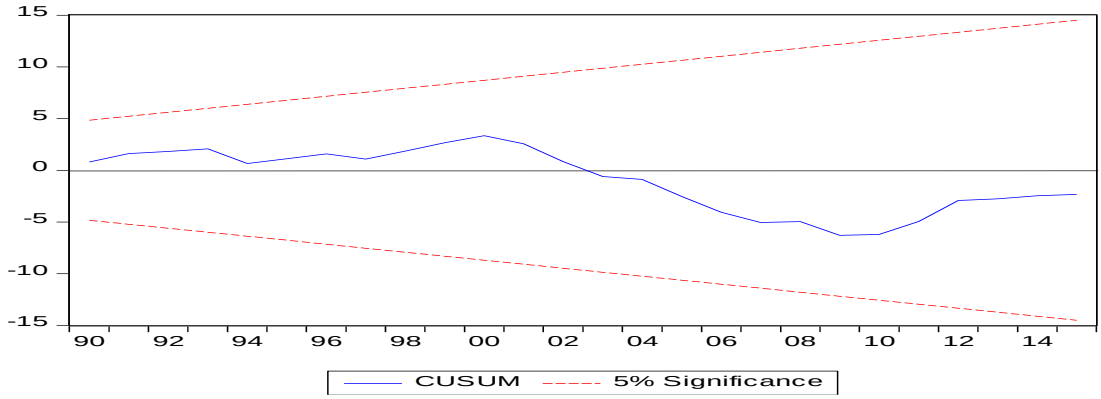


Figure 2 CUSUM Test at 5 percent level of significance.

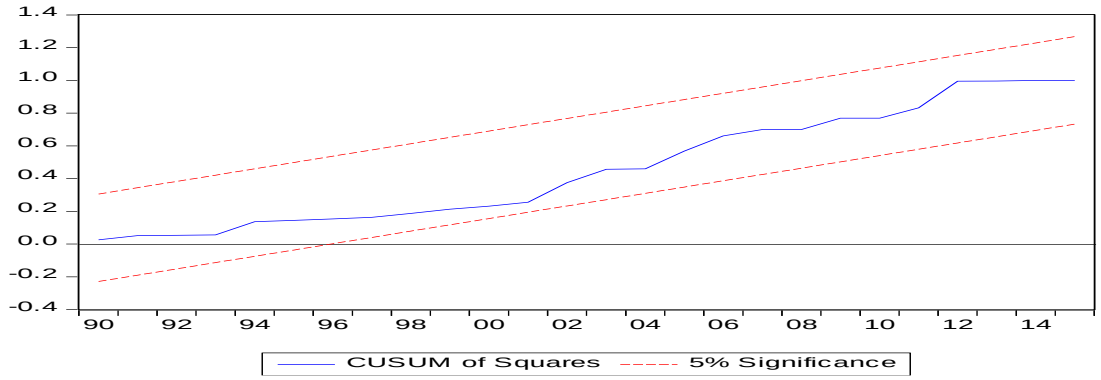


Figure 3 CUSUM of Squares Test at 5 percent level of significance.

Conclusion

This study has revealed new theoretical and practical implications. Compelled by the recent development in international trade, this paper has empirically investigated the impacts of trade liberalization from the perspectives of Pakistan's agriculture sector. The current study is significant in its framework in that it has analyzed the effect of trade liberalization on agricultural growth in Pakistan and made suggestions to its policymakers regarding trade liberalization and economic growth. There was a dire need for a study which could suggest policymakers, the development of agriculture sector. Specifically, we took the agriculture sector because it is the mainstay of Pakistan's economy and provides livelihood to most of the country's population.

Firstly, there is an extreme need for improving trade balance by increasing exports as much as possible. The export of agricultural goods is highly recommended. Moreover, the agriculture sector needs to develop so that it could expand production and export supply capacity in the country. Its trade and investment policies require some reforms to adjust to the changing economic environment. The policies should gear towards more free trade and the elimination of trade barriers. This should

help the country to attract more trade and investments which promote growth. More incentives should be provided to qualified investors who are interested in investing in Pakistan. Furthermore, the government should also improve the agriculture sector which employs about 44% of the total population in the country. Agriculture is the mainstay of the economy but the sector itself is very poor. Through modernization and commercialization, the agriculture sector should become market-oriented. Subsidies should be provided to the rural population in terms of agricultural infrastructure for the enhancement of agricultural produce as well as fully reap the benefits of trade openness.

Encouraging and directing foreign direct investors to invest in the industrial and agricultural sectors should be growth enhancing. An investor-friendly environment must be created in the manufacturing and agricultural sectors of the economy to attract direct foreign investors into those sectors. Emphasis should be placed on the two agricultural sectors because of their contributions to the economy in terms of employment creation, income generation, foreign exchange generation, revenue generation, GDP growth, and the like. Finally, modern technology is highly recommended to promote efficiency and competition. Modern technology and innovations are required in production. High-quality products that are price competitive ensure higher value in the market which will help eliminate the existing trade deficit.

