

The Velocity of Money Revisited

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Introduction

- ◆ Before the introduction of money, exchanges are done in the form of barter, which is well known to have many limitations, such as the non-coincidence of needs, the difficulties of the settlement of any imbalances, and use of credit.
- ◆ Money provides a single numeraire for all goods and services, makes temporary imbalances and credit possible and simplifies greatly the process of price discovery in markets.
- ◆ Money increases the choices of all traders and enables many transactions that are not possible through barter alone. Thus, it serves a useful social purpose and its issuer deserves to enjoy the seigneurage.

The Quantity Theory of Money

- ◆ At the macroeconomic level, the typical starting point of monetary theory is the quantity equation:

$$\text{◆ } MV = PT,$$

- ◆ where M is the nominal quantity of money supply, V is supposed to be a constant known as the velocity of money, P is the aggregate price level, and T is the (real) aggregate quantity of transactions in the economy.
- ◆ T is often identified with and assumed to be proportional to the real aggregate output of the economy, Y , or GDP. Thus the quantity equation is also written as:

$$\text{◆ } MV = PY, \text{ from which we obtain:}$$

$$\text{◆ } V = PY/M.$$

The Quantity Theory of Money

- ◆ According to this interpretation of the quantity theory, the velocity of money is given by the nominal GDP divided by the nominal money supply. If V were a constant, then an increase in the money supply, holding Y (real GDP) constant, increases the aggregate price level. Alternatively, an increase in the money supply, holding the aggregate price level constant, increases real GDP.
- ◆ In fact, if V were a constant, then the rate of inflation is given by the difference between the rate of growth of the money supply and the rate of growth of real GDP.
- ◆ However, this interpretation of the quantity theory requires the assumption that the aggregate quantity of real monetary transactions is proportional to real GDP.

The Quantity Theory of Money

- ◆ V , the velocity of money, can be shown to be empirically neither constant over time in the same economy or across different economies.
- ◆ Why are there variations in V , within a given economy over time, as well as across different economies?

