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Study on the interactive mechanism of economic growth, inflation and capital markets using dynamic Bayesian factor graph

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With the deepening of economic globalization and financial liberation, capitalization degree can no longer be ignored for its influence on the relationship between economic growth and inflation. In consideration of the evolvement from the period of industrialization to economic financialisation of the U.S., through the Bayesian network learning of rolling time window, the study concentrate on the dynamic transmission mechanism between economic growth, inflation and capital markets. It turns out that the interactive relationship between capital markets and economic operation is becoming closer and closer. Furthermore, in the order of bond, stock and real estate markets, indicators related to capital markets gradually enter into the transmission mechanism of economic growth and inflation.

Key words: Economic growth, inflation, capital markets, Bayesian network.

INTRODUCTION

The relationship between economic growth and inflation has long been an important and hot topic in macroeconomics. In particular, the relationship is dynamic and conditional, which is bound up with social and economic environment, macro policies and exogenous shocks, and so on. Moreover, with the rapid development of capital markets, financial assets keep expanding while financial innovations keep emerging, which means that the capitalization degree can no longer be ignored any more. According to incomplete statistics,

the last two decades saw an explosion in the scale of global financial assets represented by stock, bond and derivative markets, which increased from 80 trillion in 1998 to 247 trillion in 2014, about three times as much as global GDP.

The development of capital markets has brought about a series of phenomenon that is difficult to explain, which put forward great challenge for the modern theories of economic growth and inflation under the classical among money supply, economic growth and inflation has begun

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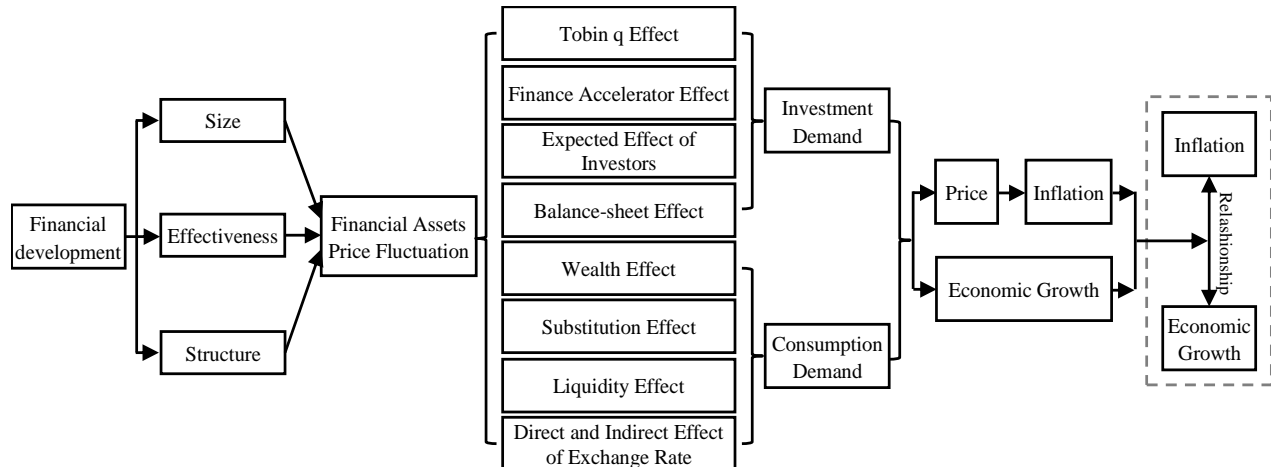


Figure 1. The effect of financial development on the relationship between economic growth and inflation.

to come out in some developed countries such as framework. Back in the 1970s, the deviating phenomenon the U.S. Not only that, jobless recovery even took place in the U.S., which is associated with the overall transformation in the ways of economic growth and economic operation. In addition, financial activities including speculating transactions by leverage and asset securitization are playing a more and more important role in its economic growth at present, which has fundamental difference with that based on resource input and technological progress.

