

DOES FINANCIAL STRUCTURE MATTER IN DETERMINING THE EFFECTIVENESS OF MONETARY POLICY? A COMPARISON BETWEEN CIVIL-LAW AND COMMON-LAW COUNTRIES

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ABSTRACT

This paper compares the effectiveness of monetary policy between civil-law and common-law countries by using the impulse response of monetary policy on the level of investment and consumption. This comparison is made to determine whether countries of common-law origin are less sensitive to monetary policy actions compared with civil-law countries. Theoretically, we expected monetary policy is to be more effective in civil-law countries, in which financial structures are generally more bank-based as compared to common-law countries, in which financial structures are more market-based. The impulse response functions were generated through the estimation of first-differences VAR. The findings show that the impact of monetary policy on investment and consumption is relatively stronger, responds more quickly and is long lasting in civil-law countries compared with common-law countries.

Keywords: monetary policy, legal structures, financial structures, impulse response

INTRODUCTION

Many researchers and policymakers have acknowledged that a critical role of banks is to manage and control risks. These functions give banks a central position within the process of saving and investment allocation that makes these institutions relevant for the transmission of monetary policy. In general, most economists agree that monetary policy has significant effects on the real sector in the short run. The channel through which monetary policies are transmitted, however, remain a matter of discussion. Recently, the literature has shed more

light on the channels of the transmission mechanism, especially through the so-called credit view. In this view, the monetary transmission mechanism can be divided into two separate channels: the bank lending channel and the balance sheet channel. The former is related to banks' ability and the latter to their willingness to supply loans to the private sector. The credit view focuses on the importance of banks in transmitting monetary policy actions. They argued that the banking sector serves as the main source of finance for both households and firms, thus changes in banks loan could have consequences on the total output through its effect on private sector spending.

The credit view relies on the assumption of imperfect capital markets, which implies that the effects of monetary policy may differ among firms, industries or countries. This means that differences in countries' financial structures may experience different impacts from monetary policy impulses. Meanwhile, the differences in financial structure across countries could be related to their legal structure. This argument draws from the work of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), who focus on the relationship between legal structure and finance. La Porta et al. show that the variations in the financial structures across countries are related to differences in the countries' legal systems. Cecchetti (1999), using the argument of La Porta et al. and the credit view of monetary policy, investigated the possibility that the legal system in a country has an influence on the impact of monetary policy on output and prices. In a study of 11 European Union countries, Cecchetti found that a country's legal structure, financial structure, and monetary transmission mechanism are interconnected. The study found that in countries with better legal protection for shareholders and debtors, the impact of an interest rate change on output and inflation is lower. Using a similar approach, Elbourne and de Hann (2006) estimated monetary transmission for the 10 new and future EU member countries in Central and Eastern Europe. They examined the extent to which monetary transmission in these countries is related to financial structure indicators. Unlike Cecchetti, they found little evidence of any link between financial structure indicators and monetary policy.

The objective of the current paper is to examine the effects of monetary policy in countries with different financial structures. Specifically, this paper investigates whether there is any difference in the effectiveness of monetary policy actions between countries with different financial structures, that is, between civil- and common-law countries. This is based on the fact that the legal structure will determine the shape of the financial structures in the countries, and that the difference in the countries' financial structures is important in explaining differences in the effectiveness of monetary policy between countries. Empirical studies that directly examine the relationship between legal structure and monetary policy effectiveness, however, are very limited. Thus, there are several

questions related to this relationship that need further clarification. This paper intends to address some important questions, particularly whether monetary policy is more effective in civil-law countries, in which the financial structure is more bank-based (La Porta et al., 1997, 1998; Demirgüç-Kunt & Levine, 1999) as compared to common-law countries, in which the financial structure is more market-based.

In this paper, the relationship between financial/legal structures and the effectiveness of monetary policy was investigated in a sample of 24 countries. The sample consists of 12 civil-law countries and 12 common-law countries. Out of 12 countries of civil-law tradition, eight are developing countries, while for common-law countries, there are six developing countries. The impulse responses of a monetary policy shock on macroeconomic variables have been estimated for individual countries, and then comparisons have been carried out between civil-law and common-law countries. This paper compares the effectiveness of monetary policy between civil-law and common-law countries in affecting the level of investment and consumption. The usage of investment and consumption is based on the fact that these two variables are the main channels through which the impact of monetary policy actions is transmitted to output. The direct impact of monetary policy changes on these variables could provide a clearer picture of the relationship between financial/legal structure and monetary policy.

LITERATURE REVIEW

Financial Structure and Monetary Policy

Financial structure refers to the nature of the components that make up a financial system. Allen and Gale (2001) identify these components as the agents in the system, financial institutions, financial markets, the central bank, the regulatory authority, the political system (that is, government and its policies), the legal system (particularly contract enforcement and governance mechanisms), customs (that is, the importance of reputation and other implicit mechanisms for contract enforcement), accounting systems, and the nature of the incentive to generate and disseminate information. Empirically, Levine (2002) measures financial structure by constructing an index that reflects the aggregate size, activity, and efficiency of the financial institutions sector relative to the financial markets sector of the country. Based on Levine, Tadesse (2002) uses a dummy variable to classify a financial system as either market-based or bank-based. If Levine's conglomerate index of size, activity, and efficiency for a country is above the mean value of the index, then Tadesse classifies the country as having a bank-based financial system. If the index is below the mean, then Tadesse

classifies the financial system as market-based. Cecchetti (1999) focuses on the structural aspects of the financial systems that are important for the transmission mechanism. He constructs an aggregate index of financial structure based on the size and concentration of the banking sector, the health of the banking system, and the relative amount of credit allocated through banks. These are the financial variables that the lending view of the transmission mechanism suggests should be important.