The Proportionality of the Real Quantity of Aggregate Transactions to Real GDP

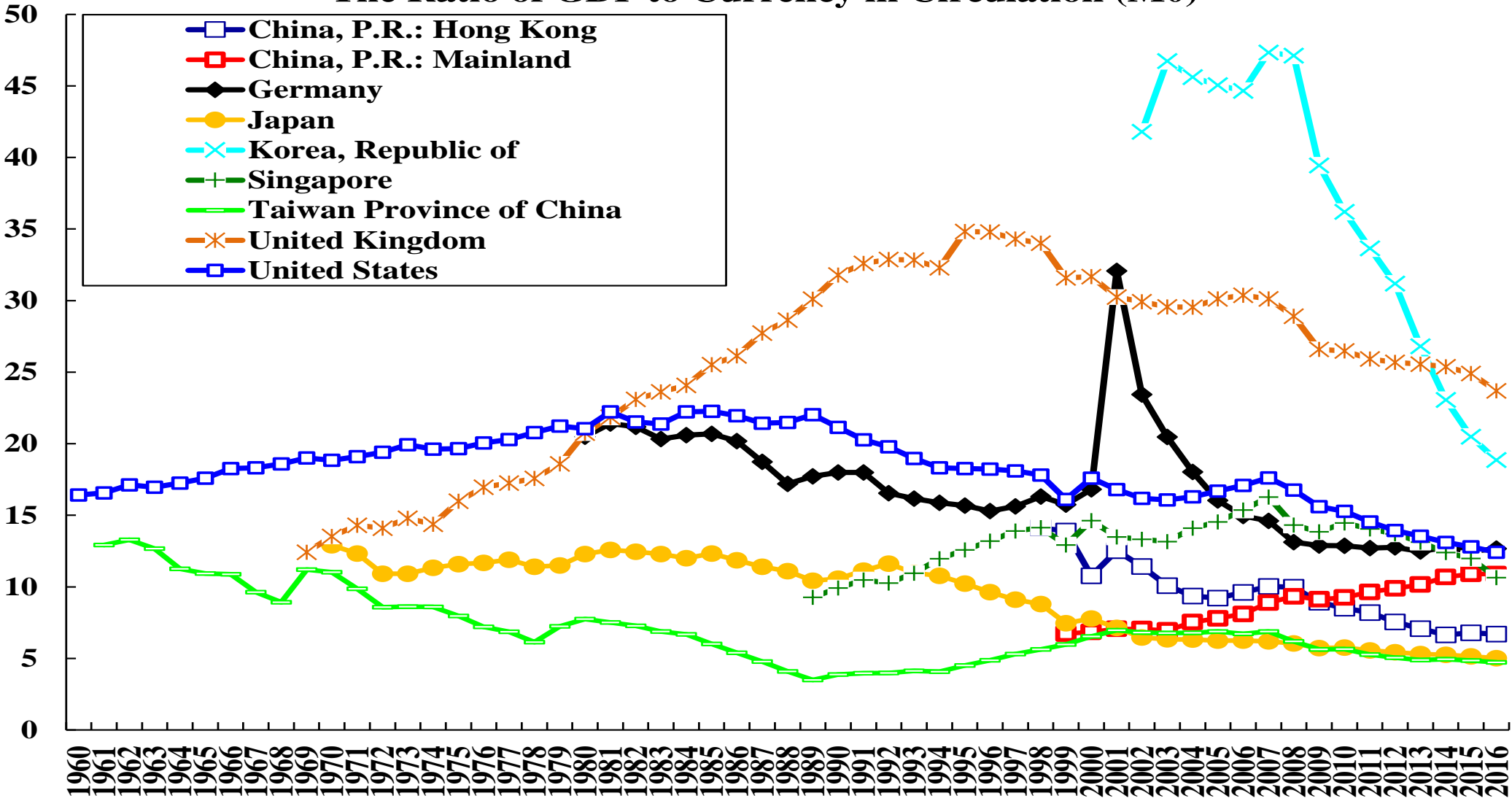
- ◆ Unfortunately, even in a simple economy without any transactions involving pre-existing assets, both real and financial, T cannot in general be assumed to be proportional to Y .
- ◆ Moreover, we know that among the three components of the demand for money--transactions demand, precautionary demand and speculative demand--the latter two depend on expectations about the future, which also affect the quantity of monetary balances held, for a given level of nominal GDP.
- ◆ The relationship between transactions, or settlements, and real economic activities, also depends on the local credit customs and traditions and in particular on the frequency of monetary settlements. In ancient China, most transactions are on credit and settlement of accounts is either annual or three times a year. It is well known that the central banks in Chinese societies will expand the money supply at the end of a lunar year to meet the liquidity needs and then contract afterwards.

The Non-Constancy of the Velocity of Money: Currency in Circulation (M0)

- ◆ The ratio of nominal GDP to currency in circulation (M0) is clearly not constant either over time for the same economy or across economies (see the following chart).
- ◆ There appears to be an initially rising phase for the velocity of M0, followed by a falling phase.
- ◆ China appears to be an exception, as its velocity has been rising, but it may just be due to the fact that it is still in the early phase.
- ◆ A declining velocity implies that more and more currency is needed in order to support a unit of nominal GDP. Why is this the case?
- ◆ A natural explanation would be the increasing monetization and specialization and division of labor as the economy grows. For example, agricultural households that used to be self-sufficient now sell their output and buy their inputs and consumption goods on the market.
- ◆ It may also be related, in part, to the increase in illegal transactions which are typically conducted only in cash (and perhaps in crypto-₈ currencies today).