Capital markets are developing so fast that we are curious about its effect on the relationship between economic growth and inflation. Take finance as the typical representative of capital markets for example, as shown in Figure 1, its development will influence investment and consumption through the following channels: Tobin q effect, finance accelerator effect, expected effect of investors, balance-sheet effect, wealth effect, substitution effect, liquidity effect, direct and indirect effect of exchange rate; which can then exert influence on price and output, and further the relationship between economic growth and inflation. Therefore, after taking full consideration of capital markets, the coordinated development of economic growth and inflation should be the main goal of macroeconomic policies, which means that study on the interactive mechanism of economic growth, inflation and capital markets, is of great importance.

However, given the interaction between capital markets and economic operation, the dynamic evolutionary relationship between economic growth and inflation is becoming more and more complicated, which is difficult for traditional methods to find dynamic change of key influential factors and transmission mechanism. Dynamic Bayesian factor graph as a part of the Bayesian network, which is first put forward by Wang et al. (2015), illustrates a good way to solve this problem. With the characteristics

of effectiveness and concision, it provides a unified framework for intricate dependencies among multiple variables.

A direct benefit of the method is that we can actually start with a very large initial factor set, and the adaptation process through given data set will eliminate irrelevant or unimportant factors to deliver a right topological model structure with the dominant factors as a solution. In such a data-driven approach, expert knowledge is no longer essential, although it can still be helpful at various stages of an adaptation to reduce irrelevant or unimportant factors. The change in key influential factors and transmission mechanism can be found in time through the Bayesian network learning of rolling time window.

In consideration of the period of industrialization and economic financialisation from the U.S., the study concentrated on the dynamic interactive mechanism between economic growth, inflation and capital markets.

LITERATURE REVIEW

There are numerous theoretical and empirical contributions that investigate the interactive mechanism among money supply, economic growth and inflation. As a typical model to study the relationship among unemployment, inflation and economic growth, Phillips curve, which was first put forward by Phillips in 1958, has received a lot of attention for a long time. And with the emergence and replacement of new economic problems, the original Phillips curve was constantly being modified by different schools of thought (Samuelson and Solow, 1960; Friedman, 1967; Lucas, 1972; Calvo, 1983; Gail and Gertler, 1999; Manki and Reis, 2003), the development and evolution of which constitutes the most fundamental theoretical basis for research on the relationship among money supply, economic growth and inflation. Then considering that money played a more and

more important role in economic development, it was introduced into the traditional models through different forms. According to the difference in the methods that monetary variables were introduced into the models and the emphasis on the role that monetary variables played, there were five categories of models such as monetary growth model (Tobin, 1965), money-in-the-utility model (Sidrauski, 1967), cash-in-advance model (Clower, 1967), monetary stock effect (Palley, 1996) and transaction cost model (Itaya and Mino, 2003).

At present, with the integration of global finance and deepening of economic financialisation, financial markets contribute a lot and play a very important part in the macro-economic operation. Thus the links between financial development and macro-economic variables have drawn considerable attention and received enormous research, which can be divided into three following categories.

Interaction between financial development and economic growth

Financial development is considered as a key to economic growth, and the last two decades have witnessed a resurgence of interest in the relationship with the emergence of endogenous growth theory. Some studies have focused on testing the effect of financial development on economic growth, the general findings of which indicate that the financial sector has significant and positive impact on growth (for example, Jahfera and Inoueb, 2014; Ang, 2008; Levine, 2005).

Furthermore, some studies aim at determining which category of financial markets most explains economic growth. For instance, Montes and Tiberto (2012), Cole et al. (2008), and others in this body of literature all stress that stock market development is important in fostering long-run economic growth since it facilitates efficient inter-temporal allocation of resources, capital accumulation, and technological innovation. On condition that there is a positive relationship between financial development and economic growth, other studies, however, have been interested in examining the direction of causality between the two variables, yet have not reached a consensus: studies such as Kolapo and Adaramola (2012), Akinlo and Egbetunde (2010), Estrada et al. (2010), and Enisan and Olufisayo (2009) insist that financial development induces economic growth, while Kar et al. (2011), Panopoulou (2009), Odhiambo (2008) and Ang and McKibbin (2007) in their empirical studies achieve opposite conclusion.