Theoretical implications

This study has made several important theoretical contributions. Primarily, past studies have pointed to the positive growth effects of trade openness (Chang et al., 2009; Dollar & Kraay, 2004; Frankel & Romer, 1999; and Freund & Bolaky, 2008). Though some studies also supported our research findings such as liberalization promotes growth, growth itself had a negative effect on trade balance for the majority of countries. According to Sarkar, 2005, there is not a significant relationship between the per capita growth rate of real GDP and trade liberalization Sarkar (2005) was not significant. (Kim et al., 2012)provided evidence that trade has a negative impact on the low income, high inflation, and agricultural countries.

The findings from the present research are based on trade openness which has a significant negative effect on agricultural growth in Pakistan. The country's imports are greater than exports that led Pakistan to suffer continuous trade deficits. There is, so a dire need for improving trade balance by increasing exports as much as possible. The negative contribution of trade to growth may have been due to the prevailing unfavorable terms of trade. The main exports of Pakistan are in raw primary products which experience fluctuating prices, while the prices of its imports, which are mainly consumables, are rising. In Pakistan, the economy is often adversely affected by floods and natural disasters which affect the nation's agricultural output. In addition, unfair competition in some of the sectors of the economy such as the textiles, poultry, and rice, resulting from trade liberalization could explain the negative impact of trade openness on agricultural growth. Therefore, in the short run, some of the domestic sectors are not able to compete more favorably with their more efficient counterparts of the advanced countries. This is usually because most of the domestic industries are infant industries which produce at a relatively higher average cost. This situation reduces productivity in these sectors which subsequently affects growth negatively. Our study results are the same as those reported by (Rodriguez & Rodrik, 2000); so we can say that study results are valid and usable.

Practical implications

This paper has empirically analyzed the impact of trade liberalization on agricultural economic growth over the period 1985-2015, by utilizing OLS regression techniques. Its results have revealed that trade openness has a significant adverse impact over the agricultural growth of Pakistan. They support the concept that, in an open economy, in which domestic production requires domestic and imported inputs, trade distortions caused by government policies like tariffs and exchange controls lower growth significantly over a long period. Since it hampers the supply of imported inputs, there is a decrease in the productivity of capital accumulation and, this leads to a reduction in the growth rate. The coefficient of the TOP variable is negative. This shows that trade openness could be detrimental to agricultural growth in Pakistan.

Limitations and Future Research

This study has contributed important evidence to literature by coming up with substantial findings of substance about economic growth under the paradigm of trade openness. However, there are several limitations to this study that provide opportunities to extend this study with the further future investigation. First, it would be valuable to further examine how trade liberalization has influenced other major sectors such as industrial and services sectors which are also worthy of examination. This study has attempted to analyze the impact of trade liberalization on agricultural value added growth in Pakistan. The availability of the data, however, limited the scope of this study. Throughout this study, the variables selection decision was hard because of adjustments to the data availability of the variables used in this study. The short data period also gave limited options to

explore the data for further analysis using a different analysis technique to achieve reliable results. This limitation in data has also meant that the type of data used in this study was varied. The use of data on the same platform creates coherent and synchronized results, thus avoiding biased results. This shortcoming of the data has also meant that the study's scope was limited.

Second, this study has focused only on the agricultural growth of Pakistan. This, therefore, gives options to compare the impact of the trade liberalization on other sectors and other member countries. The impacts of the trade liberalization can be broadened to arrive at a more holistic analysis in terms of trade, sectors, and countries.

Further research could also focus on Pakistan's trading partners and specific commodities traded. There is also a need to draw attention to two new directions in trade strategy in Pakistan, namely trade liberalization in some service sectors and regional free trade agreements. Finally, since only the agriculture sector was the area of focus in this study, future studies could compare the impacts of the liberalization agreement with other sectors, such as manufacture and service; involving other sectors can enrich the analysis presented in this study.

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Chinese Consumer Purchase Decisions on Safe Meat Products Based on ANP Theory

Hongjun Tao, Associate Professor, Department of International Trade and Economics, School of Economics and Management, Fuzhou University, Shangjie, Minhou, Fuzhou, Fujian, 350108, China
Jeff Luckstead, Assistant Professor, Division of Agriculture and Bumpers College, University of Arkansas, Fayetteville AR, 72701, USA
Liang Zhao, Associate Professor, Department of Economics, College of Economics, Fujian Normal University, Shangjie, Minhou, Fuzhou, Fujian, 350117, China
Qingbing Wu, Graduate Student, Department of International Trade and Economics, School of Economics and Management, Fuzhou University, Shangjie, Minhou, Fuzhou, Fujian, 350108, China

Background Information

With the rapid development of China's economy and the further improvement of people's living standard, consumer's view of consumption has changed. Consumers pay high attention to food quality. The possible factors that influence consumers' purchase of safe meat include brands, convenience, price, income, education and the people's trust in the government. Food information related to food safety, food quality, and food trust also has an impact on consumers' decision-making behavior. Therefore, understanding the factors and preferences that consumers consider to buy safe meat products not only provides a reference for the market positioning of food producers, but also provides a direction for the government to regulate the safety of meat products. In this study, the key factors of safe meat food purchase were discussed with multiple criteria decision. This paper investigates the factors that consumers consider when choosing safe food. The research results may have policy recommendations for meat safety and meat consumption.