Empirical findings clearly indicate that the nature of the transmission mechanism is influenced by the structure of a country's financial system. Cecchetti (1999), for example, investigates the importance of firms' dependence on bank loans for the effectiveness of policy changes. He looks at how differences in the size, concentration, and health of the banking systems, across a sample of 16 countries, are likely to affect the impact of monetary policy and concludes that countries with many small banks, less healthy bank systems, and poorer direct capital access display a greater sensitivity to policy changes than do countries with large, healthy banks and deep, well-developed capital markets. Allen and Gale (2001) look at the evidence related to differences in financial structure and growth between countries over a long average period of time. They find that in general, financial structure does affect aggregate real economic variables. Meanwhile, Cecchetti and Krause (2001) study the issue of whether financial structure affects the effectiveness of monetary policy. Cecchetti and Krause look at 23 developed and emerging market countries and find that financial structure does matter. Specifically, countries with less direct state ownership of banking system assets have lower variances of both output and inflation.

Legal Structure and Monetary Policy

La Porta et al. (1997, 1998) found that a country's legal system is related to its financial structure. According to La Porta et al., investors provide capital to firms only if they believe they will get their money back. For equity holders, this means that they must be able to vote out directors and managers who do not pay them. For creditors and holders of bonds, this means that they must have the authority to repossess collateral. Furthermore, these legal rights must be accompanied by confidence that the laws will be enforced. In countries in which these protections are strong, equity and bond markets are broad and deep and primary capital markets will be important. By contrast, in countries in which investor protections are weak, finance will come primarily through the banking system. Specifically, La Porta et al. examined the relationship between shareholders' rights, creditor rights, and enforcement on the one hand, and the concentration of ownership and availability of external finance on the other. La Porta et al. found that civil-law countries give investors weaker legal rights than

common-law countries do. Common-law countries give both shareholders and creditors the strongest, and French-civil-law countries the weakest, protection. German-civil-law and Scandinavian countries generally fall between the other two. The quality of law enforcement is the highest in Scandinavian and German-civil-law countries, next highest in common-law countries, and again the lowest in French-civil-law countries.

In addition, La Porta et al. (1997, 1998) found that, first, corporate ownership is more concentrated in countries in which shareholders and creditors are poorly protected by both the substance of the law and its enforcement. Second, countries with weaker legal rules and less rigorous law enforcement have smaller and narrower capital markets. The findings suggest that English common-law countries have the least concentration of corporate ownership and the largest and deepest capital markets. Meanwhile, French civil-law countries have the most concentrated corporate ownership and the smallest capital markets. In line with La Porta et al., Demirgüç-Kunt and Levine (1999) also find that countries with common-law tradition have been found to be more market-based, while countries with a French civil-law tradition have been found to be more bank-based. These findings clearly indicate that legal structure shapes the financial structure of the countries.

With regard to the effects of monetary policy on economic activities, empirical studies found that the effectiveness of monetary policy varied considerably among countries. Gerlach and Smets (1995), for example, found that the effects of a change in the monetary shock on output were somewhat larger in Germany than in France or Italy, while the United Kingdom fell somewhere in between. However, the differences in the transmission of monetary policy documented in the Gerlach-Smets study were not very large. Meanwhile, Barran, Coudert, and Mojon (1996) found the effect of a contractionary monetary shock on output is relatively long-lasting in Germany, with output bottoming out about ten quarters after the shock, somewhat less long-lasting in the United Kingdom, with output bottoming out after about eight quarters, whilst in France about six quarters after the shock. Dornbusch, Favero, and Giavazzi (1998) estimate the impact of a coordinated monetary policy move on activity in a group of EU countries, controlling for intra-European exchange rates. They find that the 'impact-effects' of a change in monetary policy are similar in Germany, France, and the United Kingdom but smaller than in Sweden and Italy. The full effects of the coordinated monetary policy move are, however, lower in the United Kingdom than in Germany and France. Ramaswamy and Sløk (1998) looked at the speed of adjustment to an unanticipated contraction in monetary policy. Using the vector autoregression (VAR) approach, they found that the EU countries fall into two broad groups as far as the transmission of monetary policy is concerned. In one group (Austria, Belgium, Finland, Germany, the

Netherlands, and the United Kingdom), output typically bottoms out about 11 to 12 quarters following a contractionary monetary shock. In the other group (Denmark, France, Italy, Portugal, Spain, and Sweden), output typically bottoms out about 5 to 6 quarters after a contractionary monetary shock.

METHODOLOGY

Estimation Strategy

In this paper, the effectiveness of monetary policy actions in the countries studied are examined by using impulse response functions. In order to calculate the impulse responses, this paper employs a VAR approach. Phillips (1998), however, criticised the use of levels VAR in the presence of some unit roots or some near-unit roots in order to derive impulse responses. He showed that long run impulse response estimates are inconsistent in unrestricted levels VAR. Many macroeconomic variables are well described by unit root processes, so this criticism should be taken seriously. Thus, this paper first examines the unit root properties of each series of the VAR model. The presence of unit roots has been tested by using the Augmented Dickey-Fuller tests (ADF). However, according to Charemza and Deadman (1997), the potential presence of structural breaks makes the ADF test unreliable for testing stationarity. A structural break will tend to bias the ADF test toward non-rejection of the null hypothesis of a unit root. As an alternative, this paper will also use the Phillips-Perron (PP) test that was suggested by Phillips and Perron (1988). If these two tests produce conflicting results, the PP tests will be used in determining the presence of a unit root in the series. The findings from unit root tests show that most of the series are non stationary in levels but stationary in first differences. This finding suggests that the first differences VAR is more appropriate than the levels VAR to model the series in this study.