Effect of inflation on financial development

By creating uncertainty and financial market frictions, high rates of inflation make the financial system inefficient in allocating resources (Keho, 2009; Naceur and

Ghazouani, 2005). A large number of empirical works have provided significant contributions to the finance-inflation nexus recently, which mainly indicates that sustained inflation and financial sector performance display a strongly negative association (Almalki and Batayneh, 2015; Kim and Lin, 2010). In their pioneering work, Boyd et al. (1996, 2001) concentrate on the links and find the above negative relationship between inflation and financial development regardless of the time period considered and inclusion or exclusion of countries that have experienced extraordinarily high rates of inflation. Naceur and Ghazouani (2005) examine the impact of inflation on the financial sector performance in the case of 11 MENA countries, which asserted a negative and significant incidence of inflation on financial development. There are also studies which examines the inflation-finance nexus on a single country bias. Bittencourt (2011) makes empirical analysis of 10 economically diverse regions in Brazil and concludes that inflation is detrimental to financial development, which is significant and robust for different data sets, different measures of financial development and different estimators. Ozturk and Karagoz (2012) investigate the abovementioned relation empirically in the case of Turkey, which also supports the previous findings.

Threshold effect of inflation on the finance-growth nexus

Given that high inflation could adversely affect the operations of financial markets, and thus change the finance-growth nexus, there is a large body of literature devoted to investigate the effect of inflation on the relationship (Tiwary and Thampy, 2015; Pradhan, 2011; Huang et al., 2010; Giedeman and Compton, 2009; Rousseau and Yilmazkuday, 2009; Lee and Wong, 2005; Rousseau and Wachtel, 2002). The existing studies have reached a consensus: there is a strong positive relation between finance and growth when inflation is low; however, at moderate inflation levels, this finance-growth relationship declines in magnitude as well as in significance and finally becomes insignificant at high levels of inflation. The threshold values of inflation vary with different countries. For instance, Kremer et al. (2013) find out separate thresholds for developed and developing countries, and note that the threshold for developed countries is much lower (2.5%) than for developing countries (17.2%). Raheem and Oyinlola (2015) confirm the existence of threshold with estimates, and suggest that the threshold level of inflation is between 5 and 10% per annum for Ghana, and 15% per annum for Nigeria and Cote d' Ivoire.

Main contribution of this paper

From the above, the relationship among money supply,

economic growth and inflation has drawn considerable attention and received enormous research, the shortcomings of which, however, demonstrate in two aspects: on one hand, large majority of previous study tends to be static empirical analysis, that is, a certain period of one country or different countries is taken into account in general, which ignores the influence of capitalization degree on the evolutionary relationship; on the other hand, stock market index is often chosen to measure the financial development in studying the linkage between financial development and macroeconomic variables, which is short of representativeness and comprehensiveness.

As one of the most effective models to deal with uncertain problems, Bayesian network was first put forward by Pearl in 1988, which has drawn a lot of attention so far, and has been widely used in many practical fields such as biology, medical treatment and psychology, and so on. Now it has begun to be applied to macroeconomics. For instance, Zhu and He (2015) used the dynamic Bayesian network to measure the pass through of RMB exchange rate to prices of different stages and industrial prices. Therefore, unlike the earlier studies, this paper avoids the subjective judgments for the complicated selection of key influential factors. The dynamic interactive mechanism between economic growth and inflation with reference to capital markets is explored through the Bayesian network learning of rolling time window.

DYNAMIC BAYESIAN FACTOR GRAPH

We will start by briefly reviewing some basic concepts of Bayesian factor graph followed by expanding it to dynamical Bayesian factor graph to include time. The dynamic Bayesian factor graph adapted from an initial factor set is then used as the model structure to capture the change in interactive mechanism of economic growth, inflation and capital markets.

Bayesian factor graph

Being a subclass of Bayesian network (Pearl, 2000), Bayesian factor graph (Wang et al., 2008) is a probabilistic qualitative modeling structure that captures and represents relationships among a set of factors in a graphical format. The inter-factor relationships, by way of causality, relevance, or independence are qualitatively represented by edges in a graph.

