

Summaries

EU Member States' Non-New Goods Trade Trends
Analyzing Exhaust Emission Regulations and Used Car Imports

Naohiko Ijiri

This paper empirically analyses the effect of the EU's exhaust emission regulations on member states' imports of used cars and related parts. In analyzing the structure of international trade, Rauch (1999) and Ijiri et al. (2013) have classified traded goods into three types based on their elasticity of substitution. Similarly, in this paper, I define used goods as "non-new" goods, and classify them into three types – scrap materials, used goods, and vintage goods.

Scrap materials are not regulated by any strict commodity exchange or other standards. As they are commonly traded for recycling purposes, they are not strictly categorized according to quality, being considered, rather, to be homogenous in nature. Used goods, so long as they are being traded, are not waste material, and as the conditions of used goods may vary, they are thought to have a lower elasticity of substitution than homogenous products. Vintage goods are characterized by the fact that their rarity increases with age, so their elasticity of substitution is lower than either scrap materials or used goods.

In this paper, I use the definition of various goods in the EU tariff line to identify non-new goods. The 8-digit tariff code based on the Harmonized System (HS) is used to calculate each EU member state's import of non-new goods. The calculations reveal that the import share of non-new goods within total imports is on the decline in EU member states.

Non-new goods, as defined for the purposes of this paper, include 21 types of cars and car parts. EU regulations related to vehicle exhaust emissions have become progressively stricter since 1992 in an effort to prevent the worsening of air pollution. It is likely that the import of used cars decreased in EU member states as a result of the strengthening of such exhaust gas regulations, and that this is a factor of the decline in the import share of non-new goods. This paper uses the structural gravity model of trade to empirically analyze the impact of exhaust emission regulations on the import of used cars, etc., by EU member states. As expected, the results of the analysis suggest that the strengthening of exhaust emission regulations has caused used car imports to decline.

Economic Growth, Environmental Pollution, and Social Welfare

Hiroyuki Yoshida

This paper considers the relationship between economic growth and environmental pollution from the perspective of dynamic macroeconomics. In general, private economic activities give rise to environmental pollution such as air pollution and soil contamination. We assume that the pollution stock operates as a negative externality for the utility function of consumers. Consumers maximize lifetime utility by solving a dynamic optimization problem in the infinite horizon case. Moreover, the government collects income taxes and allocates all its tax revenues in two different ways: productive public spending and pollution abatement activities. In this model productive public spending plays an important role as a positive externality, giving rise to endogenous growth. In addition, environmental deterioration is expressed by an explicit formulation.

The main purpose of this paper is to investigate how changes in the income tax rate affect the economic growth rate and social welfare using the framework of Barro-type (1990) endogenous economic theory. The conclusion is that, if consumers have little interest in the quality of the environment, if the environment is not greatly degraded by private sector economic activity, or if environmental decontamination efforts have significant effects, economic growth and social welfare are simultaneously maximized when the government sets the tax rate at $\tau = 1 - \alpha$. Conversely, if consumers pay considerable attention to environmental quality, if the environment is greatly degraded by private sector economic activity, or if environmental decontamination efforts have no significant effects, the conclusion is that economic growth is maximized when the government sets the tax rate at $\tau = 1 - \alpha$, but social welfare is minimized. These conclusions carry a policy implication that government policy without accurate knowledge of the nature of the utility function of consumers, the mechanism of pollution generation, and the technology of pollution abatement, could result in the worst outcome for social welfare.

Research on Foreign Trade in Vintage Product
– An Examination of the Structure of Foreign Trade
in Non-New Tradable Goods –

Takaaki Maeno

This research uses tariff line-level foreign trade data to show the fundamental structure of foreign trade in non-new tradable goods to 24 countries and regions from the four countries that are the subject of analysis, centering on Japan and the US. With the progressing globalization of the international division of labor, the markets for non-new goods are increasing in economic importance from the perspective of re-use and re-manufacture of intermediate input goods. However, while there is an accumulated number of studies to date that consider trade in non-new goods in specific products and specific markets, research attempting a comprehensive analysis of the structure of foreign trade in non-new goods remains scarce. This research is an attempt at capturing the characteristics of the structure of foreign trade in non-new goods.