Methodology

Firstly, this paper classifies the safe meat food into five levels of food safety, food quality, food trust, food market and consumer characteristics, and uses Interpretive Structural Model (ISM) to examine the relationships between levels. Secondly, this paper analyzes consumers' purchasing decisions on safe meat products and discusses the market demand for safe meat products by using the ANP model,.

The Analytic Network Process is proposed by Saaty in 1966 year, which is a kind of qualitative and quantitative analysis method, and often used to deal with complex decision problems. The factors that influence consumers' buying behavior are interrelated, and impact on consumers' behavior together. The ANP model describes and analyzes the purchasing

behavior of consumers by analyzing the interaction and feedback within the set of elements within the system and in the element set.

The Interpretive Structural Model (ISM), developed by Warfield in the 1973 year, is a method to analyze the relationships between elements. By decomposing the complex system into several subsystem elements, a hierarchical structure model is formed. Based on the qualitative analysis, the fuzzy view is transformed into a more intuitive model with good structural relation through the mathematical operation of two-dimensional matrices, especially suitable for the systematic analysis of many variables and complicated relationships.

Expected Results

In this paper, questionnaires are used to build the ISM model to determine the relationship between the impact factors and feedback. After discovering the intricate interrelationships between the factors, the decision model of the ANP is used to explore the importance of the factors that consumers consider in purchasing safe meat products. This article's expected results may be described as: the higher the consumer' education level and the income are , the higher the consumers' desire for safe meat. The higher the quality and safety certification level of food are, the higher the consumers' willingness to purchase safe food. Producer's good reputation also plays an important role in consumer's purchasing decision. Consumers have a higher preference for traceability of meat products, especially in the production of meat products.

China's food traceability system construction is still in the initial stage. The more traceable information on meat safety, the more it helps consumers purchase. However, with the increase of traceability information contained in meat products, it is bound to increase the cost of production of safe meat products, which will eventually lead to higher prices. In the current time, the Chinese government should focus on strengthening the supervision of the meat production. At the same time, meat producers should also pay attention to improve corporate reputation.

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Durable Goods Consumption of the Chinese Urban Households Since the Reform and Opening to the Outside Word

Qingfei Yin, Tianxiang Yin
Central South University

It has been just 40 years since the reform and opening to the outside world in 1978. It starts a revolution in the Chinese society and brought tremendous changes in people's life both in quantity and in quality. Their durable goods consumption can be considered as a "defining gauge" of these huge changes. And thus we take the consumption of durable goods as our topic for the changes of Chinese households' life in the past 40 years.

The development and evolution of durable goods consumption in Chinese households during the past 40 years can be divided into the following five stages.

1 The First Stage: a Transition from the Consumption of Old Durable Goods to the New Ones (1978-1984)

This stage can be regarded as a prelude of the durable goods era.

Before the reform and opening to the outside world, the Chinese households had very few durable goods. The most representative durable goods were the "Four Old Durables" (which were invented in 19th century or earlier and so were known as old at that time). They are also known by Chinese households as "The Three Rotations (in means the bicycle, the sewing machine and the watch, which all run as rotations) and One Sound (it means the radio receiver, which can make sounds)". There were almost no such durable goods as TV sets, refrigerators, washing machines, air conditioners, and so on (which were invented in 20th century and so were known as new) in the Chinese households. The ownership of such "Three Rotations and One Sound" were the dreams of most Chinese households then. Even such "Four Old Durables" were very simple and inferior. They were also very limited in quantity and had to be sold by ration under the highly-centralized and inefficient planning economy.

After the reform and opening-up in 1978, the income of the Chinese households rose very rapidly and more and more Chinese households realized their dreams of owning "The Three Rotations and One Sound". Some researches show that the per hundred person ownership of sewing machines by urban households increased from 8.6 in 1978 to 18.6 in 1984 with a growth rate of 116.3%; that of bicycles increased from 23.3 in 1978 to 41.6 1984 with a growth rate of 76.8%; that of watches increased from 29.3 in 1978 to 62.2 in 1984 with a growth rate of 136.2%; and that of radio sets increased from 20.2 in 1978 to 35 in 1984 with a growth rate of 73.3%.

In table 1 below we can see the ownership from 1978 to 1985.