In order to derive impulse responses, a set of identifying restrictions has to be imposed. There are two approaches that are widely used to achieve identification of the shocks. The first approach is based on imposing restrictions on the contemporaneous effects of shocks, while the second approach is based on imposing long-run restrictions on the effects of shocks. To impose contemporaneous restrictions, the standard approach is a Choleski decomposition of the residual covariance matrix from the VAR model. This approach imposes a contemporaneous recursive structure on the shocks that depends in a crucial way on the ordering of the variables in the system. The ordering reflects the speed at which variables respond to shocks. The literature on monetary transmissions has suggested several different orderings; there is no agreement on the ordering because different economic theories imply different orderings. Meanwhile, an

example of a long-run identifying assumption could be that nominal shocks have no effects on real output. The arguments for imposing certain restrictions are usually based on economic theory, and depending on the theory, different long-run restrictions have been proposed. Faust and Leeper (1997), however, argued that imposing a long-run restriction does not necessarily provide a reliable basis for drawing structural inferences. This paper will not follow the approach of imposing long-run restrictions in order to achieve identification of the shocks. Instead, restrictions will be imposed on the contemporaneous effects of shocks.

Model and Data Set

To draw valid empirical inferences about the response of macroeconomic variables to a change in monetary policy, we need an appropriate way of identifying the monetary shocks. There are two dimensions of the conduct of monetary policy. One is that central banks adjust the instruments of monetary policy in response to changes in variables related to their objectives, the reaction function. The other concerns actions taken by central banks to adjust the instruments of monetary policy to affect the real economy. This paper is more related to the latter issue, which requires us to identify the policy-induced component of changes in output. For this purpose, this paper follows the study by Bernanke and Blinder (1992), and Christiano, Eichenbaum, and Evans (1996), who focus on short-term interest rates as a monetary policy instrument. This is due to the fact that most central banks smooth overnight or other short-term interest rates when they deliberately intend to change the stance of monetary policy. Thus, the disturbances to the interest rate are identified as shocks to monetary policy in this paper. Meanwhile, the responses of macroeconomic variables to an interest rate shock are interpreted as the responses of those variables to an unpredicted shift in monetary policy.

To generate the impulse response, this paper employs a VAR model of which the main characteristic is a relatively small number of variables describing the dynamics of the economy. Commonly, a VAR model to study monetary policy shocks will include at least four variables: output, price, money, and short-term interest rate. These correspond to the variables of a standard IS-LM model. The four-variable VAR model, however, often results in the price puzzle; which is a finding of a sustained price rise following an unanticipated monetary tightening represented by a positive innovation of the interest rate. Sims (1992) argued that the price puzzle is a result of omitting variables and suggested that it could be resolved by including the exchange rate and commodity price in the set of variables. Meanwhile, to formalise the credit view, Bernanke and Blinder (1988) suggest that the VAR model should also include the loan price and the loan quantity in the set of variables to model. Based on the above discussion, the following VAR model has been used in this study:

$$\begin{aligned} \Delta(\log v_t) = & \sum_{i=1}^m \beta_i \Delta(\log v_{t-i}) + \sum_{i=0}^n \gamma_i \Delta(\log p_{t-i}) + \sum_{i=0}^p \lambda_i \Delta(\log r_{t-i}) \\ & + \sum_{i=0}^q \phi_i \Delta(\log cr_{t-i}) + \sum_{i=0}^r \psi_i \Delta(\log x_{t-i}) + \mu_t \end{aligned} \quad (1)$$

where v is a vector of macroeconomic variables, p is the price level, r is a short-term interest rate, cr is credit, x is the exchange rate, Δ indicates the first differences, and μ is orthogonal disturbances. In this paper, there are two macroeconomic variables: investment (*inv*) and consumption (*con*). In the estimation process, however, these two macroeconomic variables were entered into the regression equations separately. In other words, the impulse responses of monetary policy shock on investment and consumption will be investigated individually. The estimation was carried out using the statistical software E-View.

The monetary policy shock is identified through a standard Choleski-decomposition with the ordering of variables as in Equation (1). The ordering of endogenous variables in Equation (1) is fairly standard in the recent empirical literature of the transmission of monetary policy shocks. This ordering is based on the assumption regarding the operation of monetary policy transmission mechanisms, which is that policy shocks have no contemporaneous impact on macroeconomic variables and prices but may immediately affect credit and the exchange rate. However, the policy interest rate does not respond to contemporaneous changes in credit and the exchange rate. Specifically, the macroeconomic variable (v) is placed before all other variables, which means that the other variables can affect v only with lags. Meanwhile, the price (p) is placed before the interest rate (r), which implies that r can affect p with lags. The ordering also allows contemporaneous changes in r to influence cr and x .