Mathematically, a Bayesian factor graph is a directed acyclic graph encoding the joint probability distribution for a set of factors in the form of random variables $X = \{x_1, x_2, \dots, x_n\}$, where n is the number of factors in the set. The sample of factor X_i can be denoted by $D_i = \{x_i^1, x_i^2, \dots, x_i^{r_i}\}$, where r_i is the number of nominal

values of factor X_i , and the whole dataset can be indicated as D . This structure represents the qualitative information of a problem domain. The nodes in the graph represent random variables, and the absence of an edge between any two nodes represents conditional independency between the corresponding variables. If there is an edge from X_i to another node X_j , then X_i is a parent of X_j , and X_j is a child of X_i . The probability distributions between each node and its parents represent the quantitative information of a Bayesian factor graph.

The set of parent nodes of X_i is denoted by G_i and the whole graph structure is a vector $G = \{G_1, G_2, \dots, G_n\}$. Given a graph structure G , the probability of X can be written as the product of the local distribution of each node X_i given its parents:

$$P(X|G) = p(x_1, x_2, \dots, x_n | G) = \prod_{i=1}^n p(x_i | G_i) \quad (1)$$

For our problem, the graph structure G is not known. Introducing a prior $p(G)$ on the possible structures, we have

$$p(X) = \sum_G p(G) p(X|G) \quad (2)$$

By using the Bayes rule, the posterior distribution of the graph structure becomes

$$p(G|X) = \frac{p(G)p(X|G)}{p(X)} \quad (3)$$

where $p(G|X)$ is termed scoring functions and can assume various specific forms. Based on discretized data, we use the Bayesian Dirichlet equivalence uniform scoring function (Heckerman, Geiger & Chickering, 1995) for the marginal likelihood of the network $P(D|G, \alpha)$

$$P(D|G, \alpha) = \prod_{i=1}^n \prod_{j=1}^{q_i} \frac{\Gamma(\frac{\alpha}{q_i})}{\Gamma(\frac{\alpha}{q_i} + \sum_{k=1}^{r_i} m_{ijk})} \prod_{k=1}^{r_i} \frac{\Gamma(\frac{\alpha}{r_i q_i} + m_{ijk})}{\Gamma(\frac{\alpha}{r_i q_i})} \quad (4)$$

In (4), q_i is the number of values of G_i . The j th unique value of G_i is devoted by ϕ_{ij} , and m_{ijk} is the number of records where factor X_i equals x_{ik} and G_i equals ϕ_{ij} . α is the equivalent sample size parameter which denotes the prior belief in the uniformity of the conditional distributions of the graph. This scoring function metric guides us to find the maximum posterior structure for the

set of factors under study. Finding the optimal structure is to find a structure that maximizes the posterior probability

$$G^* = \arg \max_G P(G | D) \quad (5)$$

Which is the criterion used in Wang et al. (2008) and also in this study.

Incorporating dynamism in Bayesian factor graph

Reference to the practice of Wang et al. (2015), dynamics can easily be incorporated into the model structure of Bayesian factor graph discussed above by rolling the time window.

Suppose we want to model the structural dynamics of n factors for a time period of (T_1, T_2) with a given data set D over the same time period: $D = \{X_{it} : T_1 \leq t \leq T_2, 0 < i \leq n\}$. For each t ($T_1 \leq t \leq T_2$), there is one Bayesian factor graph G_t generated based on data set $D_t = \{X_{it} : T_1 \leq t \leq t, 0 < i \leq n\}$. Then the edges with transmission strength greater than p_1 and transmission probability greater than p_2 are selected to constitute the Bayesian factor graph G_t . For a discrete time t_i of which $i = 1, 2, \dots, T$, and $T_1 \leq t_i \leq T_2$. This process will lead to a time series of Bayesian factor graphs: G_{t_i} where $i = 1, 2, \dots, T$. These G_{t_i} will be termed dynamic Bayesian factor graph that is seen as a dynamical model for an underlying system from the time period (T_1, T_2) .