The Ratio of Nominal GDP (PY) to Currency in Circulation (M0)

The Ratio of GDP to Currency in Circulation (M0)



The Non-Constancy of the Velocity of Money: Broad Money (M2)

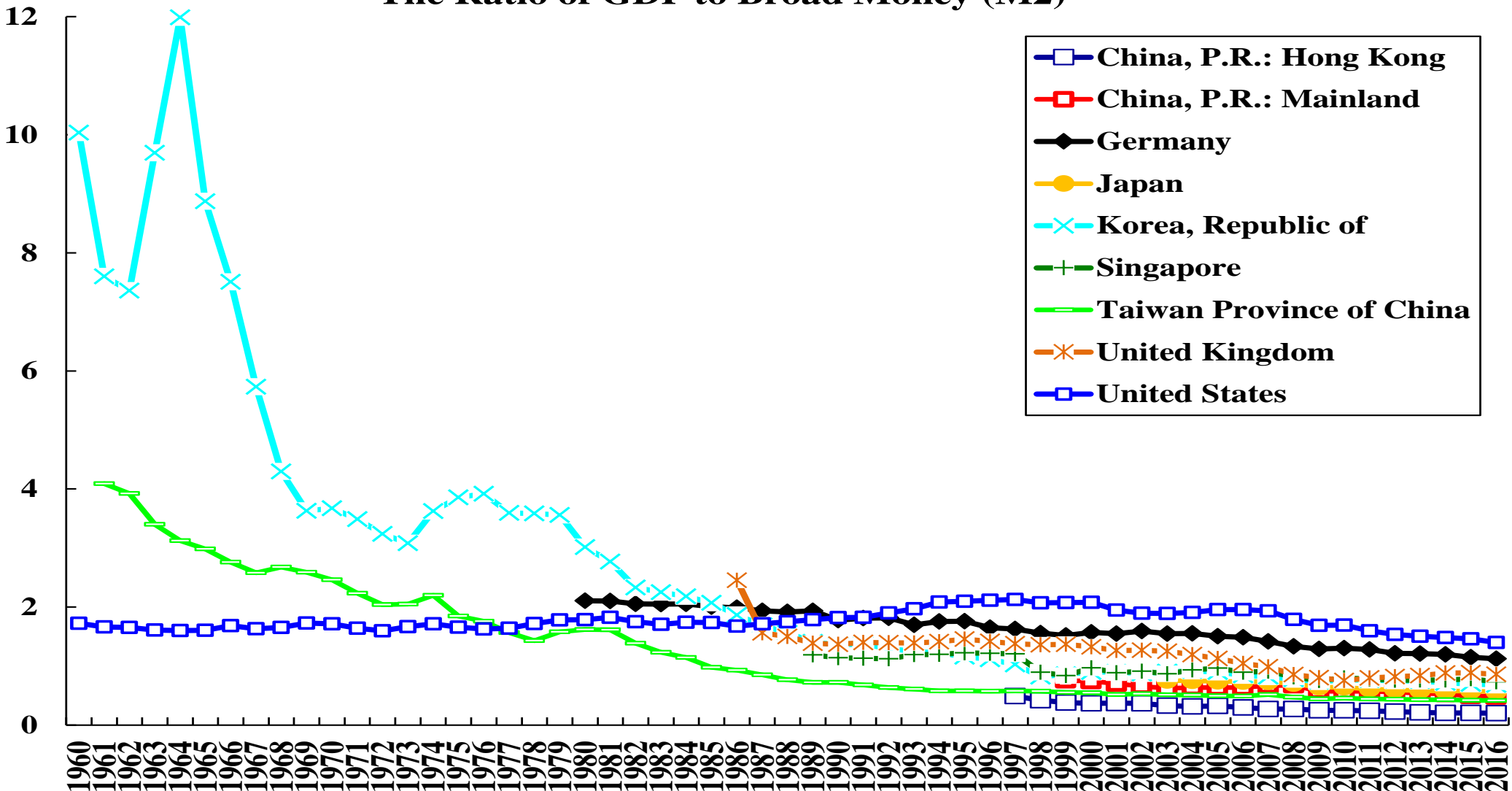
- ◆ The ratio of nominal GDP to broad money (M2) is also clearly not constant either over time for the same economy or across economies.
- ◆ But it does seem to have a declining trend, even in China.
- ◆ A declining velocity implies that more and more broad money is needed in order to support a unit of nominal GDP. Why is this the case?
- ◆ A natural explanation would be the need for money for the settlement of transactions involving the exchange of existing real assets or financial assets. It can also be related to the increasing fragmentation of production across different firms, resulting from specialization and division of labor, and the decline in the degree of vertical integration within firms.
- ◆ It may also be related, in part, to the rise of financial instruments such as money market mutual funds that are essentially equivalent to personal checking accounts but are not always counted as part of M1 (and hence M2). This also raises the question of what financial instruments should be counted as money.

