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A Study on the Determinants of Social Welfare: Evidence from Macroeconomics

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Abstract

Purpose - Social welfare is a social insurance system that provides funds and services for all citizens to maximize their life quality. Its ultimate goal is to alleviate social contradictions. Therefore, this paper explores the determinants of social welfare in terms of macroeconomics.

Research design, data, and methodology - Based on the vector error correction model, the annual time series from 1990 to 2017 will be used to conduct an empirical analysis. The real GDP, the real income, the inflation and the degree of openness will be treated as independent variables. The input of social welfare will be treated as a dependent variable. These variables will be used to perform the cointegration test and the vector error correction model to explore how the macroeconomic variables affect social welfare both in long run and short run.

Result - Via the empirical analysis, it can be summarized that the real GDP, the real income and the degree of openness are the driving determinants to enlarge the social welfare. Conversely, the inflation is the obstructive determinant to reduce the social welfare.

Conclusion - The positive and negative determinants of social welfare exist simultaneously, China's government should take macroeconomic regulation and control to balance them to enlarge social welfare.

Keywords: Social Welfare, Macroeconomics, Determinants.

JEL Classifications: C50, E23, I38.

1. Introduction

Since the reform and opening-up policy implements, China has made world-famous achievements in economy. According to a statement from the National Bureau of Statistics of China in January, 2011, it is reported that China's economic aggregate has exceeded that of Japan and ranked second in the world. Even though China's economy still develops rapidly, it has also brought about a series of social problems such as the allocation of resources and the wealth gap. Among them, one of the most prominent social problems is the social welfare. In general, the social welfare has two definitions. That is, the broad definition and the narrow definition. In a broad sense, the social welfare refers to all kinds of policies and social services to improve the living standards. In a narrow sense, the social welfare refers to social care and social services for children, the elderly, mothers and children's families, the disabled, chronic mental patients and so on.

Often, the social welfare is regarded as the regulator of social contradictions. Its final goal is to alleviate some prominent social contradictions. Due to its importance to modern society, a large number of economists have studied the determinants of social welfare in different situations and angles. For example, Pivato (2013) makes an incomplete ordinal interpersonal comparison to study the social welfare. Perc, Petek and Kamal (2014) study this preposition by treating the density and interconnectedness of influential players as a determinant of the social welfare. Atalla, Gasim and Hunt (2018) adopt a quantitative analysis to study the impact of gasoline demand and pricing policy on social welfare in Saudi Arabia. Compared with the previous researches, this paper takes a wild attempt to study the determinants of social welfare in terms of macroeconomics. As a matter of fact, the macroeconomics is a broad concept which evolves a mass of economic variables. In this paper, we only focus on the impact of real GDP, the real income, the degree of openness and the inflation on social welfare.

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In order to explore how the real GDP, the real income, the degree of openness and the inflation impact the social welfare, an annual time series from the year of 1990 to 2017 will be applied to construct a vector error correction model to study the operating mechanism among them. the real GDP, the real income, the inflation and the degree of openness will be treated as independent variables. The input of social welfare will be treated as a dependent variable. These variables will be used to perform the cointegration test and the vector error correction model so as to explore how the macroeconomic variables affect the social welfare both in the long run and in the short run. Via the empirical analysis, we have gotten four conclusions. The first is that the real GDP has a positive effect on social welfare. The second is that the real income has a positive effect on social welfare. The third is that the degree of openness has a positive effect on social welfare. The fourth is that the inflation has a negative effect on social welfare. In summary, the real GDP, the real income, the inflation and the degree of openness are the determinants of social welfare in terms of macroeconomics.

The overall structure of this article will be demonstrated as followings. Part one is the general introduction of this paper. Part two analyzes the previous researches for reference so as to make a distinguish. Part three introduces the model and variables in this paper. Part four mainly focuses on the relation among them in econometric analysis. Part five summarizes the main idea of this paper and provides some suggestions.

2. Literature Review

Social welfare refers to the social security system that the state provides all citizens with funds and services in accordance with the law to ensure a certain living standard and to improve the life quality as much as possible. As a matter of fact, the general social welfare mainly refers to social services and facilities. Due to that the social welfare is the regulator of social contradictions, a lot of scholars have tried to study this proposition in different aspects. This paper exploits a new view from macroeconomic field to study the determinants of social welfare. The previous studies will be listed below.

