STUDY ON CHINESE TECHNICAL ECONOMY AND GLOBAL SOCIAL RESPONSIBILITY

Huanping Zhang¹ Maohua Li¹² Zoltán Zéman³

Affiliation:
¹School of Business, Xi’an Siyuan University (Xi’an)
²Faculty of Economics and Social Sciences, Szent István University (Gödöllő)
³Institute of Business Studies, Faculty of Economics and Social Sciences, Szent István University (Gödöllő)

Corresponding author: Maohua Li
Email address: maohua.li@qq.com

ABSTRACT: As Chinese economy develops, China is the second largest economy in the world with $13.01 trillion nominal GDP in 2017. However, there are always several different voices on Chinese products and Chinese technical economy, even on Chinese internal problems, such as environmental problems, food safety problems. This paper wants to study the relation between Chinese technical economy and global economy, and finally wants to argue for the goods of Chinese technical economy and Chinese product. Firstly, this paper uses literature review method to renew the definition of Chinese technical economy. Secondly, this paper uses linear regression analysis to test the relation between Chinese technical economy and global economy. At last, this paper gives its own policy advices to improve the quality of Chinese technical economy.

1. Introduction
After near 40-year’s reform and opening-up policy in China, China has become a key world economy. China, with its socialist market economy, is the world’s second largest economy with GDP 82,712.2 billion Yuan in 2017¹. Over the past two decades, the world has witnessed China’s transformation from a planned economy into a more market-driven economy (Guan & Yam, 2015). China is playing a growing role in the world economy (Lardy, 1994). China, as a new power, is challenging the traditional dominance of the US in the governance of the global economy (Hopewell, 2015), and has made a great contribution to the world economic recovery (Baoan Wang, 2015). However, China is not about to replace the United States as the world’s dominant country (Nye Jr, 2017). The real relation between Chinese economy and world economy is very complicated, and they impact one another (Jiayu Sun, 2017).

Nowadays, some Chinese brands are really very popular in the world, such as Huawei, ZTE, Tencent etc. But when we talk about “Chinese technical economy”, a few words will come into our mind, such as “low quality”, “low price”, “goods dumping”, etc. And some “incidents” also happen related to exported Chinese products, such as 2007 Chinese export recalls (Roth etc. 2008). However, when we talk about “Made in Japan”, the public will jump to conclusion like “lean management”, which is the holistic approach of lean methods, strategic implementation and the consideration and integration of the cultural

¹ Source: http://www.stats.gov.cn/english/PressRelease/201801/t20180118_1574943.html
level (Bertagnolli, 2018). And the words for describing “Made in Germany” or “Hergestellt in Deutschland” are “craftsmen”, “craftsmen spirits” and “luxury”. So comparing with “Made in Japan” and “Made in Germany”, “Chinese technical economy” is always labeled with “low price” and “low quality”.

Figure 1. Several famous Chinese brands and production places
Source: Moving from “Chinese technical economy” to “Innovated in China”. Website: http://www.digi.city/blog/2016/11/21/moving-from-made-in-china-to-innovated-in-china
Under these backgrounds, Chinese Ministry of Industry and Information Technology made a draft with the name “Chinese technical economy 2025”, which was approved by the State Council of the People’s Republic of China. “Chinese technical economy 2025” has been used in different areas including manufacture, information, education, etc. This paper wants to research on the relationship between “Chinese technical economy” and “world development”. With this purpose, this paper also wants to find the current problems on “Chinese technical economy”. At last this paper will talk about the reasons for why there is a paradox that where there are more products from China in one country or area, there will be more criticism about Chinese products.

2. Research methodology
In order to research on the relationship between “Chinese technical economy” and “world development”, this paper uses SPSS 22.0 to do correlation analysis and linear regression analysis.

Figure 2. Description of methodologies
As mentioned above in figure 2, this paper uses SPSS 22.0 to finish the analyses. SPSS Statistics is a software package used for logical batched and non-batched statistical analysis. As one of the most powerful statistics software in the world, SPSS is more convenient to do social science analysis, especially for most traditional analysis models, such as regression analysis, correlation analysis, factor analysis, principle component analysis and so on.