The Non-Constancy of the Velocity of Money: Broad Money (M2)

- ◆ The availability of personal checking accounts is not universal. For example, no personal checking accounts are allowed in China.
- ◆ The adequacy of the social safety net can also be a factor affecting the stock of precautionary money balances held.
- ◆ The availability of real-time settlement is likely to diminish the stock of money required for transactions.
- ◆ The degree of financial deepening is likely to increase the stock of money required. (For example, in addition to the trade in stocks, there will be trade in the mutual funds owning the stocks, and perhaps even trades in mutual funds of mutual funds.)
- ◆ There is also no clear trend in the ratio of currency in circulation to broad money, even though the use of cash should be diminishing relatively.

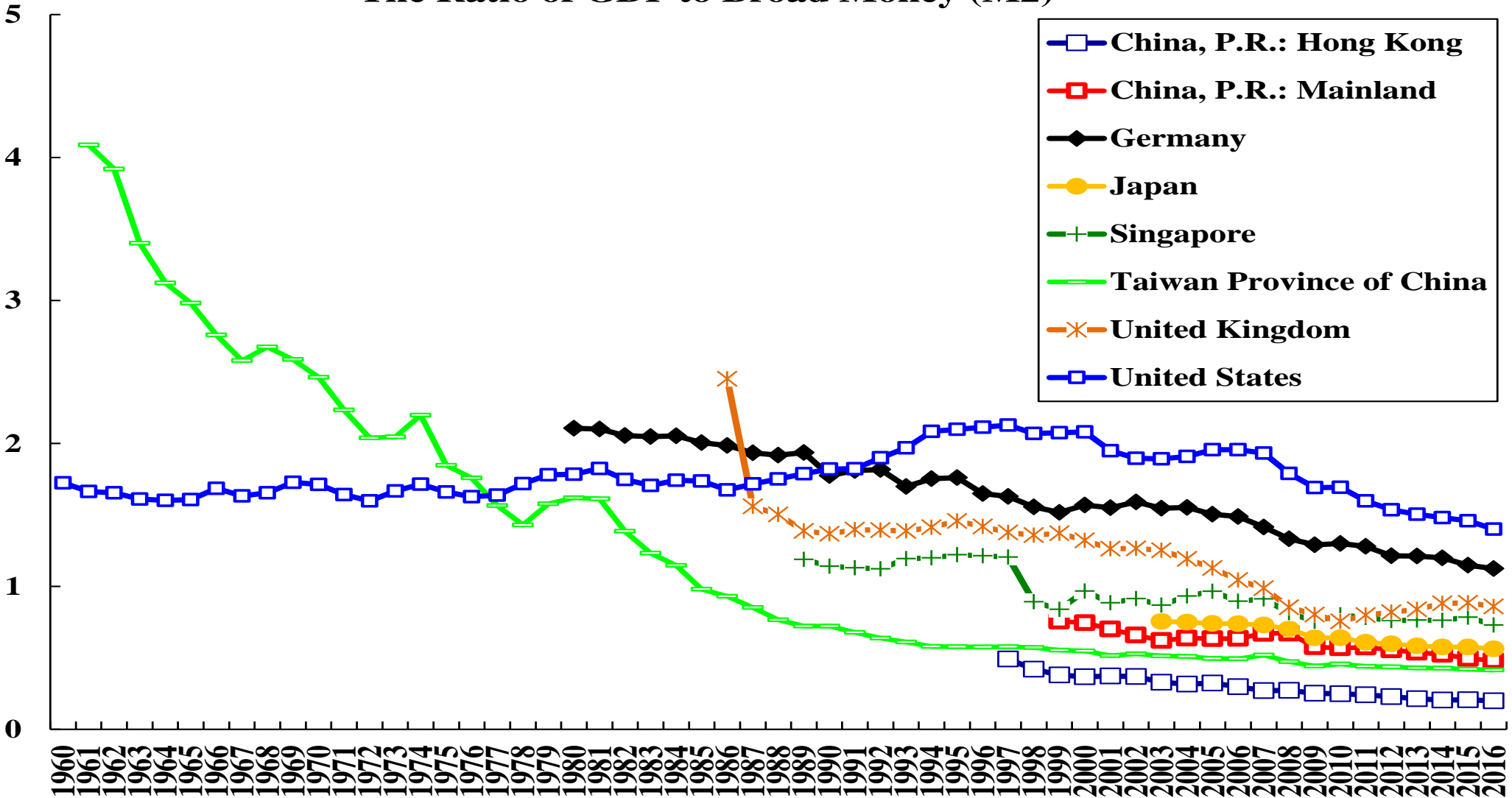
The Ratio of Nominal GDP (PY) to Broad Money (M2): (1)