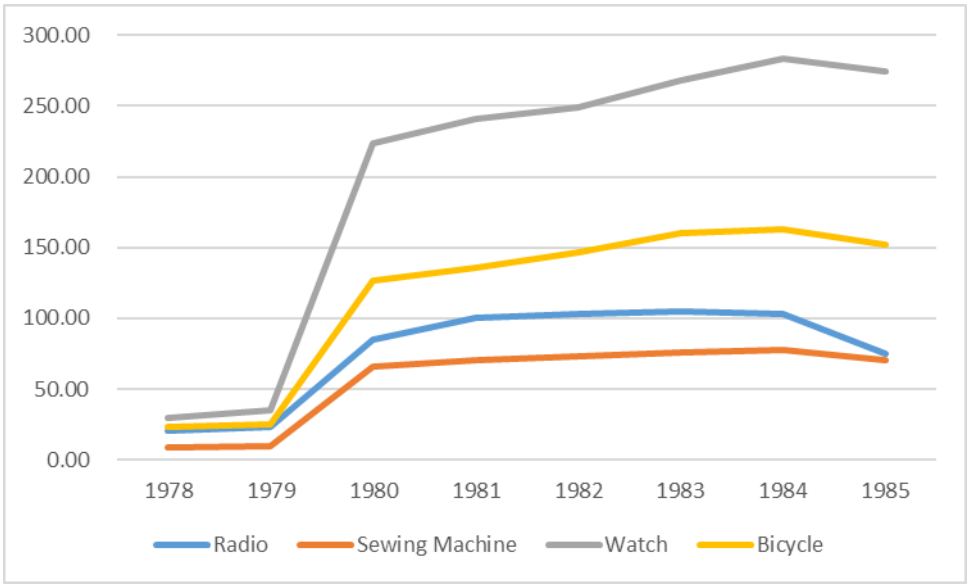
Table 1: Urban Chinese Household Ownership of "Four OLD Durables" (in per hundred households)

	bicycles	sewing machines	watches	radio sets
1978	23.30	8.60	29.30	20.20
1979	25.00	9.80	35.20	23.30
1980	126.77	65.57	223.89	84.90
1981	135.90	70.41	240.76	100.52
1982	146.65	73.60	248.89	103.40
1983	159.93	76.21	268.24	104.55
1984	162.67	77.52	282.95	103.11
1985	152.27	70.82	274.76	74.62

Source: Statistical Yearbook of China 1981-1986.

Note: the data in 1978 and 1979 are in per hundred persons instead of per hundred households.

Figure 1: Urban Chinese Household Ownership of “Four Old Durables” (in per hundred households)



Note: the data in 1978 and 1979 are in per hundred persons instead of per hundred households.

We see that the growth of the ownership for “The Four Old Durables” is quite fast and it outstripped the sum of growth during the past 30 years before the reform and opening up in only a few years.

At the same time, with opening to the outside world, the Chinese households got to know the new durable goods in foreign households which greatly attracted them. Some new durable goods such as black/white TV sets and radio recorders started to be owned by Chinese households with large pace. These new durable goods made the first shockwave of foreign durable goods to the consumption of Chinese households. The representative durable goods of such shockwave are cassette tape recorders and black/white TV sets.

Before the reform and opening-up, it was quite rare for the Chinese households to own a TV sets. The per hundred person ownership was only 1.3 in 1978, but it rose to 19.4 in 1984，or in per hundred households, it was 82.04. it took about only as short as 5-6 years that the ownership of TV sets by

Chinese urban households became as high as nearly every family had one. Such speed is very fast in the world.

Another durable good attracted the Chinese urban households is the tape recorders. In the late 1970's and early 1980's, just after opening to the outside world, the new life style of western countries, Hongkong and Taiwan attracted the mainland young people. They they often took a tape record to go through the street for showing that they lived as a new life style and attracting the eyes of others. The tape recorders The ownership of tape records was only 5.45 in 1980, but it rose to 41.16 in 1985.