Jung and Kim (2014) performs a study about the welfare distribution. Their findings show that taking care of the old age is a kind of economic social welfare. Manwhile, it is also a kind of psychological welfare because of the relation with children. Fleurbaey (2015) tries to define sustainability in terms of leaving it possible for future generations to sustain certain defined targets. It is shown that variants of genuine savings and the ecological footprint can then serve as indicators of sustainability. The link between sustainability and intergenerational welfare is examined, and it is shown how to incorporate indicators of sustainability into a social welfare measure, including risk in the analysis. Ivankina and Latygovskaya (2015) use the light of the sustainability model to study the interaction between the social welfare and sustainable development. The results show that welfare regulation is an ontological concept, which measures the change of social reality in the process of individual existence. Under the condition of uncertainty, it uses the ability of universal resources to carry out activities to improve the stability of social objects. The social welfare is a major factor in the stability of social relations. The sustainability and welfare are interrelated processes consistent with the principle of complementarity. Sadeghi, Abdollahi and Rashidinejad (2015) attempt to evaluate the impact of Feed-In-Tariff financial burden on social welfare in renewable expansion planning which is the problem of determining the best strategy to schedule the establishment of new generation plants when satisfying technical constraints and economic constraints. After applying the gravitational search algorithm to a multistage Generation expansion planning model, the benefit of generation company and consumer surplus are both determined as the social welfare terms. The virtual price criterion is also introduced to evaluate the effect of Feed-In-Tariff expenditure on consumers' surplus. The numerical studies emphasize that implementation of Feed-In-Tariff regime in the Generation expansion planning results in social welfare improvement even if the Feed-In-Tariff is imposed on the demand-side consumers. Kim (2015) conduct a study on social welfare facilities. His finding show that the social welfare facilities pose a foundation for job satisfaction and spontaneity. Um and Kim (2015) study the impact of child welfare quality delivery on customer satisfaction in terms of service distribution perspective. Their results show that the categories of all child welfare service quality are positively statistically significant.

Chen and Nie (2016) treat China as a case study to analyze the effects of carbon tax on social welfare. They apply the social optimal welfare model which is based on oligopoly competition of energy department. On the ground of social optimal welfare model, the effect on social welfare which is caused by carbon taxes in different links is further evaluated. The results show that a certain amount of carbon tax in the production link raises the social welfare, while in consumption and redistribution links lowers the social welfare. Specifically, the absolute value of marginal social welfare in the redistribution link is larger. Moreover, the values of the three types of carbon taxes vary under different redistribution demands though the variation trends of tax in the same link are similar. As a result, a small amount of carbon tax on the production link contributes to the growth of social welfare. Rouhani, Geddes, Gao, and Bel (2016) analyze the social welfare in terms of investment public–private partnership methods for transportation projects. Their purpose is to develop a detailed social welfare analysis for road pricing schemes. Their results show that

system-optimal tolling favors average users, but that governments-and the taxpayers who follow should pay for expensive systems (negative profits). In contrast, unlimited profit-maximizing tolls raise substantial profits for government, for the infrastructure's citizen-owners, and for the private department, but every user is worse off. From the social welfare aspect, one should hunt for a Pareto improvement under which all major stakeholders are better off. Their estimates indicate that a mixed public and private tolling scheme offers such an improvement. Rouhani and Geddes et al. (2016) examine that this principle develops in Brazil in aspects of both legislation and policy implementation and assesses the criticisms which have been leveled against trials to put it into effect. It figures that the principle of social function has been broadly integrated into Brazilian legislation, but, so far, the actual implementation is not serious, especially in the countryside sector. These efforts have been criticized on economic, environmental and cost-effectiveness grounds, but none of these criticisms is entirely convincing. Given the significantly inequality in land ownership in Brazil, the social function is still a major tool for boosting popular welfare.