---

2 SPSS is statistics software developed by IBM whose products cover metal servers, IOT Continuous Engineering, aaS360 with Watson, Maximo, Spectrum and SPSS Statistics. The newest version of SPSS is version 25 in 2018. However, this paper only uses correlation analysis and linear regression analysis, so version 22.0 is enough for this purpose.

3 Source: Wikipedia. Website: https://en.wikipedia.org/wiki/SPSS
Correlation analysis is widely used to study a statistical relationship between two variables. There are many types of correlation analysis, and the most popular are Pearson, Intra-class and Rank. Pearson talking about the strength and direction of the correlation between two variables is the most used in academic research. In order to study the correlation between “Chinese technical economy” and “world development”, this paper uses Pearson correlation analysis.

Regression analysis is not only a statistical methodology, but also a set of statistical processes to study on the relations among different variables. There are many types of regression models developed by scholars, among which the well-known is linear regression analysis. Linear regression model denote the dependent variable by Y and the independent variables by X₁, X₂, X₃,… And then we can make an equation for both two types of variables like the following formula.

\[ Y = F(x₁, x₂, \ldots, xₙ) \]  

Formula 1

3. Variables selection
This paper uses two variables to stand for “Chinese technical economy”, and they are “Chinese GDP (CGDP)” and “Chinese export (CE)”. “Chinese GDP” is used to study the relation between Chinese economic development and world development, and “Chinese export” is used to research on the relation between “Chinese export” and world development.

In order to reflect world development, this paper selects total three variables: “world GDP (WGDP)”, “world revenue (WR)” and “final consumption expenditure (FCE)”. The first one “world GDP” is used to research the relation between Chinese economics and world economics, and the rest two are used to study the relation between “Chinese export” and world development.

4. Data source
All the data used in this paper is from World Bank Group as shown in following figure 4. The data selected is from 1973 to 2015. The beginning year is 1973, because for some Chinese economic data, they are counted from 1973. The reason for ending in 2015 is that for some data, they are not renewed in 2016 or 2017.
5. Correlation analysis

Table 1 shows the general descriptive statistics of all the variables used in this paper. From table 1, we can easily see the mean, the standard deviation and the number of each variable. For instance, the mean of world GDP is 43.989707031, and the standard deviation is 15.980065152. From 1973 to 2015, there are totally 43 years, so the number of all the variables is 43.

| Variables              | Mean     | Std. Deviation       | N  |
|------------------------|----------|----------------------|----|
| world GDP              | 43.979807031 | 15.980065152         | 43 |
| China GDP              | 238578620507.531 | 251691977424.60     | 43 |
| China export           | 14.141131833833815 | 10.088681236961730 | 229363 |
| Revenue, excluding grants (% of GDP) | 23.199796517727 | 1.43343143789578   | 172032 |
| Revenue                | 10.136974464956824 | 3.842249255176326 | 43 |
| Final consumption expenditure, etc. (current US$) | 24.10882057937780 | 16.913514028222508 | 43 |

Table 2 is about the correlation analysis of all the variables. From the table, it is easy to see the relation between Chinese economics and world development. Pearson correlation coefficient of world GDP (WGDP) and Chinese GDP (CGDP) is positive 0.949, which mean there is strong positive relation between Chinese economics and world economics. Pearson correlation coefficients of China export (CE) and world revenue (WR), final consumption expenditure (FCE) are positive 0.901 and 0.840, that is to say, China export has a very strong relation with world revenue and final consumption expenditure. All of the analysis results are significant at the 0.01 level (2-tailed). From correlation analysis, we can find that there is a positive relation between “Chinese technical economy” and “world development”. However, in order to further study the relation between “Chinese technical economy” and “world development”, this paper will construct a linear regression model as following.

| Variables | WGDP     | CGPD     | CE        | WR        | FCE        |
|-----------|----------|----------|-----------|-----------|------------|
| Pearson Correlation | 1       | .949**   | .882**    | .990**    | .989**     |
| Sig. (2-tailed)     | .000    | .000     | .000      | .000      | .000       |
| Pearson Correlation | 1       | .722**   | .919**    | .971**    |
| Sig. (2-tailed)     | .000    | .000     | .000      | .000      |
| Pearson Correlation | 1       | .901**   | .840**    |
| Sig. (2-tailed)     | .000    | .000     | .000      |
| Pearson Correlation | 1       | .967**   |
| Sig. (2-tailed)     | .000    | .000     |
| Pearson Correlation | 1       | 1        |
| Sig. (2-tailed)     | .000    | .000     |