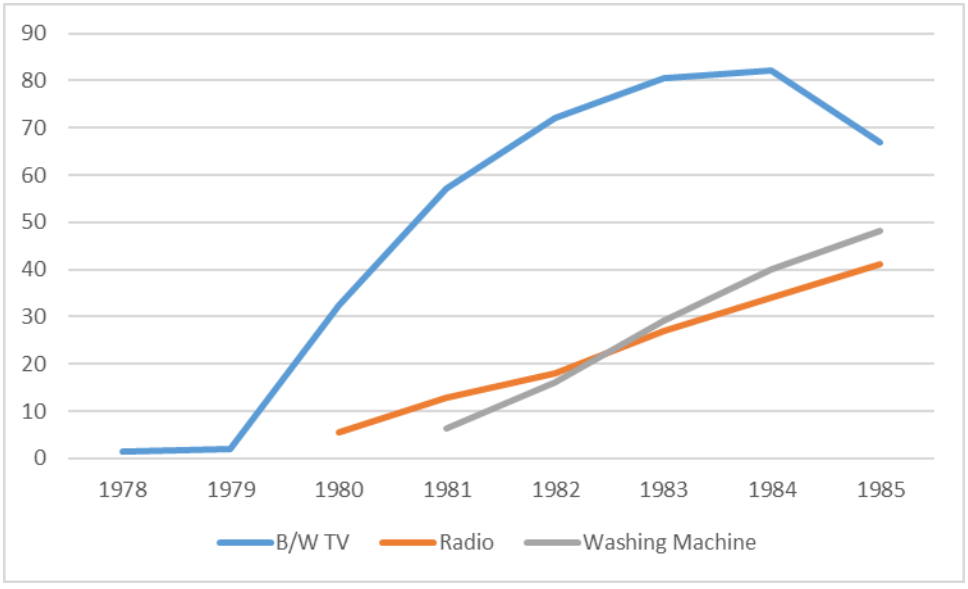
Washing machines also gradually entered the urban Chinese households later.

Table 2: Urban Chinese Household Ownership of B/W TV, Radio set and Washing Machine (in per hundred households)

	B/W TV	Radio	Washing Machine
1978	1.3		
1979	2		
1980	32.29	5.45	
1981	57.06	12.97	6.31
1982	72.21	17.99	16.09
1983	80.58	27.11	29.08
1984	82.04	34.17	40.13
1985	66.86	41.16	48.29

Note: the data in 1978 and 1979 are in per hundred persons instead of per hundred households.

Figure 2: Urban Chinese Household Ownership of B/W TV, Radio Set and Washing Machine (in per hundred households)



Note: the data in 1978 and 1979 are in per hundred persons instead of per hundred households.

Although “The Four Old Durables” and some new ones were popularized gradually in urban households in the first few years after the reform and opening-up, they were mainly due to the extreme and long term shortage of these Four Old Durables before reform and opening-up as a compensation. The pursuit for the new durables was very simple and low grade. People thought the simple and low grade ones were better than nothing. And we regard this period as a transition or overlap of the old durables to the new ones.

We note that in 1984 or 1985, the ownership of all the Four Old Durables and the B/W TVs began to decline, which showed to us obviously that the age of the “Four Old Durables” is gone, that of new durables is coming. And we thus take 1984 as the boundary of the first and the second stage.

2 The Second Stage: Coming into the New Durable Good Era (1984-1992)

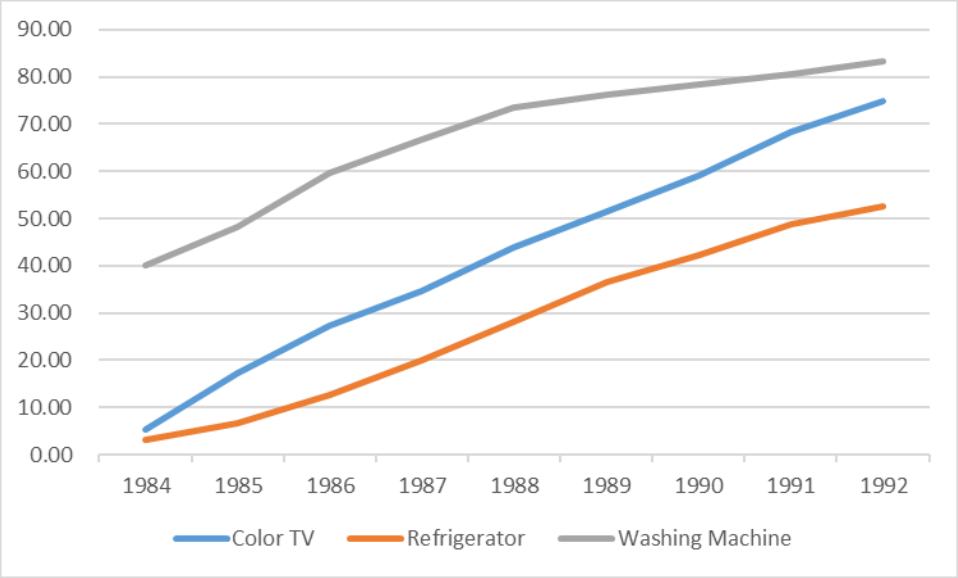
This stage can be regarded as an upsurge of durable goods era.

In the mid 1980’s, the Chinese households began to pay less and less attention to the “Four Old Durables” gradually. Some more attractive and higher-grade new durable goods became what the Chinese households aspired. The representative durable goods among them are color TV sets, refrigerators and washing machines which were regarded as the “Three New Durables” then.