Due to that a menu of scholars find that there is a positive relationship between intelligence quotient and measures of aggregate production such as social welfare and economic growth, Hafer (2017) attempts to extend this proposition via analyzing the relationship between intelligence quotient and a new measure of economic welfare. He finds that the intelligence quotient can be used to predict the growth of welfare under 5% significant level. 1% increase in the intelligence quotient can lead to 4% increase in the growth of welfare for the average country. His finding also manifests that a country's intelligence quotient is a significant determinant of cross-country differences in economic activity and welfare. Huang, Yang and Cheng (2017) employ the Schumpeterian growth model to make a comparison about the growth and welfare implications of patent policy and monetary policy. Their results show that compared with the patent policy and the mix of them, the monetary policy is more effective. Moreover, there is an ambiguous welfare difference between patent policy and monetary policy. The patent policy and the monetary policy regimes are weakly dominated by their combination in terms of raising social welfare. Menegaki, Marques and Fuinhas (2017) study the proposition which refines the growth of energy nexus with an index for sustainable economic welfare in Europe. They find that only the sustainable economic welfare affects energy in the long run and in the short run. Li, Shim and Wen (2017) use a subsistence consumption-augmented real business cycle model to study the implication of subsistence consumption for economic welfare. Their findings indicate that the eliminating economic fluctuations can be more beneficial to the less-developed economies. On the contrary, the high-speed growing economies show a lower discrepancy of welfare costs between rich and poor countries, a result that also highlights the importance of growth-enhancing policies.

Kassie, Stage, Diiro, Muriithi, Muricho, Ledermann and Zeyaur (2018) use a group of families' data to investigate the impact of farm-level economic benefits on aggregate welfare via the push-pull technology in western Kenya. Their evaluations are based on the analysis of a combination of econometric and economic surplus. Their findings show that the farm-level economic benefits can be enlarged by adopting the push-pull technology. Meanwhile, the poverty can be reduced so as to obtain a large number of welfare and economic surplus. Menegaki and Tugcu (2018) select Asian countries to study the nexus between two versions of the index of sustainable economic welfare in the growth of energy. They employ a lot of econometric methods such as the Westerlund methodology for cointegration and the Dumitrescu and Hurlin causality procedure. They estimate the growth of energy nexus by replacing the relationship gross domestic products and each of the two estimated types of the index of sustainable economic welfare. Furthermore, they also estimate the conventional nexus. However, they find no different implications between the growth of gross domestic products and the growth in sustainable economic welfare when energy conservation measures apply. Myojo and Ohashi (2018) set the case of solar photovoltaic systems in Japan to explore the consumer subsidies' effects for renewable energy on industry growth and social welfare. Because there no comparable on a proper control group available, it is very hard to estimate the relationship between industry growth and economic welfare. Their findings exhibit that the elastic demand and the small learning by doing along with modest learning spillovers in production.

As previous studies listed above, each scholar explores the determinants of social welfare in his or her own view such as the energy, the policy and so on. In order to make a difference between this paper and others, this paper attempts to analyze the determinants of social welfare in terms of macroeconomics.

3. Model and Data

3.1. Model

The social welfare refers to the social insurance system that the state provides all citizens with funds and services in accordance with law to improve the life quality as much as possible. The social welfare can be divided into broad sense and narrow sense. In a broad sense, the social welfare refers to all kinds of policies and social services that can improve the living standards. Meanwhile, its other aim is to solve the welfare treatment of individuals in all aspects. In a narrow sense, the social welfare refers to social care and social services for children, the elderly, mothers and

children's families, the disabled, chronic mental patients and so on. The social welfare contains a wide range of contents including welfare treatment in life, education & medical treatment, treatment in transportation, entertainment, sports and appreciation. The social welfare is a kind of service policy and measure. Its aim is to raise the material and spiritual living standard so as to make them enjoy more. At the same time, the social welfare is also a kind of responsibility, which is a kind of social function to protect and continue the vitality of organism on the basis of social security.

Along with the economic transformation and the industrial structure adjustment, the determinants of social welfare will also be changed. The model used in this paper gives:

$$\log SW_t = C + \alpha \log GDP_t + \beta \log Inflation_t + \gamma \log open_t + \delta \log income_t + \varepsilon_t \quad (1)$$

Where SW is the social welfare. GDP is the economic growth. $\inf lation$ is the inflation rate. $open$ is the degree of openness. $income$ is the real GDP per capita. ε is the white noise. C is the constant. α, β, δ and γ are the coefficients.