**. Correlation is significant at the 0.01 level (2-tailed).

6. Linear regression model

For a better analysis of the relation between “Chinese technical economy” and “world development”, this paper constructs a linear regression model in which China export (CE) is used as dependent variable, and world revenue (WR) and final consumption expenditure (FCE) are used as independent variables to explain China export. The linear regression model built is shown as following.

\[ CE = \alpha + \beta_1 WR + \beta_2 FCE + \varepsilon \]  

Formula 2

CE: China export
WR: World revenue
FCE: Final consumption expenditure
7. The population regression analysis
Firstly, this paper uses population regression analysis to test how much China export (CE) can be explained by the total function. The population regression results are shown in table 3.

| model | R   | R Square | Adjusted R Square | Std. Error of Estimate |
|-------|-----|----------|-------------------|------------------------|
| 1     | .903a | .815     | .806              | 4.216655887948734      |

a. Predictors: (Constant), Final consumption expenditure, etc. (current US$), Revenue

From table 3, it is easy to see that most of China export (CE) can be explained by world revenue (WR) and final consumption expenditure (FCE). R square is 0.815, which means 81.5% of total China export (CE) can be explained by world revenue (WR) and final consumption expenditure (FCE). Adjusted R square is 0.806, which means all the variables and data selected by this paper fit one another very well. And the standard error of the estimate is 4.216655887948734, which means that the prediction of the total function is of accuracy.

8. Analysis of variance
Analysis of variance (ANOVA) is a general procedure for isolating the sources of variability in a set of measurements (Girden, 1992). This paper uses ANOVA to test the whole significance of linear regression model whose result is reflected in table 4.

| Model          | Sum of Squares | df | Mean Square | F       | Sig.  |
|----------------|----------------|----|-------------|---------|-------|
| Regression     | 3057.564       | 2  | 1528.782    | 85.982  | .000b |
| Residual       | 693.427        | 39 | 17.780      |         |       |
| Total          | 3750.992       | 41 |             |         |       |

a. Dependent Variable: China export
b. Predictors: (Constant), Final consumption expenditure, etc. (current US$), Revenue

From table 4, we can see that the mean square of regression is 1528.782. F-value is 85.982 and the significance of ANOVA is 0.000 which is much less than 0.05. From the values of F-value and significance, the whole regression model is very significant, and relation between “Chinese technical economy” and “world development” is significant.

9. Linear regression analysis
In order to further research the relation between “Chinese technical economy” and “world development”, this paper uses linear regression model. Through the results in table 5, it is shown that the significances of both world revenue (WR) and final consumption expenditure (FCE) are less than 0.05, which means the linear regression model built above is very significant and China export (CE) can be explained by world revenue (WR) and final consumption expenditure (FCE).

| Model | Unstandardized Coefficients | Standardized Coefficients | t     | Sig.  |
|-------|-----------------------------|---------------------------|-------|-------|
|       | B                           | Std. Error                | Beta  |       |
| I     | (Constant)                  | -8.164                    | 3.459 | -2.360| .023  |
| WR  | 2.841 | .673 | 1.141 | 4.219 | .000 |
|-----|-------|------|-------|-------|------|
| FCE | -.145 | .157 | -.249 | -.920 | .003 |

a. Dependent Variable: China export

From table 5, the result of linear regression gives a detailed relation between China export (CE) and world revenue (WR), final consumption expenditure (FCE), which can be expressed in following formula.

\[
CE = -8.164 + 2.841 WR - 0.145 FCE \quad \text{Formula 3}
\]

### 10. Conclusion and discussion

This paper studies the relation between “Chinese technical economy” and “world development”. For this purpose, this paper selects two variables “Chinese GDP (CGDP)” and “China export (CE)” to stand for “Chinese technical economy” and three variables “world GDP (WGDP)”, “world revenue (WR)”, “final consumption expenditure (FCE)” to stand for world development. This paper uses correlation analysis and linear regression analysis to study the relation through SPSS 22.0. Through all the analysis, we find results in the following:

There is a positive relation between “Chinese GDP (CGDP)” and “world GDP (WGDP)”. This is very easy to understand. As the development of world economics, the earth is a global village, so the connection of the whole world economics will be much closer and closer. Chinese economics and world economics will interact with each other all the time actively.