For each country, the first differences VAR model is estimated by using quarterly data from 1980–2003. In certain countries, due to the limitation of the data, slightly shorter data periods have been used in the estimation. The main sources of data are the International Financial Statistics of the International Monetary Fund (IMF) and the World Development Indicators 2004 of the World Bank. Specifically, the quarterly data for p , measured by Consumer Price Index, CPI (base year 2000); r , measured by lending rate; cr , measured by domestic credit; and the exchange rate (x), measured by nominal effective exchange rate (for France, Italy, Netherlands, and Spain, the exchange rate has been measured by the real effective exchange rate), were collected from Financial Statistics. This paper uses the lending rate as the monetary policy rate, as this is the only short term interest rate available for the all countries studied over the whole sample

period. Annual data for *inv* were measured by real gross fixed capital formation and *con* by real household final consumption expenditure was gathered from World Bank Indicators. These annual data have been converted into quarterly data by using the SPLINE methods in the EXPAND procedure that is provided by SAS/ETS. In general, the SPLINE method fits a cubic spline curve to the input values (annual data). A cubic spline is a segmented function consisting of third-degree (cubic) polynomial functions joined together so that the whole curve and its first and second derivatives are continuous. Once the cubic spline curve is fitted to the data, the spline is extended by adding linear segments at the beginning and end. These linear segments are used for extrapolating values beyond the range of the input data (SAS/ETS User's Guide).

In this paper, there are 12 common-law countries and 12 civil-law countries in the sample. The selection and the number of countries used in this paper were determined solely based on data availability. Meanwhile, the classification of the country's legal structure is based on La Porta et al. (1997), who found that the nature of the laws is a product of the legal tradition on which the civil codes of a country are based (see Appendix 1 for a more detailed explanation of this classification). This paper will only focus on two legal structures, civil-law and common-law, due to the fact that these are the major legal frameworks in the world. In all estimations, the lag lengths were determined by using the Akaike Information Criteria (AIC) and Schwartz Information Criteria (SIC). The results from this analysis find that in most cases, the appropriate lag length is four quarters. However, in some cases, the optimal lag length was shorter or longer than four quarters (see Figures 1–4 for more specific information on the lag length used in each estimation).

Theoretically, we expect that monetary policies will be more effective in civil-law countries compared with common-law countries. The prediction is based on the argument that civil-law countries have been found to be more bank-based, while common-law countries are more market-based (La Porta et al. 1997; Demirgüç-Kunt & Levine, 1999). In other words, the financial sector of civil-law countries is dominated by banking institutions, and their capital markets are relatively small. This is in contrast with the financial sector in common-law countries, which have relatively large and deep capital markets. This implies that monetary policy shifts will have a greater effect on firms in civil-law countries, which mostly depend on bank loans, compared with firms in common-law countries, which have better access to the credit market via stock and bond markets. With the small capital markets, firms in the civil-law countries find it relatively more difficult to find alternative sources of finance when there is a shortage in the supply of bank loans due to tight monetary policy. Meanwhile, in the common-law countries, with the existence of relatively larger stock and capital markets, the substitution of bank loans is relatively much easier.

Therefore, firms in the common-law countries are expected to be less sensitive to monetary policy actions.

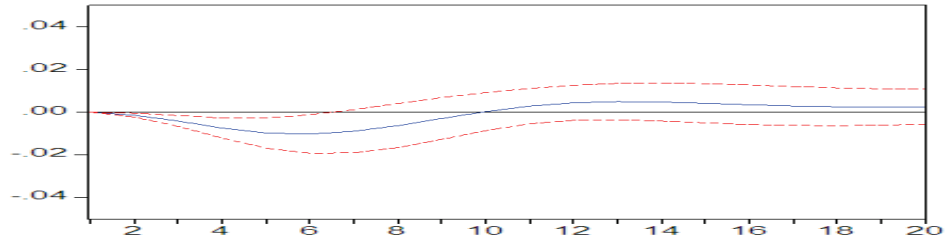
ANALYSIS AND FINDINGS

The objective of this paper is to examine the response of investment and consumption to a shock in the interest rate, thus the focus will be on the impulse response functions and not on the coefficients of the VAR. The effectiveness of monetary policy in these two groups of countries is examined by comparing the magnitude and the speed of adjustment of investment and consumption following a shock in the interest rate. Since the impacts of an increase in the interest rate on investment or consumption are expected to be negative, the size of impact in this paper is evaluated by looking at the maximum negative impact on investment or consumption. Meanwhile, the speed of adjustment is evaluated by analysing the time for this negative impact to appear and the time taken for that impact to disappear. In this analysis, the size of the shock is an increase of one standard deviation change in the interest rate, and the response of investment and consumption to this shock will be investigated over a period of 20 quarters. In each graph, the solid line indicates the impulse response function of investment or consumption to a shock in the interest rate, and the dotted lines give a 90% confidence level of the impulse response.

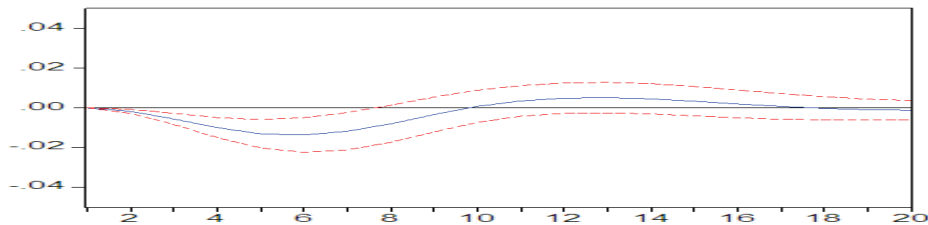
Impact of the Interest Rate Shock on Investment