The analysis categorizes tradable goods into new goods and non-new goods, makes further distinctions between the non-new goods of used goods, scrap, and antiques, matches them with goods classification by manufacturing use and attempts an examination of the structure of foreign trade. The analysis results yielded the following two points. First, Japan's trade in non-new tradable goods occurs in used products and scrap bilaterally with countries whose incomes are comparatively high among countries in Asia, suggesting the point that this structure enables access to a wider range of intermediate input goods for the production networks that can be seen in the Asian region. As to the second point, from the structure of foreign trade in non-new goods in the US the analysis shows that even when used goods and scrap share the same goods classification by manufacturing use the principal trade partner countries for used goods and scrap are distinct. While the trade in used goods directly usable for production occurs bilaterally in the North American region, trade in scrap is mostly conducted with the Asian region, predominantly with China. From these analysis results we find that in order to capture the structure of foreign trade in the framework of the international division of labor in recent years, it is necessary to conduct analyses that grasp the advances in international system design and consider the uniqueness of the tradable goods.

Constructing an Economic Theory of Cryptocurrency Value Creation

Tetsuya Saito

Moriyasu Arima

Hajime Kobayashi

Masaru Inaba

This research considers how the value of cryptocurrency is created. In this paper, we consider two channels of demand for cryptocurrency. Cryptocurrency is a method of payment and also an input factor for blockchain service providers. To build a model of demand for cryptocurrency as a method of payment, a bargaining model is considered. This approach reflects the search-theoretic model of money (Kiyotaki and Wright 1989, 1990, 1991, 1993; Kehoe, Kiyotaki, and Wright 1993; Trejos and Wright 1995; and Lagos and Wright 2005). The model of demand for cryptocurrency as an input factor uses a standard neoclassical model whose input factors are labor, capital, and blockchains.

In the first model, based on the money-search approach, buyers are money holders and sellers are goods suppliers. The money holders can use both traditional and cryptocurrency. Each buyer-seller pair bargains over the quantity of trade and the share of payment with cryptocurrency. For simplicity, this paper does not consider the dynamic process of random matching. We focus on the stage-game after pairing. The bargaining follows Nash bargaining with even bargaining power. At equilibrium (the Nash bargaining solution), the demand for cryptocurrency as a method of payment increases when its expected future price increases or its volatility decreases.

The model of demand for cryptocurrency (blockchain) as an input factor is based on a microeconomic model of banking. In this model, a neoclassical technology is applied in a competitive environment. The factor demand function is then provided by equating the factor price and the marginal product value of the blockchain. The aggregate demand for the blockchain is the sum of the two demands, and this aggregate demand then becomes the basis of value.

It is often said that the blockchain price is a bubble. Assuredly, bubbles exist, but it is also true that there is a mechanism of value creation (in this sense, cryptocurrency is not fiat money, but commodity money). High expectations for the future create the bubble.

Technical Aspects of the Bank Run Experiment

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Masaru Inaba

This paper summarizes the technical aspects of the bank run experiment. To build the computer program, we also summarized the theory behind the Diamond-Dybvig model (1983).

The program used for the experiment needed to handle numerous server-client transactions. If we tried to use the institute's local area network (LAN), there was a high probability of such transactions being regarded as maltransactions, such as Denial of Service (DoS) attacks or hacking attempts, causing the transactions to then be blocked. At the test stage, we encountered network connection terminations and other such problems. To resolve these problems, we used a wireless LAN connection between the server and clients. To do so, the server and clients were connected directly, outside the institute's LAN.

For the experiment, we wrote the program as a web application. Apache 2 was used for the web server, PHP was used as the server-side programming language, and JavaScript (miniAjax) was used for the client-side programming language. SQLite was used for the database to record all the actions of the participants. During the experiment, all the orders were sent from the server, and all the clients were monitored by pinging.

The implementation of the program was successful. During the experiment, there were a few times when the network was disconnected, but these did not pose big problems as they occurred between two stages except in one case. In that one case, the user interface was not displayed during one of the stages. To get around the problem, we asked the participant if he wanted to withdraw his deposit. The answer was no, so we did not collect the data (as there was no action, it was regarded as a "do not withdraw").