The Ratio of GDP to Broad Money (M2)

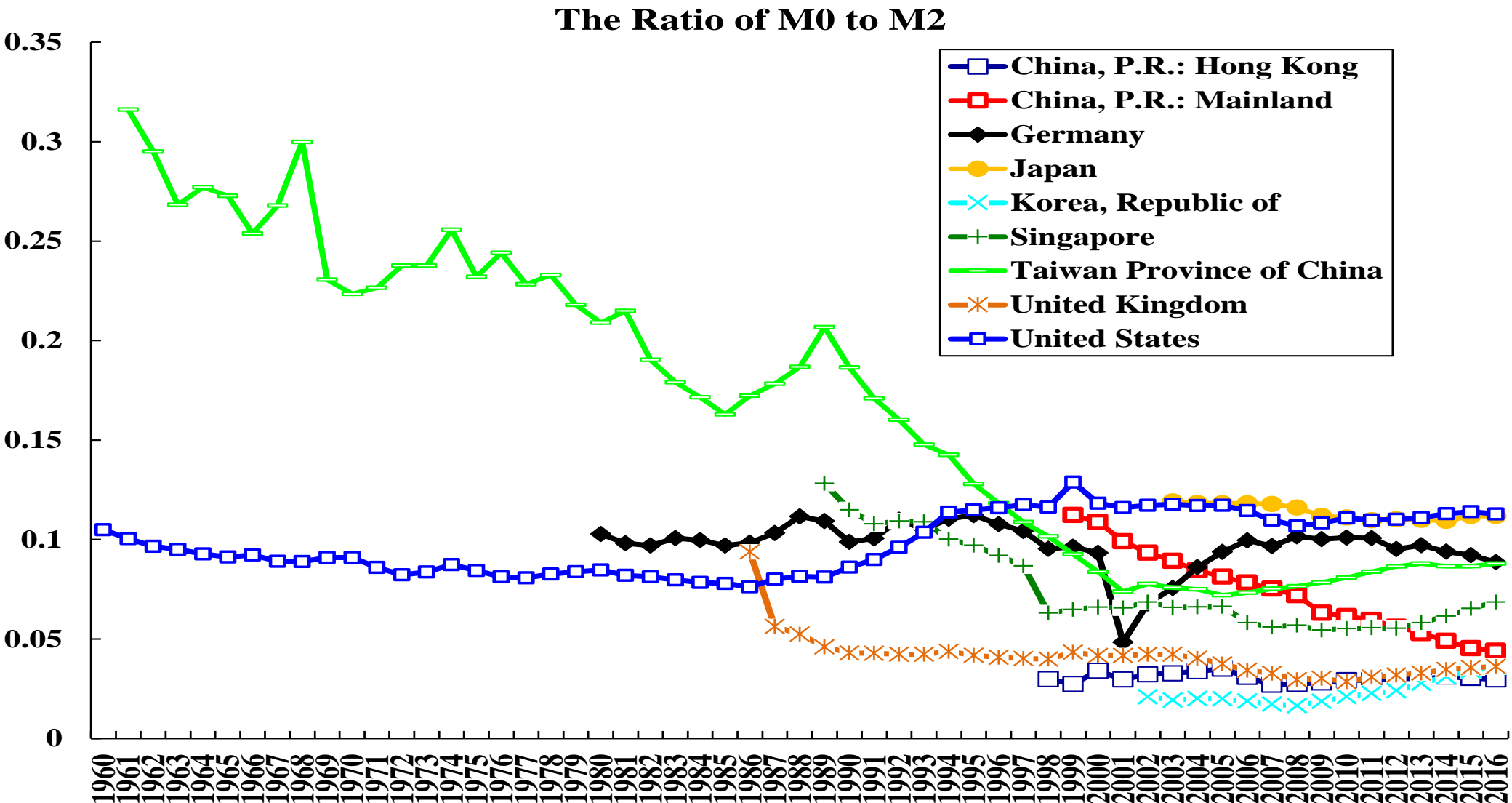


The Ratio of Nominal GDP (PY) to Broad Money (M2): (2)

The Ratio of GDP to Broad Money (M2)



The Ratio of Currency in Circulation (M0) to Broad Money (M2)



Transactions that Generate Real GDP but Do not Require Monetary Settlement

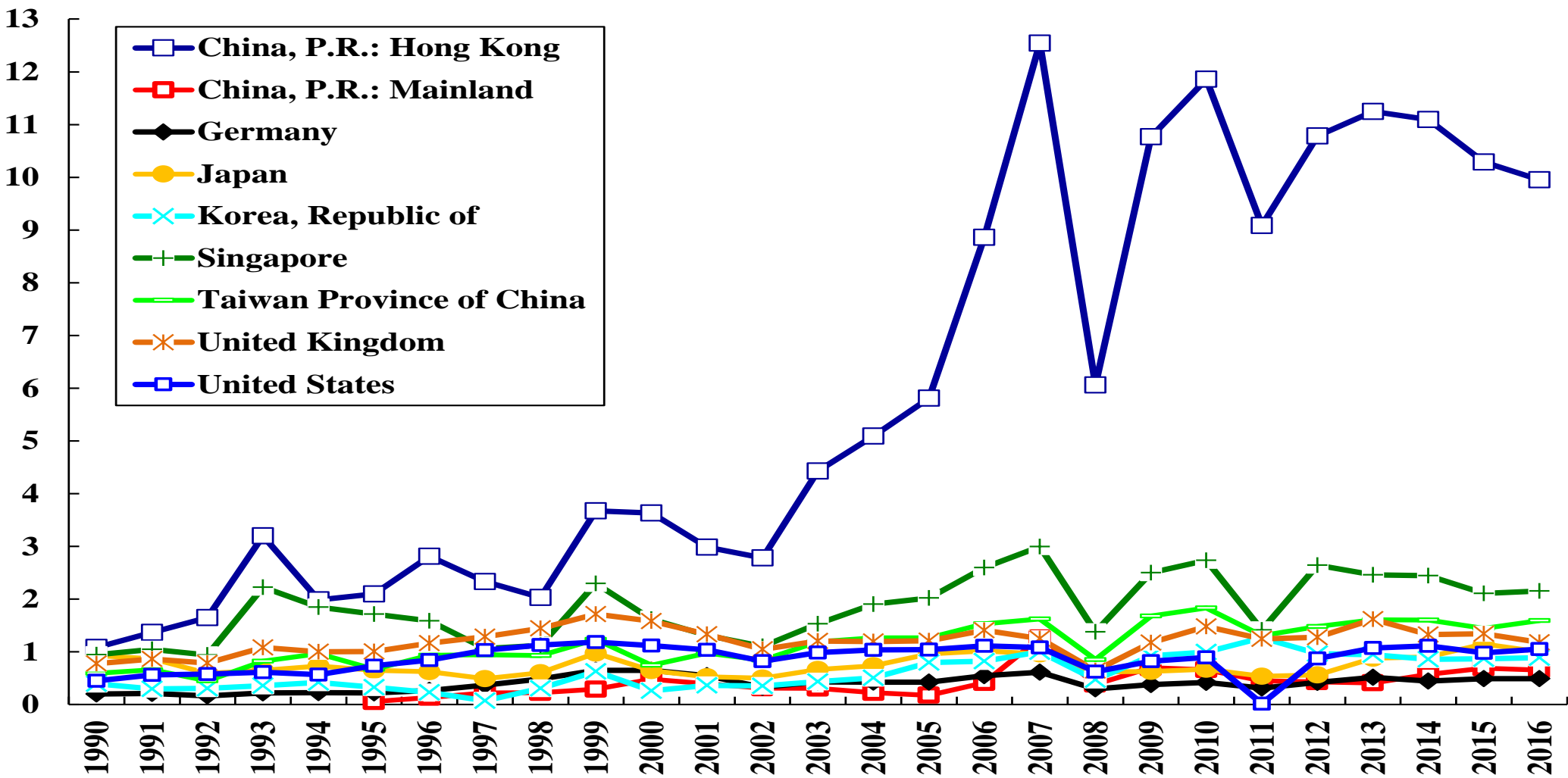
- ◆ For example, intra-firm transactions typically do not have to be settled monetarily. In that case, two firms producing identical products using identical technologies will require different quantities of money depending on whether one does everything in house and the other outsources most operations. The final real value-added may in fact be identical, but the ratios of the value-added to monetary balances will be different.
- ◆ The use of direct credit obviates the use of monetary balances until the time of settlement.
- ◆ Similarly, the use of credit cards also reduces the use of monetary balances for settlement purposes.