EMPIRICAL ANALYSIS OF DYNAMIC INTERACTIVE MECHANISM BETWEEN ECONOMIC GROWTH, INFLATION AND CAPITAL MARKETS

In consideration of the period of industrialization and economic financialisation from the U.S., this study applies the dynamic Bayesian factor graph to study the evolvement in interactive mechanism between economic growth and inflation with full consideration of the gradual development of capital markets through the Bayesian network learning of rolling time window.

Data and measurements

On account of data availability, the empirical analysis employs quarter-on-quarter data (1991Q1-2014Q4). And detailed information about variables used in our investigations is given in Table 1. In addition, it should be noted that large volume of data is required by Bayesian network. For the purpose of accurate results, here we apply Bootstrap to expand the sample. Bootstrap is a statistical method about resampling, which is based on

computer simulation. Without any other assumption about the model or additional new observations, it can make full use of the given information and make an estimate of the overall parameters. Owing to its robustness and high efficiency, Bootstrap is widely used in strict probability distribution assumption or small sample with sophisticated unknown parameters.

In addition, in economic research, irregular elements and seasonal changes usually cover up the objective laws of economic development, which has brought considerable difficulties for studying the relationship evolvement between variables. Therefore, the Census X12 seasonal adjustment is done for all the above variables to eliminate the influence of irregular elements and seasonal changes. What's more, in order to obtain an objective understanding of economic phenomenon, HP filter is applied to the above seasonally adjusted data to distinguish the time trend and cycle sequence, on the basis of which dynamic interactive mechanism can be studied on the cycle component.

Empirical results and analysis

As for the time window, it will be too short to generate regularity or too long to capture the dynamic change. In consequence, through the trial and comparison for time window of three, four, five and six years, length of four years is tested to better reflect the evolvement in interactive mechanism between economic growth and inflation. On such a basis, slide forward one quarter at a time, and set the threshold of transmission strength and transmission probability as 0.6 and 0.5 respectively.

Then the final dynamic Bayesian factor graph are composed of 81 Bayesian factor graphs. Moreover, when the criterion is interpreted as the disappearing or emerging edges with the two key variables, the stable period for a Bayesian factor graph is nearly three to five years. It should be stressed that bi-directional influence does exist for any two factors but only the direction with greater transmission probability is left in the Bayesian factor graph. Although capital markets have developed rapidly since 1990s, economic operation and growth mode have not changed fundamentally at that time.

Therefore, until the middle of 1990s, the effect of traditional economy on capital markets dominated the interaction between economic operation and capital markets. However, since the late 1990s, the U.S. began to come into transformation from the period of industrialization to economic financialisation. Capital markets represented by finance and real estate take the place of traditional economy dominated by manufacturing step by step. What's more, the interactive relationship between capital markets and economic operation is becoming closer and closer. Taking the difference in scale and transmission speed of different capital markets into account, typical indicators from different capital markets gradually begin to enter into the transmission mechanism

Table 1. Detailed information about variables.

Type		Indicator	Description
Key variables	Economic growth	GDP	GDP with constant price is chosen to eliminate the influence of price so as to measure the changes in real output for a certain period
	Inflation	CPI	CPI with constant price is chosen to represent inflation. However, we have to estimate the quarter-on-quarter data ourselves based on month-on-month data. For example, let's denote the month-on-month CPI for April, May and June is p_1 , p_2 and p_3 . Then the change between June and March can be treated as the change between second and first quarter, that is $(1+p_1)(1+p_2)(1+p_3)-1$, and so on
	Money supply	M2	With the constant emergence of financial innovation, financial development has imposed great influence on the monetary statistics and the division of monetary level, on the basis of which M2 is selected to reflect money supply
Traditional macroeconomic variables	Interest	Federal fund rate (Interest)	The federal fund rate is the most sensitive indicator of the tightness in money market, especially when the intermediate target of monetary policy changes from money supply to real interest rate since the 1990s
	Exchange rate	generalized actual dollar index (Dollar index)	The generalized actual dollar index with price adjustment is chosen as the indicator of exchange rate, which can reflect the performances of dollar in international exchange market synthetically
Capital market variables		Market capitalization (Stock)	With respect to stock markets of the U.S., the market capitalization from NASDAQ, NYSE and AMEX roughly constitutes the total value, and the data is from <i>WFE World Federation of Exchanges</i>
	Scale	Debt securities outstanding (Bond)	As for the bond markets of the U.S., debt securities outstanding summarizes the international and domestic markets and the data is taken from <i>BIS Bank for International Settlements</i>
		Yield	The yields on S&P500 (Stockyield) and one-year treasury bond (Bondyield) are selected to reflect the fluctuation in price of stock and bond markets
	Fluctuation	House price index (Hpi)	This indicator is released by the official authority OFHEO, which has direct and timely performances for the volatility in real estate market