Table 3: Urban Chinese Household Ownership of “The Three New Durables” (in per hundred households)

	Color TV	Refrigerator	Washing Machine
1984	5.38	3.22	40.13
1985	17.24	6.58	48.29
1986	27.40	12.70	59.70
1987	34.60	19.90	66.80
1988	43.90	28.10	73.40
1989	51.50	36.50	76.20
1990	59.05	42.33	78.41
1991	68.40	48.70	80.60
1992	74.87	52.60	83.41

Figure 2: Urban Chinese Household Ownership of “The Three New Durable (in per hundred households)



In this stage, it is not only the rise in quantity of durable goods (in terms of per 100 household ownership), but also the improvement in quality. it is an upgrade or update in the consumption of durable goods.

One of the obvious upgrade is the TVs, which were upgraded from a B/W to a color one, from a small screen to a larger one. In 1984, there were only 5.38 households owned color TVs in per hundred households. It increased to 74.87 in 1992. The screens of TVs also be replaced from about 12-14 inches to 25-29 or more inches.

Another upgrade took place in washing machines. In the last stage, most washing machines owned by urban Chinese households were very simple and small with semi-automatic twin-tub ones. But after mid 1980's, they were gradually replaced by larger and automatic ones. With the automatic washing machines, the home work on washing clothing became much simpler and easier.

In this period, a new kind of durable goods, refrigerators, became popular in urban households. In 1984, only 3.22 households owned refrigerators in per hundred households. The ownership went up to 52.6% in 1992.

In this stage, with the fast rise of personal income after reform and opening up, the Chinese households put much more enthusiasm on the new durable goods, which lead to a huge demand for the new durable goods. But the supply under centralized planning economy at that was very limited, which even brought the panic buying in 1987-1988. Such a huge demand can also be regarded as a second shockwave to the consumption of the Chinese households by foreign durables. It is much stronger than the first shock wage. It made China as one of the fast popularity of the "Three New Durables" in the world. Although a fast rise of income drove a huge increase and upgrade in durable good consumption, the differences of incomes among people are relatively narrow under the centralized planning economy. The Gini coefficient was about 0.3 then, which lead to the differences in consumption also narrow. Many households had similar demand for durable goods and focused on the same a few goods which made durable good market a huge wave just like synchronized oscillation

over such durables. It is consequent with a fast rise but narrow gap in income under the centralized planning economy.

Such situation was much changed after the reform to the market economy in 1992. And we took the year 1992 as the beginning of the third stage when turning to the market economy.

3 The Third Stage: Variety and Prosperity under the Market Economy Reform (1992-1998)

This stage can be regarded as an expansion and upgrade of durable goods era

In 1992 China began to discard the traditional centralized and inefficient planning economy system and started a market economy reform. It is the most important reform since the reform and opening to the outside world in 1978. This reform activated the economy and society, and greatly liberated the productive forces. It is also very important for household consumption. From then on, the household incomes increased in a much higher speed and people had much more sources of incomes for their better life under the market economy.

We can see that in this period the durable goods available were much more various than in 1980's and the consumption of durable goods became quite prosperous. In this stage, the demand dispersed to a lot of various durable goods. The widen of income differences made the widen of consumption differences and lead to a more various and diversified demand for durable goods. On the other hand, under the market economy, the durable goods market was no longer in serious and continuous shortage as in 1980's. The strong demand and sufficient supply made the Chinese household consumption of durable goods greatly boomed in that period. The "Three New Durables" went into massive replacement for better ones (for example, color TV sets were replaced by larger screen ones or home theaters, small single door refrigerators replaced by larger double door ones, simple or semi-automatic twin tub washing machines replaced by larger and automatic washing machines). At the same time, many new durable goods became popular such as air conditioners, telephones, video disc players, Hi-Fi stereo systems, cameras, video recorders, ovens and so on in urban Chinese households. The air conditioners, telephones and video recorders together with the update and replacement of the "Three New Durables" made the "Six New Durables" which became the representative durable goods in that period.

In this period, the durable goods consumption of the urban Chinese households was very active and variable. The update of some durable goods became more frequent. For example, the VCD players were very attractive in some years. But they were replaced by more complexed stereo systems very soon. The video recorders made the same experiences.

