Important laws governing China's macro-economy

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ABSTRACT

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This paper presents economic laws that are valid for China's macro-economy from 1952 to 2013 in spite of the many institutional changes during this period. The laws include a consumption function based on the adaptive expectations hypothesis of Friedman (1957) or the rational expectations hypothesis of Hall (1978), an investment function derived from the accelerations principle and the roles of government expenditure and money supply. It extends the analyses of Chow (1985, 2010 and 2011) to cover longer periods and study additional issues. *Journal of Comparative Economics* **000** () (2015) 1–6. Princeton University, Princeton, NJ 08540, USA.

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1. Introduction

There are many papers on China's macro-economy. Many are summarized by Chang, Chen, Waggoner and Zha (2015). Unlike other papers, this paper presents economic laws that are applicable for long periods beginning in 1952 and under different and changing economic institutions. Most of current research explains economic details in short periods and often by institutional changes. This paper extends the work of Chow (1985, 2010 and 2011) to cover a longer period and to incorporate the roles of government expenditure and money supply in the determination of national income in China.

One may question why the hypotheses advanced to explain consumption and investment behavior in market economies are applicable to the Chinese economy especially when central planning was practiced before market reform started in 1978. Concerning consumer behavior there is no reason why consumers living in a planned economy would behave differently from people living elsewhere. When rationing was enforced during the period of central planning, consumption of rationed commodities was affected but total consumption expenditure should remain the same. Determination of total investment expenditure by the Chinese government can be expected to follow the accelerations principle if there is a positive relation between capital stock and total output. Since total investment is the first difference in total output, it will depend on the first difference of total output. An important question concerning the Chinese economy is why the ratio of consumption to investment or to total output (which includes both consumption and investment) decreased in recent years. This paper is able to explain both consumption and investment and thus their ratio for the entire period from 1952 to 2013 by exogenous government expenditure which affects both investment and consumption (see Table 4). It explains government expenditure endogenously by current income and lagged consumption (see Table 5) without resort to exogenous political decisions.

In Section 2, the basic econometric model is formulated and estimated using data from 1952 to 2006. In Section 3, results of estimation of the model incorporating government expenditures and money supply as exogenous variables and endogenous variables using data from 1952 to 2013 are presented. Section 4 concludes.

2. Validity of the basic multiplier-accelerator model for the period 1952–2006

The model of Chow (1985, 2010, 2011) consists of three simultaneous equations to determine three dependent or endogenous variables. The three variables are aggregate consumption C, aggregate investment I which includes capital accumulation by both the non-government and the government sectors and gross national product Y which is the sum of C, I and X, X being the excess of exports over imports. In the second model, government expenditures G and total money supply M measured by currency in circulation are introduced. All of the above variables are measured in constant prices after deflation by a GDP deflator. The GDP deflator P was obtained as the ratio of gross domestic product in current prices to an index of gross domestic product in constant prices. All data used can be found in *China Statistical Yearbook* of various years.

In the first model, the three endogenous variables are explained by the following structural equations:

$$Y_t = C_t + I_t + X_t \tag{1}$$

$$C_t = c_0 + c_1 Y_t + c_2 C_{t-1} + u_{1t} \tag{2}$$

$$I_t = a_0 + a_1 Y_t + a_2 Y_{t-1} + a_3 I_{t-1} + u_{2t} \tag{3}$$

We treat X_t as exogenous. The predetermined variables in this model include the lagged endogenous variables C_{t-1}, I_{t-1}, Y_{t-1} and the exogenous variable X_t. The method of two-stage least squares will be applied to estimate the parameters of Eqs. (2) and (3).

The sample period of Chow (1985) is from 1952 to 1983, while the sample period of Chow (2010) is from 1978 to 2006. In this section we examine whether the above model is valid for the entire period from 1952 to 2006. The data used can be found in *China Statistical Yearbook 2014*. All data used in this paper including data from 2007 to 2013 are presented in Table 1. Note that these data are slightly different from the data used in Chow (1985) and Chow (2010) because of data revision by the National Statistics Bureau of China.

The results of estimation are presented in two parts. The first part is for the original multiplier-accelerator model and is presented in this section. The second part is for the model which incorporates government expenditures and money supply as two additional variables and is presented in Section 3.

Data on GDP, consumption, investment, net exports, government expenditures, money supply (currency in circulation) in units of 100 million yuan at current prices and the GDP deflator are shown in Table 1. The variables Y, C, I, X, G and M are in constant prices, obtained by dividing the above nominal figures by the GDP deflator P. The GDP deflator is the ratio of GDP in current prices to GDP in constant prices. The data for P from 1952 to 1978 are taken from Table 1 of Chow (1985), converted to 1.000 for 1978. The data for P from 1978 to 2013 are the ratio of nominal GDP and GDP in constant prices provided in Tables 3.1 and 3.5, respectively of *China Statistical Yearbook 2014*.

According to the permanent income hypothesis of Hall (1978) consumption C is a random walk plus drift, i.e., is equals to a constant plus lagged consumption. Based on the estimates of the coefficients of the consumption function in Table 2, the coefficient of lagged consumption is indeed 1 and the income variable is insignificant. The same consumption function is found in Chow (1985, 2010 and 2011). Note that the data used in this paper are slightly different from the data used in Chow (1985, 2010 and 2011) because of data revision by China's National Statistics Bureau which affects the estimation results to some extent.

As reported in Table 2, the consumption function supports the hypothesis of Hall (1987), showing an insignificant effect of income and a coefficient of lagged consumption equal to 1. The investment equation reported in Table 2 supports the accelerations principle of investment since the coefficients of Y^* and Y_{t-1} are opposite in sign and of similar order of magnitude. Note that the point estimates of these coefficients are larger than 1 in absolute value but given their standard errors these estimates we accept the hypothesis that the population values are smaller than 1 in absolute value.

To find out whether the consumption and investment functions remained unchanged after 1978 when economic reform started, the sample of Table 2 are divided into two parts with the second part beginning in 1979. In the first sample, the point estimates of the coefficients of income and of lagged consumption in the consumption are respectively –.050 and 1.142. In the second sample these coefficients are 0.047 and 0.973. However, the Chow test for the temporal stability of these two sets of coefficients yields an $F(3, 48)$ statistic equal to 3.0769, leading to rejection of the null hypothesis of temporal stability at a 5% level (critical value = 2.81%) but not at a 1% level (critical value = 4.23). Although the point estimates of the two coefficients in both sample periods are close and satisfy the hypothesis of Hall (1978), their small standard errors have led to a moderately large F statistic. By contrast, the $F(4, 46)$ statistic for testing the temporal stability of the investment function equals only .34276, strongly supporting the null hypothesis of temporal stability. The reason is the larger standard errors of the coefficients of income and lagged income in the investment equation.

After the data from 2007 to 2013 are included the results from estimating the model are reported in Table 3. Observe that in the consumption function the income variable is significant as suggested by the permanent or expected income hypothesis of Friedman (1957) and the rational expectation hypothesis of Hall (1978) is replaced when data after 2006 are included. One