(a) The market value of financial assets is utilized to account for the financial development. It should be noted that the statistics including only stock and bond markets are incomplete. The reason for us to ignore the financial derivatives market is the high leverage ratio, which can distort its tendency and even affect the relationship between financial development and macroeconomic variables. (b) The principal data source of this paper is Wind database without special explanation.

mechanism of economic growth and inflation. Moreover, with the deepening of economic financialisation, indicators related to capital markets are playing an increasingly important role in the moderating and mediating effects and transmission mechanism tends to be more and more complicated.

In addition, we get rid of the periods with special effects on the overall economy from Asian

financial crisis, subprime mortgage crisis and European debt crisis for a better identification of the evolvement of the interactive mechanism between economic growth and inflation. Due to the limitation of space, transmission mechanism graphs with representativeness are chosen for the followed analysis. Table 2 illustrates detailed information about transmission mechanism between economic growth and inflation with

transmission strength and probability, which can be divided into four stages:

Stage 1: There is only direct linkage between GDP and CPI, and they form another independent system compared with variables from capital markets, which reflects the relatively backward development of capital markets before the middle

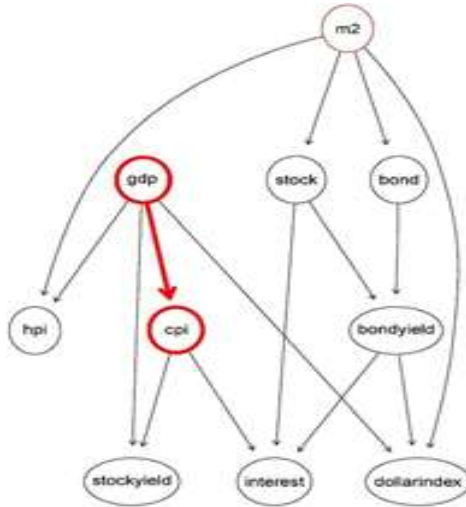


Figure 2. Transmission path graph (1993-1996).

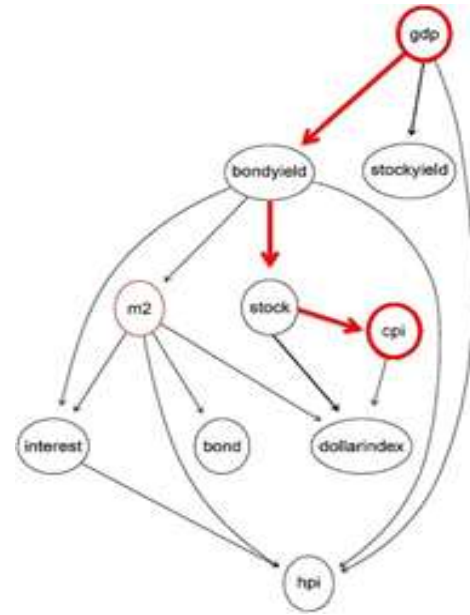


Figure 4. Transmission path graph (2003-2006).