3.2. Data

(1) Social welfare: According to the classification of receiving object, the social welfare can be divided into six types. ① Public welfare for all social members. ② Occupational welfare for employees and their families. ③ Old-age benefits for the elderly. ④ Children's welfare for infants and young children. ⑤ Women welfare for women. ⑥ Disability benefits for the disabled. Due to these categories, it is very difficult to select a standard to measure the social welfare. Therefore, the input of social welfare will be used to represent the development of social welfare in this paper.

(2) GDP: it is often used to measure the economic growth. In this paper, the GDP will be replaced by the real GDP.

(3) Inflation: it is a sustained rise in the price of goods and services over a period of time. In this paper, it will be replaced by the consumer price index (CPI).

(4) Degree of openness: it is a ratio of sum of export & import to GDP. The degree of openness can strength the economic cooperation home and abroad. It not only can promote the economic growth but also it can transfer the labor force. The degree of openness plays a vital role in resource allocation and benefit distribution. Moreover, it also can affect the social welfare. Especially, for a country who is experiencing the economic transformation, the function of the degree of openness should be much accounted of.

(5) Real income: it is the opportunity for an entity to consume and save within a certain time frame, usually expressed in currency. In this paper, it will be replaced by the real GDP per capita.

In this paper, the annual data from the year of 1990 to 2017 will be used to study the determinants of social welfare. All these datum are sourced from the National Bureau of Statistics of China.

4. Empirical Analysis

4.1. Unit Root Test

When using the traditional time series to conduct an empirical analysis, usually, we must make sure that these economic data should be stationary. On this background, the parameters will be estimated and the hypotheses will be tested in the econometric model. In this paper, the Augmented Dickey-Fuller test will be employed to verify the stationarity of all variable. The testing results show in <Table 1>.

The Augmented Dicky-Fuller test equations are the optimal estimates which are obtained by quantities of trials. And the auto correlation of the error term has been eliminated. The equation ① is the process of Augmented Dicky-Fuller test for $\log SW_t$. The value of Augmented Dicky-Fuller test statistic (-1.711) is greater than the 5% test critical value (-2.981), which means that $\log SW_t$ is non-stationary. After conducting the first difference, the result of equation ② reports that the value of Augmented Dicky-Fuller test statistic (-6.246) is less than the 5% test critical value (-2.986), which means that $\Delta \log SW_t$ is stationary. Namely, $\log SW_t$ is the process of $I(1)$. The equation ③ is the process of Augmented Dicky-Fuller test for $\log RGDP_t$. The value of Augmented Dicky-Fuller test statistic (-1.948) is greater than the 5% test critical value (-2.986), which means that $\log RGDP_t$ is non-stationary. After conducting the first difference, the result of equation ④ reports that the value of Augmented Dicky-Fuller test statistic (-3.188) is less than the 5% test critical value (-2.986), which means that $\Delta \log RGDP_t$ is stationary. Namely, $\log RGDP_t$ is the process of $I(1)$. The equation ⑤ is the process of Augmented Dicky-Fuller test for $\log OPEN_t$. The value of Augmented Dicky-Fuller test statistic (-1.459) is greater than the 5% test critical value (-2.986), which means that $\log OPEN_t$ is non-stationary. After conducting the first difference, the result of equation ⑥ reports that the value of Augmented Dicky-Fuller test statistic (-4.440) is less than the 5% test critical value (-2.986), which means that $\Delta \log OPEN_t$ is stationary. Namely, $\log OPEN_t$ is the process of $I(1)$. The equation ⑦ is the process of Augmented Dicky-Fuller test for $\log INC_t$. The value of Augmented Dicky-Fuller test statistic (-1.868) is greater than the 5% test critical value (-2.981), which means that $\log INC_t$ is non-stationary. After conducting the first difference, the result of equation ⑧ reports that the value of Augmented Dicky-Fuller test statistic