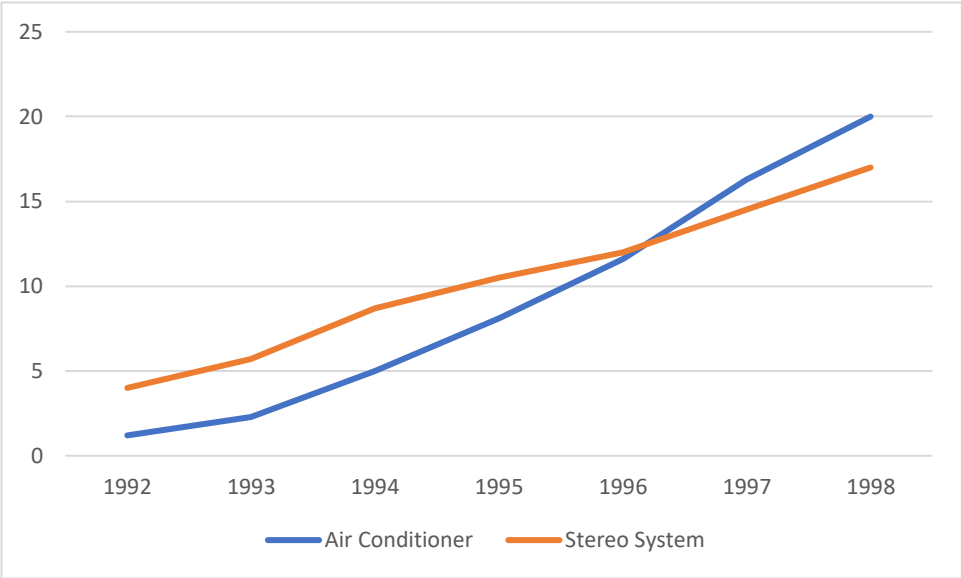
One of the popular durable goods was the air conditioner which made the life in home more comfortable. In 1992, there were only 1.2 households owning air conditioners. But 6 years later in 1998, there were 20 households who owned air conditioners.

Under the market economy, people had more and more demand for communication. The telephone became very popular. Data show that there were 239 million households owned telephones in 1991, it increased to 733 million in 1993. The speed of increase was very fast and continued to the end of 1990's when the mobile phones replaced.

Table 4: Urban Chinese Household Ownership of Air conditioners and Stereo Systems (in per hundred households)

	Air Conditioner	Stereo System
1992	1.20	4.00
1993	2.30	5.70
1994	5.00	8.70
1995	8.11	10.52
1996	11.60	12.00
1997	16.30	14.50
1998	20.00	17.00

Figure 4: Urban Chinese Household Ownership of Air conditioners and Hi-Fi Systems (in per hundred households)



In this period, the durable goods consumption was no longer focus on a few products. It divided into different levels and layers among households. Some households bought the color TV sets, refrigerators and washing machines. Some mid income other households may buy air conditioners, showers, Hi-Fi systems, cameras. And some high income households may buy pianos, mobile phones or even cars.

The durable goods consumption in this period also shows that the demand for them came into a higher level which meet the demand for enjoyment and entertainment.

4 **The Forth Stage: Embracing the Information Revolution (1998-2005)**

The 21th century is an information age. The Internet connects the world into a global village. The Internet play more and more important role in everyday life. The most important devices to connect the Internet is personal and mobile phones.

In late 1990, at the coming of the new century, computers, mobile phones began to be the most attractive durable goods for the urban Chinese households. They popularized in the urban Chinese households at a very high speed.

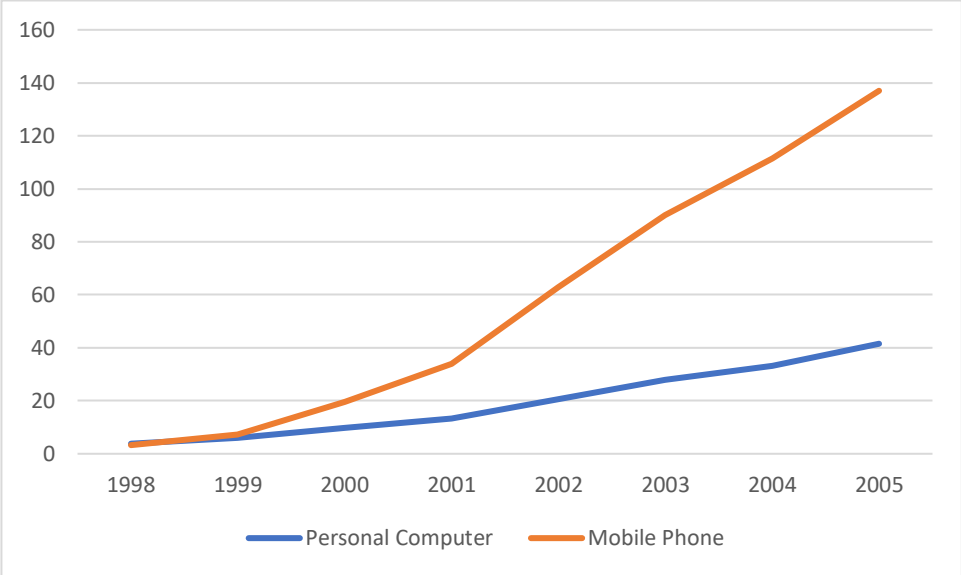
In 1998, only 3.8% households owned the personal computers, but it rose to 41.52% in 2005. The ownership of mobile phone rose at a much faster speed. In 1998, only 3.25% urban households owned mobile phones, but 2005, it increased to 137% within 7 years. Such a speed may be the fastest in the world.