This section investigates whether there is a difference in the effectiveness of monetary policy in affecting the level of investment between the civil-law and common-law countries. Figure 1 shows that in most civil-law countries in this study, a negative impact on investment due to an increase in the interest rate can be observed with a two quarter lag except in France, Mexico and the Philippines. In these three countries, the initial impact of the interest rate increase is a temporary increase in investment, so the negative impact can only be observed after quarter eight. The largest temporary positive impact can be found in the case of the Philippines, where the impulse response function initially increases to the maximum level (0.021799) at quarter six before it decreases and turns negative at quarter nine. In France and Mexico, although the temporary positive impact on investment is relatively small, these impacts have deferred the negative impacts on investment to quarter seven and quarter six, respectively. In terms of magnitude, Figure 1 shows that the value of maximum negative impacts of investment in civil-law countries ranges from -0.000225 to -0.019701 . The largest impact can be found in the Philippines and the smallest in Spain. Besides the Philippines, the large negative impact of the interest rate shock on investment can also be observed in Argentina (-0.0120247) and Chile (-0.013684). Figure 1

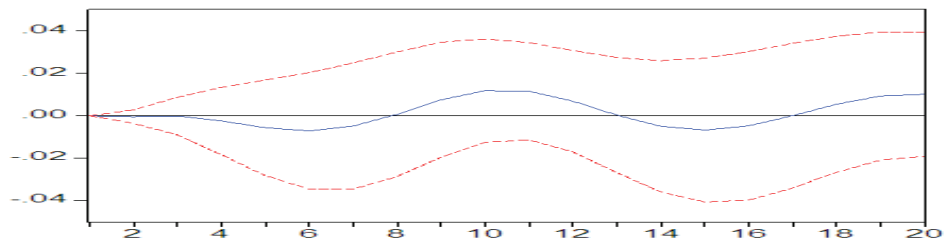
also shows that the time taken for the negative impacts on investment to disappear or the impulse response functions to reach baseline after experiencing a shock ranges from 6 to 16 quarters. In 5 out of 12 countries, the impact will die out only after quarter 10.



Argentina (lag = 4)



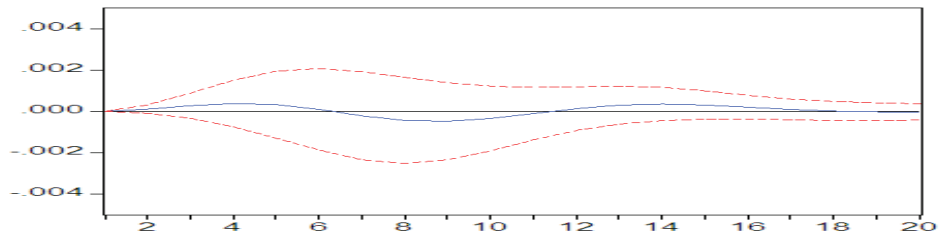
Chile (lag = 4)



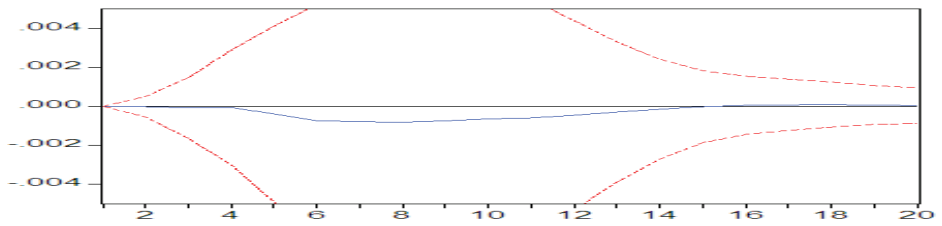
Colombia (lag = 4)

Figure 1. Responses of *inv* to the shock in the interest *r* in civil-law countries.

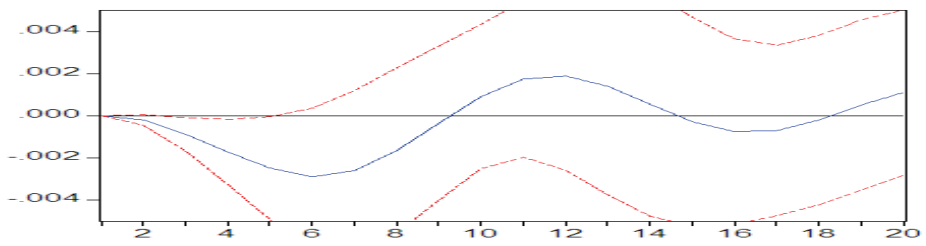
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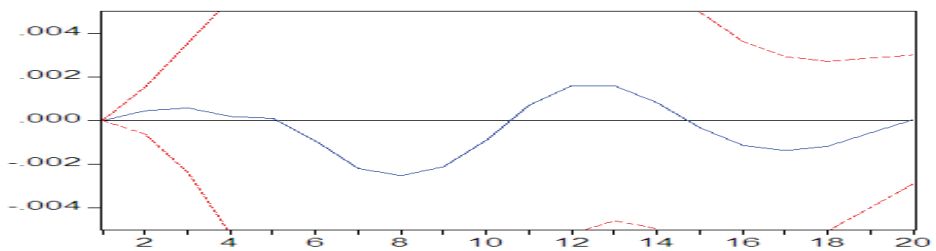
France (lag = 4)



Indonesia (lag = 4)

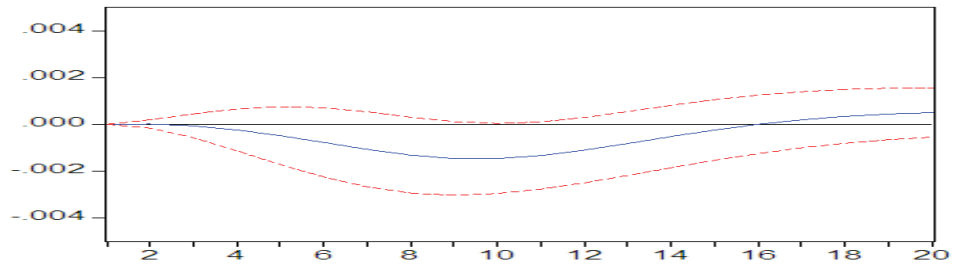


Italy (lag = 4)