<Table 1> Stationarity Test of Variables

Augmented Dicky-Fuller Test Equation	D.W.	S.D.	5% Test Critical Value
$\Delta \log SW_t = -0.013 \log SW_{t-1} + 0.558 \Delta \log SW_{t-1} + 0.072$ .....(−1.711)*.....(2.845).....(2.539)	2.678	0.010	-2.981
$\Delta^2 \log \mathrm{SW}_t = -1.164 \Delta \log \mathrm{SW}_{t-1} - 0.006$ .....(−6.246)*.....(−0.892)	2.316	0.186	-2.986
$\Delta \log RGDP_t = -0.012 \log RGDPI_{t-1} + 1.198 \Delta \log RGDPI_{t-1} + 0.046$ .....(−1.948)*.....(6.722).....(2.484)	2.135	0.006	-2.986
$\Delta^2 \log RGDP_t = -0.590 \Delta \log RGDPI_{t-1} - 0.002$ .....(−3.188)*.....(−0.679)	2.869	0.185	-2.986
$\Delta \log OPEN_t = -0.153 \log OPEN_{t-1} + 0.177 \Delta \log OPEN_{t-1} - 0.058$ .....(−1.459)*.....(0.886).....(−1.420)	2.013	0.105	-2.986
$\Delta^2 \log OPEN_t = -0.886 \Delta \log OPEN_{t-1} - 0.0002$ .....(−4.440)*.....(−0.023)	2008	0.120	-2.986
$\Delta \log INC_t = -0.012 \log INC_{t-1} + 1.197 \Delta \log INC_{t-1} + 0.044$ .....(−1.868)*.....(6.708).....(2.429)	2.130	0.006	-2.981
$\Delta^2 \log INC_t = -0.592 \Delta \log INC_{t-1} - 0.002$ .....(−3.199)*.....(−0.658)	2.870	0.185	-2.986
$\Delta \log INF_t = -0.441 \log INF_{t-1} + 0.586 \Delta \log INF_{t-1} + 0.888$ .....(−2.954)*.....(3.128).....(2.949)	2.234	0.149	-2.992
$\Delta^2 \log INF_t = -0.933 \Delta \log INF_{t-1} - 0.002$ .....(−3.176)*.....(−0.549)	2.147	0.294	-2.992

Note: 1)* represents the Augmented Dicky-Fuller test statistic.
2) Δ represents the difference operator.

<Table 2> VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	243.624	NA	7.34e-15	-18.356	-18.114	-18.286
1	505.019	402.146	9.70e-23	-36.540	-34.918	-36.122
2	543.532	44.438*	4.37e-23*	-37.579*	-35.088*	-36.813*

Note: 1) * indicates lag order selected by the criterion.
2) LR: sequential modified LR test statistic (each test at 5% level).
3) FPE: Final prediction error.
4) AIC: Akaike information criterion.
5) SC: Schwarz information criterion.
6) HQ: Hannan-Quinn information criterion.

(-3.199) is less than the 5% test critical value (-2.986), which means that $\Delta \log INC_t$ is stationary. Namely, $\log INC_t$ is the process of $I(1)$. The equation ⑨ is the process of Augmented Dicky-Fuller test for $\log INF_t$. The value of Augmented Dicky-Fuller test statistic (-2.954) is greater than the 5% test critical value (-2.992), which means that $\log INF_t$ is non-stationary. After conducting the first difference, the result of equation ⑩ reports that the value of Augmented Dicky-Fuller test statistic (-3.176) is less than the 5% test critical value (-2.992), which means that $\Delta \log INF_t$ is stationary. Namely, $\log INF_t$ is the process of $I(1)$.

4.2. Cointegration Test

From the Unit Root Test, it can be known that all variables are the process of $I(1)$. Furthermore, the long-run relationship among them needs to be verified. Before confirming the long-run relationship among them, the optimal lag should be selected. <Table 2> shows the VAR lag order selection criteria.

Based on the Akaike information criterion and the Schwarz information criterion, the lag two is selected as the optimal. Therefore, the lag of cointegration test is lag one. The result of cointegration test shows in <Table 3>.

<Table 3> Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Trace Result
$r = 0$*	0.834	116.406	69.819	0.000	3 cointegrating eqn(s) at the 0.05 level
$r \le 1$*	0.742	69.757	47.856	0.000	
$r \le 2$*	0.546	34.507	29.797	0.013	
$r \le 3$	0.317	13.999	15.495	0.083	
$r \le 4$*	0.145	4.084	3.841	0.043	
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****	**Max-Eigen Result**
$r = 0$*	0.834	46.649	33.877	0.001	2 cointegrating eqn(s) at the 0.05 level
$r = 1$*	0.742	35.251	27.584	0.004	
$r = 2$	0.546	20.508	21.132	0.061	
$r = 3$	0.317	9.914	14.265	0.218	
$r = 4$*	0.145	4.084	3.841	0.043	

Note: 1)*denotes rejection of the hypothesis at the 0.05 level. 2) **Mackinnon-Haug-Michelis (1999) p-values.