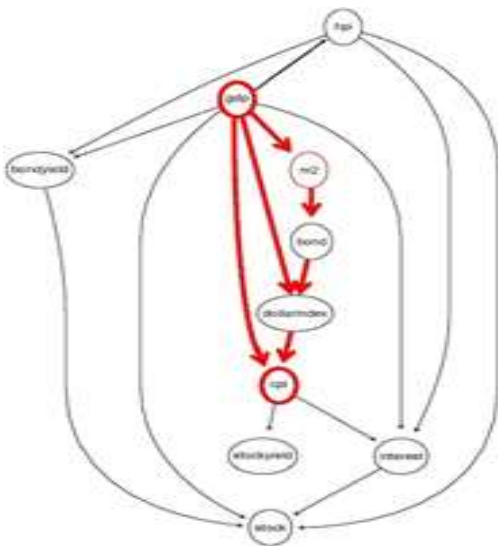


Figure 3. Transmission path graph (1999-2002).

of 1990s. It can be seen from Figure 2 that macroeconomic indicators such as GDP, CPI and M2 are in a dominant position in the transmission path, especially GDP and M2, which are located in the original position. At the same time, indicators related to capital markets are situated in the middle or end of the transmission path. In a word, traditional economy plays a leading role at this stage, and the effect of traditional economy on capital markets dominated the interaction between economic operation and capital markets.

Meanwhile, there is significant transmission relationship between M2 and capital markets, which demonstrates the monetary shunting effect of capital markets. From the second to the fourth stage, in the order of bond, stock

and real estate markets, indicators related to capital markets gradually enter into the transmission mechanism of economic growth and inflation. The transmission system between GDP and CPI has experienced the evolvement from the period with both direct and indirect linkage to the period with only indirect linkage based on indicators related to capital markets.

Stage 2: The earlier mentioned two independent systems set out to turn up signs of fusion. The indicator Bond measuring the scale of bond market begins to enter into the GDP-CPI system. Apart from direct linkage, indirect transmission path comes into existence based on indicator from capital markets. According to Figure 3, as an important operation platform, bond market has become the hinge of financial markets and traditional economy. Money supply can impose influence on the scale of bond market through asset substitution effect, wealth effect and expected effect, which in turn acts as the bridge of transmission mechanism from GDP to CPI.

Stage 3: The direct linkage between GDP and CPI starts to disappear, and indicators related to capital markets that have an effect on GDP-CPI system extend to Bondyield and Stock. As shown in Figure 4, as the most classical portfolio, stock and bond markets share the role of tie of interaction between GDP and CPI, which bear the functions of transmission and adjustment combined with the linkage mechanism of stock and bond markets.

Stage 4: The two systems come into further integration. As the representative indicators of stock, bond and real estate markets, Bondyield, Stock and Hpi all enter into the GDP-CPI system. As is indicated in Figure 5, GDP is

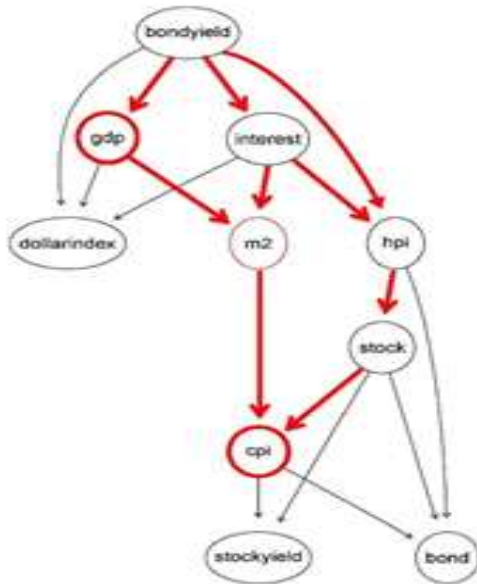


Figure 5. Transmission path graph (2011-2014).

no longer situated in the dominant position to simply have impact on other indicators. However, Bondyield sets about having an effect on GDP and plays an important part in the overall transmission mechanism. What's more, indirect interactive mechanism between GDP and CPI becomes more and more complicated, and different transmission chains interwoven into a network. As the most important parts of capital markets, financial markets and real estate markets presents mutual penetration and fusion, which have moderating and mediating effects on transmission mechanism between GDP and CPI. In addition, the reason for the order of bond, stock and real estate market to enter into the transmission mechanism can be summarized as follows:

Firstly, as one of the earliest countries to develop bond markets, its development in the U.S. can date back to the 18th century. In the 1990s, bond market is the main part of financial markets, the scale of which is more or less twice as much as that of stock market. On one aspect, the bond market can regulate the money supply. On the other hand, the real relationship between supply and demand of the market can be reflected to great extent by interest rates formed in bond markets. Owing to its close connection to money and capital markets, indicator from bond market goes into the GDP-CPI system in the first place.