The durable goods for information consumption such as computers and mobile phones not only increase in quantity very quickly, but also upgrade very frequently. They are often replaced within 5 years. For mobile phones, the time interval is shorter. Frequent replacement makes them not so durable and make the consumption of them goes up and up continuously.

Table 5: Urban Chinese Household Ownership of Personal Computers and Mobile Phones (in per hundred households)

	Personal Computer	Mobile Phone
1998	3.80	3.26
1999	5.91	7.14
2000	9.70	19.50
2001	13.30	34.00
2002	20.63	62.89
2003	27.81	90.07
2004	33.11	111.35
2005	41.52	137.00

Figure 5: Urban Chinese Household Ownership of Personal Computers and Mobile Phones (in per hundred households)



The durable goods consumption in this period also shows that the demand for them came into another higher level which meet not only the demand for enjoyment and entertainment but also for development.

5 The Fifth Stage: Coming into the Age of the Automobile (2005-)

This stage can be regarded as a great jump in the consumption of durable goods.

After coming into the new century, with fast rise of personal incomes, the Chinese urban households began to turn to much more expensive durable goods. The previous durable goods are most under10 thousand yuan in prices. But for pursuing better life they turned their purchasing power to the durable goods 100 thousand yuan such as cars, 10 times more expensive than ever, it is really a great jump in durable goods consumption.

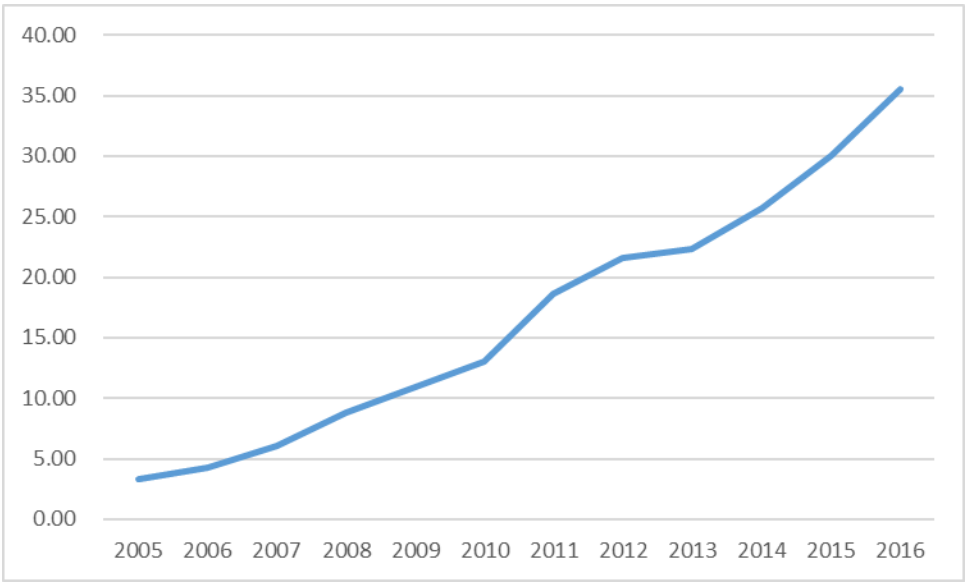
Auto mobile is one of the most important invention in durable goods. Owning it can be taken as a gauge of a household consumption. It can also be a standard of living in a country. The most important change in the consumption of urban Chinese households in the past decade is the fast popularity. In 2005, there were only 3.37 percent of urban households who owned cars, it rises to 35.5 in 2016. In Beijing, it is 47.3 and 43.1 in Tianjin. China has become the largest country of car consumption in the world since 2009.

Table 6: Urban Chinese Household Ownership of automobiles (in per hundred households)

	Car
2005	3.37
2006	4.32
2007	6.06
2008	8.83
2009	10.89
2010	13.07

2011	18.58
2012	21.54
2013	22.30
2014	25.70
2015	30.00
2016	35.50

Figure 6: Urban Chinese Household Ownership of automobiles (in per hundred households)



In this stage, the durable good consumption of urban Chinese households jumps onto the age of automobile.

From the state above, we can see that the Chinese urban households pursued the households of developed countries in durable good consumption at a faster speed than those of most other countries during the past 40 years. 40 years ago, the durable good consumption of Chinese urban households lagged about 50 years behind those of western countries. But now the gap narrowed within 10 years and even no obvious gap in some durable goods such as mobile phones, color TV sets, and so on. The update and replacement of durable goods are more frequent for Chinese urban households. The durable goods consumption is more important. The tremendous changes in durable good consumption of Chinese urban households greatly due to the reform and opening to the outside 1978 and to the market economy reform in 1992. Reform is the liberation of productive force and is also the liberation of consumption power. The consumption of Chinese households will be greatly improved while persisting in reform and opening up policy.

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