Results and Theoretical Reverification of the Bank Run Experiment

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This paper discusses an experiment verifying the bank run model suggested by Diamond and Dybvig (1983). The experiment follows that of Garratt and Keister (2009) to improve on their trials.

The model assumes a bank with two types of deposits, each of a different maturity. Depositors keep their money at the bank until maturity. However, some depositors face sudden demand for liquidity and withdraw their money. In such a climate, other depositors choose whether or not to withdraw their money before maturity. If withdrawn deposits exceed a certain amount, the bank becomes insolvent. Diamond and Dybvig call this a “bank run” because withdrawals before maturity are considered a panic action.

Experiments were processed six times at the Economic Experiment Center of Kansai University. Participants in the experiments were students of Kansai University. The maximum number of participants each time was 25 (the actual numbers were 25, 20 and 10).

In the experiments, at the beginning of each period, participants were initially randomly assigned to a bank in the computer program. Each bank consisted of five depositors. Using payoff tables, the banks were classified as having either low or high solvency margins. In addition, there were periods with and without compulsory withdrawals (sudden demand for liquidity). All the participants knew the structure of each stage and could see the result (payoff) at the end of each period.

Garratt and Keister (2009) used a user interface with only a “withdraw” button. In their case, a clicking sound meant a withdrawal, and a bank-run could be induced by the sound. It is a fact that rumors, like clicking sounds, can generate a panic in the real world. To test this hypothesis, we used an alternative user interface with a “do not withdraw” button after testing with the same interface as Garratt and Keister. In our new interface, clicking sounds did not necessarily mean withdrawals.

The result of our experiments was very clear. Bank runs often occurred when the solvency margin was low and there was only a “withdraw” button. Bank runs were rare when the solvency margin was high. In addition, even when the solvency margin was low, bank runs were rare when

we used the interface with the “do not withdraw” button.

Our result confirms that clicking sounds induce bank runs, which indicates that rumors (clicking sounds) generate panic actions.

**A Study of the Consistency Between Theoretical and Experimental Analysis
of Bank Runs and the Case Study of an Actual Bank Run in Japan**

Moriyasu Arima

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Hajime Kobayashi

Masaru Inaba

The global economy periodically faces the possibility of a financial crises triggered by bank runs, which are the subject of this study. Unfortunately, as of the current time, no failsafe method for avoiding bank runs altogether has yet been found. This study attempts to shed light on the mechanism of bank runs and the factors that trigger them using a three-pronged approach – the theoretical model, an experiment to test whether the theory can be backed up, and a case study of an actual bank run, to confirm its consistency with the theory as well as the results of the experiment. Of these, the current paper focuses on the third, i.e., a case study aimed at examining and checking whether the theory and experimental results are consistent with the mechanism of an actual bank run.

The experiment of this study replicated that of Garratt and Keister (2009), which was based on the model suggested by Diamond and Dybvig (1983), and was conducted with a view to confirming the consistency of its results with the theory. Initially, there emerged a conflict between the theory and the results of the experiment. The cause of this was found to be the sound of a click, which only happened at the time of withdrawal. Realizing that this sound was probably being used as a factor for predicting the occurrence of a panic, we rearranged the system so that the click would not function as a signal of money withdrawals. This improved the consistency of the experiment's results with the theory.

For the purpose of the current paper, we searched for an actual incident where an external factor corresponding to the sound of a click caused a bank run in Japan. We were able to confirm that the 1973 run on the Toyokawa Shinkin Bank (a credit union) was exactly such an incident. The trigger in this case was a silly conversation among high-school girls, but as the insecurities resulting from that conversation increased and combined with a rumor effect, the misunderstanding took the shape of confirmed fact and spread throughout the town, resulting in a major bank run. The management of the bank at the time the rumor started was quite healthy, and it was in no way susceptible to a bank run. We, therefore, conjectured that rumors (which correspond to the sound of a click in our experiment) acted as the trigger to dramatically lower the

bank's solvency margin ratio (an indicator of the extent to which its assets covered commitments for future payments), resulting in a higher probability of withdrawals, and causing a run on the bank. While comparing several cases of bank runs by classifying them according to what caused the run, this paper focuses on and describes in detail the Toyokawa Shinkin Bank incident, as it is the closest to the kind of bank run considered in this study.