Monetary Transactions that Do not Generate GDP

- ◆ Transactions that involve the exchange of pre-existing capital assets such as firms (including structure and equipment), real estate, and financial assets such as stocks and bonds do not generate additional current GDP beyond the commissions and brokerage fees. However, they can be large relative to the nominal GDP.
- ◆ The market capitalization of stock exchanges can be used as a proxy of the wealth within an economy (of course, this omits the value of non-publicly listed enterprises and the value of real estate owned by the households). Hong Kong and Singapore have exceptionally high ratios because many non-local stocks are traded on their respective exchanges.
- ◆ A more useful indicator can be the annual turnover of the stock exchanges and real estate transactions (excluding transactions of newly completed real estate).

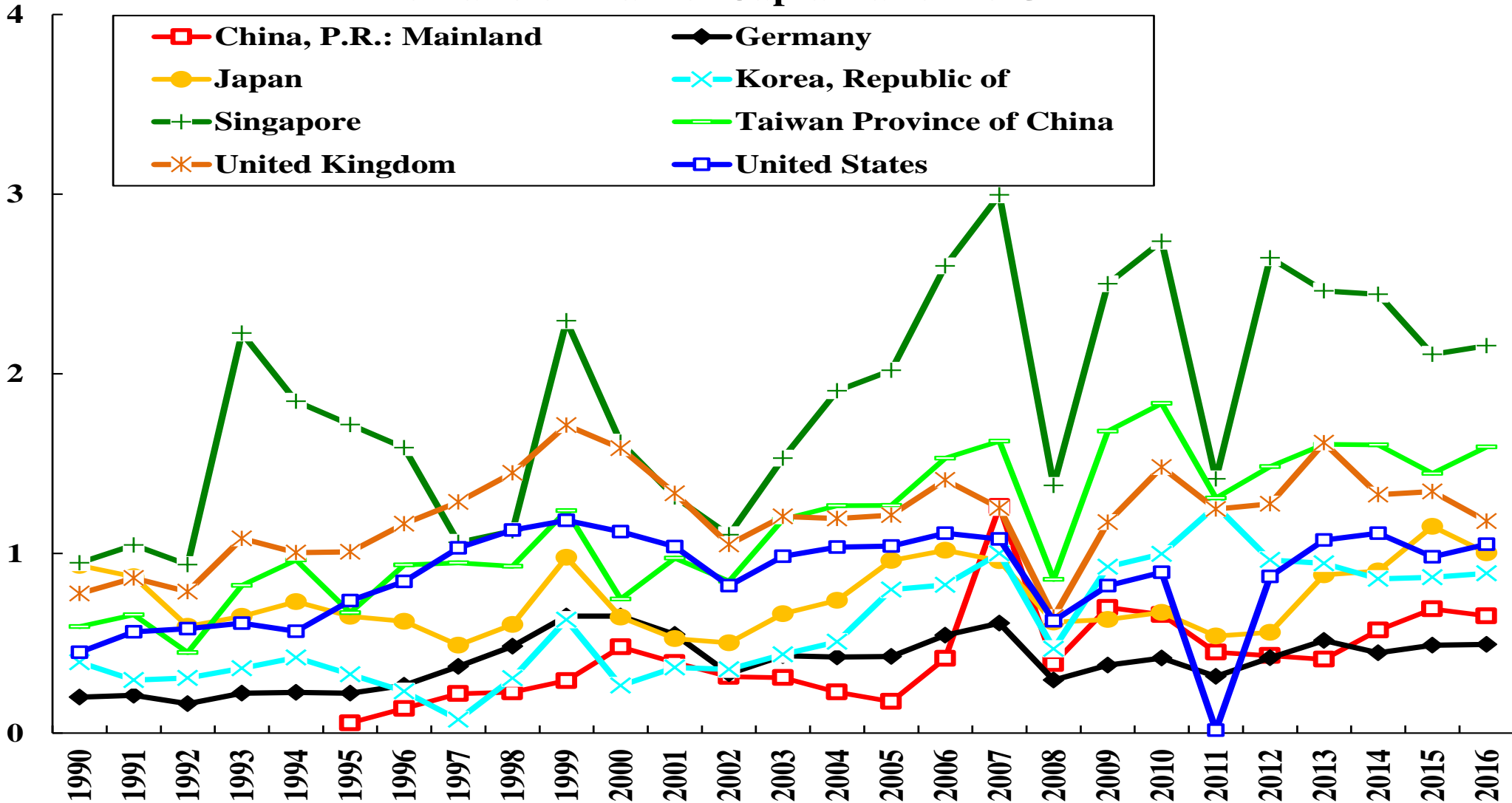
The Ratio of Stock Market Capitalization to GDP: (1)

The Ratio of Market Capitalization to GDP



The Ratio of Stock Market Capitalization to GDP: (2)

The Ratio of Market Capitalization to GDP



The Appropriate Price Index

- ◆ While the GDP deflator would appear to be the right price index, it does not normally capture the change in the prices of real and financial assets. However, transactions of pre-existing real and financial assets will definitely have an impact on the volume of monetary transactions.
- ◆ We have often seen the divergence in the rates of growth of the prices of goods and services, and the prices of real assets, such as real estate, and financial assets, such as stocks and bonds.
- ◆ In principle, there should be at least two separate types of monetary transactions, those involving real goods and services produced in the current period, and those involving pre-existing real assets as well as financial assets. An increase in the money supply can have differential effects on the two types of transactions and on the rate of changes of the prices of goods and services and the price of assets.
- ◆ It is actually possible to have deflation in the prices of goods and services and inflation in the prices of assets. Is a composite price index incorporating the price changes in both goods and services on the one hand and real and financial assets on the other hand possible ?

Alternative Payment Systems

- ◆ Precious metals and gems
- ◆ WeChat as a payment mechanism
- ◆ Bitcoin and other crypto-currencies

Concluding Remarks

- ◆ There is an opportunity to rebuild the quantity theory of money, distinguishing the different forms of money, the different types of transactions, and the price indexes of goods and services and real and financial assets.
- ◆ Only then can we have a full understanding of the past decade of macroeconomic and monetary developments in the developed economies of the U.S., the Euro Zone, and Japan. Why did “Quantitative Easing” fail or at least take such a long time to stimulate the real economy?
- ◆ And with such a full understanding, we can better use monetary policy for macroeconomic control and management in the future.