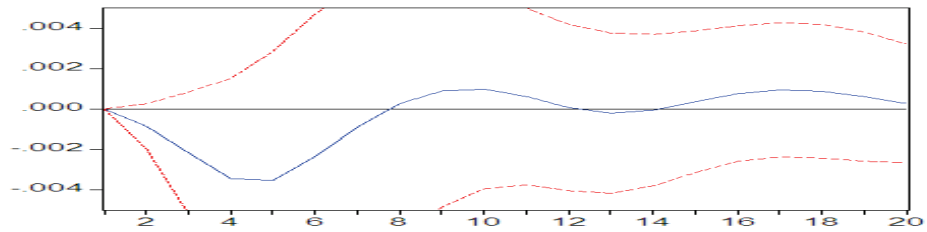


Mexico (lag = 6)

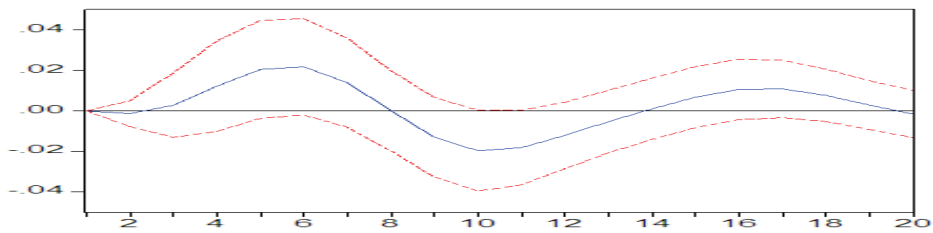
Figure 1. (continued)



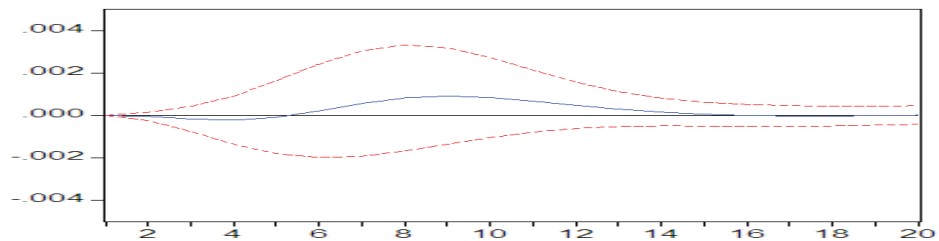
Netherlands (lag = 4)



Peru (lag = 4)

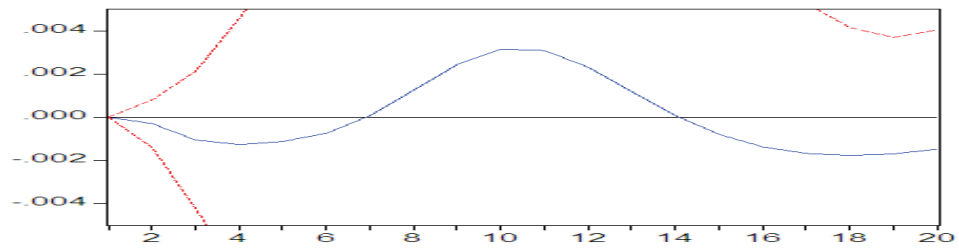


Philippines (lag = 4)



Spain (lag = 4)

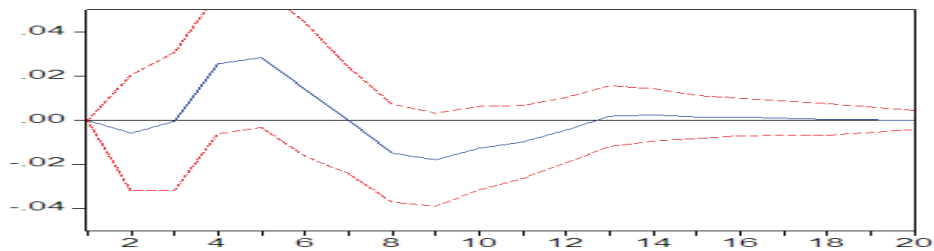
Figure 1. (continued)



Venezuela (lag = 4)

Figure 1. (continued)

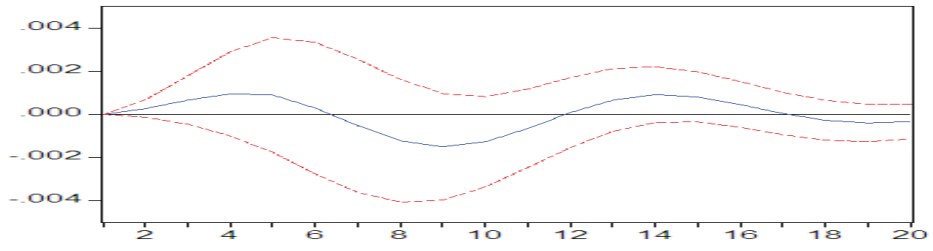
The responses of investment to the one standard deviation innovation in the interest rate in common-law countries are presented in Figure 2. Figure 2 shows that the immediate negative impacts on investment can be observed only in case of India, Ireland, New Zealand, Pakistan, South Africa, Thailand, and United Kingdom (UK). However, in these countries the interest rate affects investment with lags of two to four quarters. In other countries (Australia, Canada, Malaysia, Singapore, and USA), the initial impacts of an increase in the interest rate on investment are positive. These positive impacts, however, turn to negative after quarter five to quarter eight. The values of the maximum negative impacts on investment for common-law countries range from -0.000607 to -0.017935 . The smallest impact is in the case of Thailand, and the largest impact can be found in the case of Australia. These negative impacts disappeared in quarter six in the case of Thailand, but in India they take longer to die out (16 quarters). In most cases (8 out of 12 countries under study), the impulse response functions return to baseline after quarter 10.