The relation between “Chinese technical economy” and “world development” can be explained by the formula 3. From formula 3, we can see that if final consumption expenditure (FCE) increases 1 unit, China export (CE) will decrease by 0.145 units. From this, we can see that if one country really wants to reduce the “lower-price” and “lower-quality” products from China, the first step is to develop its own economy and to increase the personal income. If one country has already removed all the poverty and has the ability to say no to “lower-quality products” in China, this will push Chinese companies to improve their products quality. This also reflects the basic economic theory that supply is determined by demand, and demand is determined by income. So if “lower-price” and “lower-quality” “Chinese technical economy” is popular in one country, which means there are still a lot of poor people living in this country. Maybe if there is no “Chinese technical economy” in this country, these poor people will be living harder or cannot survive.

For Chinese government, if China wants to change the reputation of “Chinese technical economy”, there is still a long way to go. Fortunately, China government has already made a proposal to change “Chinese technical economy” into “Innovated in China”, and the proposal name is “Made in China 2025”. However, to achieve this, China government still needs to do a lot of work to attract more talents, for instance, talents for AI (Artificial intelligence). And Chinese government should make more policies to motivate companies and institutions to make more innovation now.

![Figure 5. Advices](image)

From analysis above, we can see that “Chinese technical economy” is not only the responsibility of China, but it is world responsibility. This is what I call “global responsibility”. Global responsibility includes two dimensions: buying responsibility and consuming responsibility. “Buying responsibility”
means if you are buying “lower-price” and “lower-quality” products from China or these products are popular in your country. From the relations among supply, demand and income, you should not complain. All you and your government need to do is to work harder to make people much richer. For “consuming responsibility”, it means that if you and your country are consuming Chinese products, you are responsible for the environmental problems in China, so Chinese environmental problems are not only Chinese problems, and they are world’s problems.

Frankly speaking, this paper only uses China and “Chinese technical economy” as a research sample to explain the relation and interaction of world economics. In the future, I will continue to study the relation between “Made in Asia” and world development. I want to build a new business model which goes like this: Designed in America, made in Asia and consumed in Europe. However, all the continents are not separate from one another, and they are on the same boat and same supply chain, so they are responsible to one another.

Acknowledgements
This work is sponsored by China Scholarship Council, and this paper has been presented in 4th Winter Conference of Economics PhD students and Researchers.

References
[1] Girden, Ellen R. (1992). ANOVA: Repeated measures: Sage.
[2] Lardy, Nicholas R. (1994). China in the world economy. Peterson Institute Press: All Books.
[3] Roth, Aleda V, Tsuy, Andy A, Pullman, Madeleine E, & Gray, John V. (2008). Unraveling the food supply chain: strategic insights from China and the 2007 recalls. Journal of Supply Chain Management, 44(1), 22-39.
[4] Guan, JianCheng, & Yam, Richard CM. (2015). Effects of government financial incentives on firms’ innovation performance in China: Evidences from Beijing in the 1990s. Research Policy, 44(1), 273-282.
[5] Hopewell, Kristen. (2015). Different paths to power: The rise of Brazil, India and China at the World Trade Organization. Review of International Political Economy, 22(2), 311-338.
[6] BaoanWang. (2015). Chinese economy is still the power of world economy. Qushi(21), 63-63.
[7] Nye Jr, Joseph S. (2017). Will the liberal order survive: The history of an idea. Foreign Aff., 96, 10.
[8] Jiayu Sun. (2017). The Study on the Relation between Chinese Economics Development and World Economy. Consume Guide (20).
[9] Bertagnolli, Frank. (2018). Einführung Lean Management Lean Management (pp. 217-219): Springer.