Secondly, after the bond market, stock market comes into existence in the transmission mechanism between GDP and CPI. Since the late 1990 s, the scale of stock market expands rapidly, which is gradually more mature and perfect and plays a more and more important role in the economic operation no matter in terms of stock issuance and circulation, or in the aspect of market capacity and development degree. The flow of funds

between stock and bond markets will be different due to different stages of economic operation. In addition, the understanding and focus on liquidity, security and profitability from economic subjects will change with the economic situation and market background, which may correspondingly give rise to the change in investment portfolio and fluctuations of asset price. As a consequence, the GDP-CPI system will be affected through substitution effect, Tobin q effect and finance accelerator effect, and so on.

Finally, the entrance of indicator from real estate market is an inevitable trend for a certain degree of economic financialisation. As is known to all, the development of real estate market depends on large numbers of various kinds of financial institutions. With the development of financial liberalization and globalization, real estate as both investment and investment instruments is increasingly involved in the market transaction. Capitalized pricing is becoming more and more popular in the development of real estate market. As a real asset possessing the function of both investment and consumption, its price can be affected by not only cost, supply and demand, but also monetary policies to some degree.

Furthermore, the fluctuations from real estate price will have effect on inflation through wealth effect, balance-sheet effect, expected effect, liquidity effect and money illusion, and so on.

Conclusions

The relationship between economic growth and inflation is dynamic and conditional, which is bound up with social and economic environment, macro policies and exogenous shocks, and so on. Moreover, with the globalization of financial markets and emergence of financial innovations, the capitalization degree can no longer be ignored any more. In consideration of the evolvement from the period of industrialization to economic financialisation of the U.S., through the Bayesian network learning of rolling time window, we concentrate on the dynamic interaction mechanism between economic growth and inflation with full consideration of the gradual development of capital markets. Thus, the following conclusions can be reached:

1. From the period of industrialization to economic financialisation, the relationship between capital markets and economic operation is becoming closer and closer. Indicators related to capital markets gradually enter into the interactive mechanism between economic growth and inflation, which constitutes the dynamic evolvement in the background of economic financialisation.
2. The dynamic transmission mechanism between economic growth and inflation can be divided into four stages. In the first stage, the effect of traditional economy on capital markets dominated the interaction between

economic operation and capital markets, and there is only direct linkage between GDP and CPI. From the second to the fourth stage, in the order of bond, stock and real estate markets, indicators related to capital markets go into the transmission mechanism step by step. The transmission system between GDP and CPI has experienced the evolvement from the period with both direct and indirect linkage to the period with only indirect linkage based on indicators related to capital markets.

Based on the above conclusions, policy suggestions are put forward for the process of economic financialisation as follows:

1. Optimize the structure of traditional economy and capital markets, and it is of great importance to keep balanced development between them from the view of both gross scale and internal structure.
2. The rapid development of capital markets has changed the traditional transmission mechanism among important macroeconomic indicators. In the future policy-making, we should pay more attention to the stable development of financial markets as well as the transmission effect of capital markets.
3. Financial asset price had better be gradually incorporated into the reference index for adjusting and making monetary policies.
4. Establish both global and dynamic monitoring and warning system of capital markets. Through taking full consideration of capital flow, the fluctuation in price of financial assets and the whole process of risk from formation, transmission to final outbreak under the perspective of interactive development of different capital markets, the operation of different capital markets and the whole economy should be real-time monitored to identify abnormal fluctuations of the markets without delay.

Conflict of Interests

The authors have not declared any conflict of interests.

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