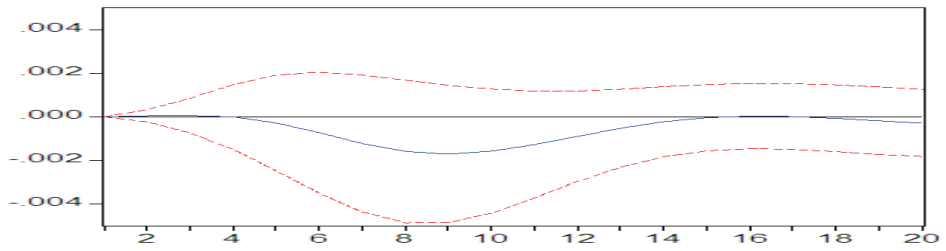
Australia (lag = 4)

Figure 2. Responses of *inv* to the shock in the interest *r* in common-law countries.

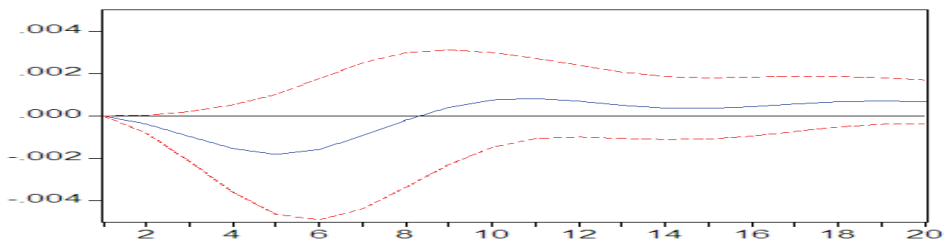
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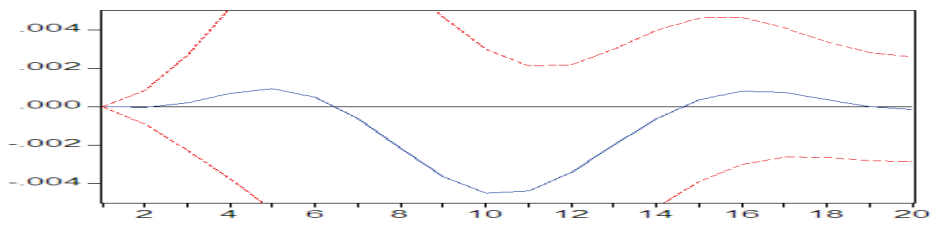
Canada (lag = 4)



India (lag = 4)

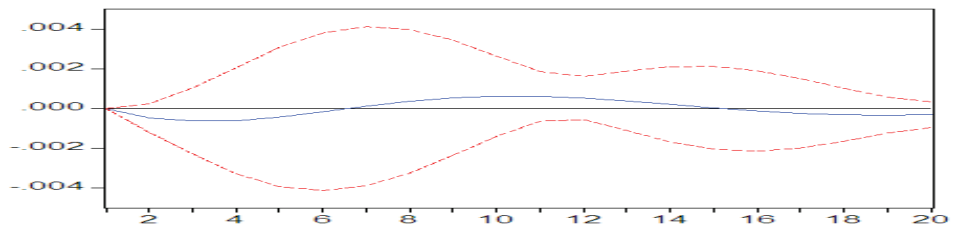


Ireland (lag = 4)

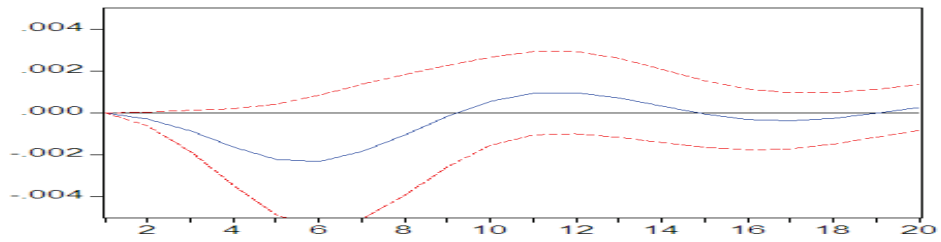


Malaysia (lag = 6)

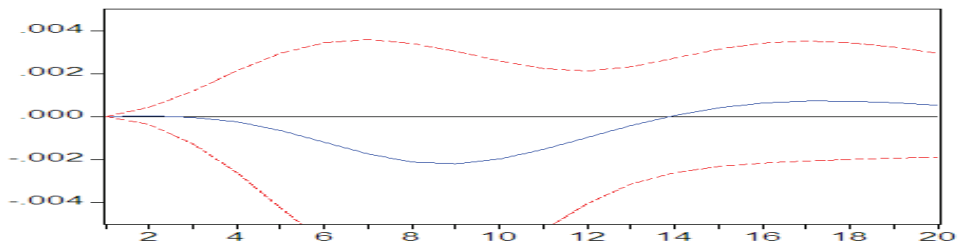
Figure 2. (continued)