<Table 4> Vector Coefficient of Vector Error Correction Model

VECM	Model 1	Model 2	Model 3	Model 4	Model 5
Variable	$\Delta \log SW_t$	$\Delta \log RGDP_t$	$\Delta \log OPEN_t$	$\Delta \log INC_t$	$\Delta \log INF_t$
ECM_{t-1}	0.191 (0.026) [7.310]	0.113 (0.050) [2.284]	0.388 (0.036) [10.740]	0.112 (0.050) [2.253]	0.305 (0.054) [5.692]
$\Delta \log SW_{t-1}$	0.327 (0.044) [7.390]	-0.650 (0.084) [7.738]	0.295 (0.061) [4.840]	-0.630 (0.084) [-7.560]	-0.960 (0.090) [-10.640]
$\Delta \log RGDP_{t-1}$	1.650 (0.243) [6.80]	-0.843 (0.046) [-18.320]	-2.196 (0.335) [-6.558]	-0.920 (0.046) [-19.960]	-2.413 (0.497) [-4.857]
$\Delta \log OPEN_{t-1}$	0.289 (0.017) [16.780]	0.096 (0.033) [2.945]	0.230 (0.024) [9.690]	0.098 (0.033) [2.984]	-0.280 (0.035) [-8.050]
$\Delta \log INC_{t-1}$	1.733 (0.251) [6.900]	0.961 (0.476) [2.018]	0.217 (0.035) [6.260]	0.104 (0.048) [2.174]	0.245 (0.515) [4.768]
$\Delta \log INF_{t-1}$	-0.495 (0.058) [-8.576]	0.517 (0.109) [4.726]	-0.539 (0.080) [-6.763]	0.512 (0.110) [4.669]	0.323 (0.118) [2.730]
C	0.596 (0.061) [9.694]	0.231 (0.012) [19.791]	0.573 (0.085) [6.754]	0.227 (0.012) [19.427]	0.062 (0.013) [4.920]

Note: 1) ( ) represents the standard errors. 2) [ ] represents the t-statistics.
3) Δ represents the difference operator. 4) ECM represents the error term.

<Table 3> indicates that there are two cointegrating equations among them. One of the normalized vector cointegrating equations gives:

$$\log SW_t = 0.269 \log RGDP_t + 0.261 \log OPEN_t + 1.990 \log INC_t - 3.239 \log INF_t$$
$$\text{.....}(0.069)\text{.....}(0.089)\text{.....}(0.141)\text{.....}(0.438) \quad (2)$$

Where the value in the parentheses is the standard error. Equation (2) indicates that the real GDP, the degree of openness and the real income have a positive relation with the social welfare. Conversely, the inflation have a negative relation with the social welfare. Concretely speaking, 1% increase in the real GDP will lead to 0.269% increase in the social welfare; 1% increase in the degree of openness will result in 0.261% increase in the social welfare; 1% increase in the real income will bring about 1.990% increase in the social welfare; On the contrary, 1% increase in the inflation will lead to 3.239% decrease in the social welfare.

4.3. Vector Error Correction Model

According to <Table 2>, the optimal lag is the lag two. Therefore, the lag of the vector error correction model is log one. Via the analysis of the vector error correction model, the long-run and the short-run relationship among variables can be explored. <Table 4> shows the coefficient of the vector error correction model.

Model 1 illustrates the short-run correction of each variable to the social welfare. <Table 4> shows that the social welfare in the t-1 period has a positive effect on the social welfare in the t period. 1% increase in the social welfare in the t-1 period will lead to 0.327% increase in the social welfare in the t period. The real GDP, the degree of openness, the real income in the t-1 period also have a positive effect on the social welfare in the t period. 1% increase in the real GDP, the degree of openness, the real income in the t-1 period will result in 1.650% increase in the social welfare in the t period, 0.289% increase in the social welfare in the t period and 1.733% increase in the social welfare in the t period. However, 1% increase in the inflation in the t-1 period will lead to 0.495% decrease in the social welfare in the t period. Seen from the overall results of model 1, the coefficient of the error correction term is negative, which is keeping with the opposite correction mechanism. This result indicates that the 0.191% deviation between the real value of each year's social welfare and the value of long-run equilibrium can be corrected.

4.4. Granger Causality Test

The result of the unit root test demonstrates that all variables are the process of $I(1)$. Therefore, the Granger causality test can be proceeded. Meanwhile, the result of cointegration test indicates that there is a long-run relationship among them. According to theorem of Granger causality, there are at least one causality among variables. Based on the Akaike information criterion and the Schwarz information criterion, the lag one is selected as the optimal. <Table 5> the result of the result of Granger causality test.

<Table 5> shows that under the 5% significant level, there are three unilateral causality relation among them. The real GDP, the degree of openness, the real income and the inflation are the driving factor to impact the social welfare. This result also matches the result of cointegration test and the result of vector error correction model.

5. Conclusion

This paper sets China as a research object to analyze the determinants of social welfare in terms of macroeconomic field. An annual time series from the year of 1990 to 2017 will be employed and a quantity of econometric methods such cointegration test, the vector error correction model and the Granger causality test will be applied to verify the operation mechanism of each determinant in macroeconomic field to the social welfare. The overall result of this paper shows that there is a long-run relationship between social welfare and real GDP, degree of openness, real income, inflation. Specifically speaking, the result of cointegration test shows that the cointegration relationship among social welfare and real GDP, degree of openness, real income, inflation. There into, the real GDP, the degree of openness and the real income have a positive effect on social welfare. Oppositely, the inflation has a negative effect on social welfare. The result of the vector error correction model shows that the social welfare, the real GDP, the degree of openness and the real income in the $t-1$ period have a positive effect on social welfare. However, the inflation in the $t-1$ period has a negative effect on social welfare in the t period. The elastic coefficients of the social welfare, the real GDP, the degree of openness and the real income in the $t-1$ period to the social welfare in the t period are 0.327, 1.650, 0.289, 1.733 and -0.495. Additionally, the result of Granger causality test shows that the real GDP, the degree of openness, the real income and the inflation have a good explanation to the social welfare in the model.

<Table 5> Result of Granger Causality Test

lags	Null Hypothesis	Obs	F-Statistic	Prob.	Result
1	$\log RGDP$ does not Granger Cause $\log SW$	27	7.548	0.011	Rejected
	$\log SW$ does not Granger Cause $\log RGDP$		0.716	0.406	Accepted
1	$\log OPEN$ does not Granger Cause $\log SW$	27	8.988	0.006	Rejected
	$\log SW$ does not Granger Cause $\log OPEN$		1.534	0.228	Accepted
1	$\log INC$ does not Granger Cause $\log SW$	27	7.792	0.010	Rejected
	$\log SW$ does not Granger Cause $\log INC$		0.810	0.377	Accepted
1	$\log INF$ does not Granger Cause $\log SW$	27	14.474	0.001	Rejected
1	$\log SW$ does not Granger Cause $\log INF$	27	1.420	0.245	Accepted

The empirical evidence in this paper also provides some suggestions to China's government. In the economic field, China's government should take macroeconomic regulation and control to promote the social welfare. For instance, even though the China's GDP experiences a high speed development, China's government should spare no effort to develop the productive force. Then, with the economic globalization, China's government should open its domestic market and reduce trade barriers so as to promote the international trade. Meanwhile, China's government can use the tax means to adjust the real income. A good tax means can make the social capital distributed best. Finally, China's government still needs monetary policy to balance the inflation. The smaller inflation can lead to greater real social welfare.

All in all, the purpose of this paper is to exploit the determinants of social welfare in terms of macroeconomic field. Therefore, via the evidence in this paper, China's government can take proper measures to increase the social welfare so as to make people live in a good life. Specifically speaking, there are two approaches to enlarging the social welfare. One is that China's government can increase the GDP, expand the degree of openness and enlarge the real income so as to augment the social welfare. Another is that China' government can aggrandize the social welfare via lowering the inflation.

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