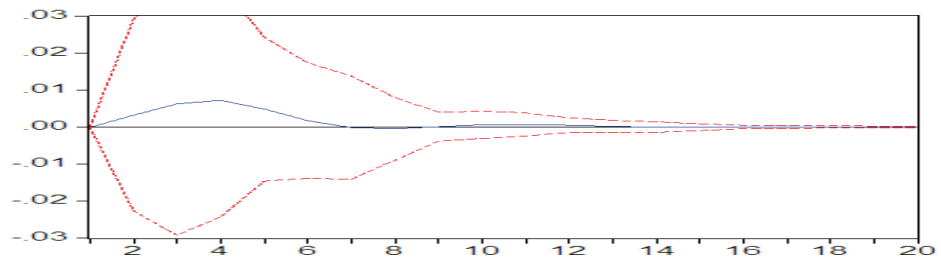
New Zealand (lag = 2)



Pakistan (lag = 4)



South Africa (lag = 4)



Singapore (lag = 4)

Figure 2. (continued)

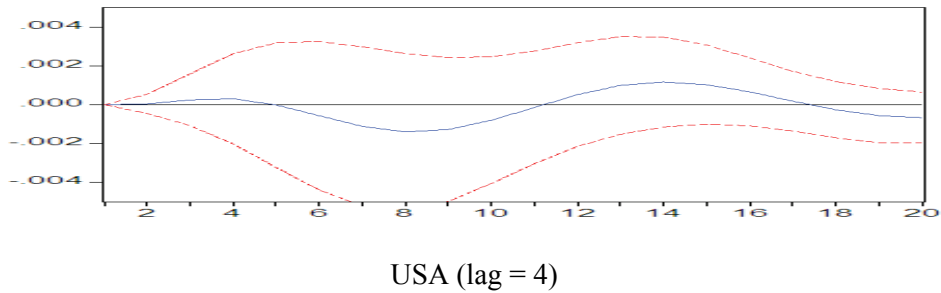
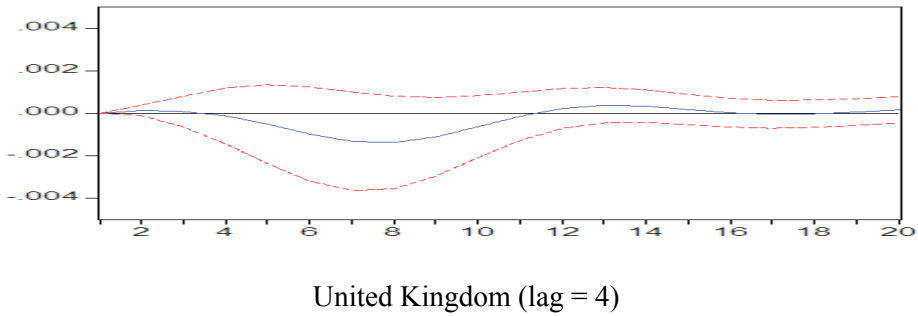
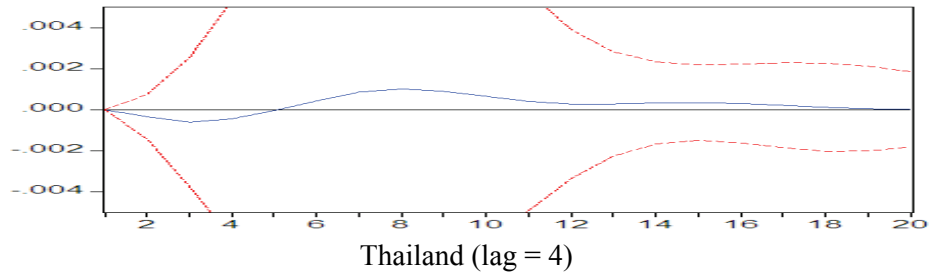


Figure 2. (continued)

The graphs in Figures 1 and 2 indicate that, in general, the interest rate shock has larger impacts on investment in the civil-law countries compared with the common-law countries. In civil-law countries, 3 out of 12 countries (Argentina, Chile and Philippines) have a maximum negative impact of investment of more than -0.01 . In contrast, for the common-law countries, this is only happened in the case of Australia. Table 1 shows that the mean of the maximum negative impact on investment in civil-law countries (-0.005329) is higher than the mean value for the common-law countries (-0.003500). This indicates that the interest rate generally has a greater impact on investment in civil-law countries compared with common-law countries. Comparing the graphs in Figures 1 and 2 also shows investment in the civil-law countries responds more quickly to the shock in interest rate as compared to common-law countries.

From Figure 1, in eight civil-law countries, the negative impacts on investment take place after quarter two, while in common-law tradition, this only occurs in four countries. In other common-law countries, the negative impact on investment takes longer to materialise. In addition, in civil-law countries, only in three cases is the initial impact on investment positive, compared with five cases in the common-law countries.

Table 1
Summary Statistics for Impulse Response Functions of Investment to the Shock in the Interest Rate.

	Responses of investment (<i>inv</i>) to interest rate shock			
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.010247(6)		2	10
Chile	-0.013684(6)		2	10
Colombia	-0.007120(6)		2	8
France	-0.000477(9)	0.000381(4)	7	12
Indonesia	-0.000813(8)		2	16
Italy	-0.002903(6)		2	10
Mexico	-0.002529(8)	0.000580(3)	6	11
Netherlands	-0.001461(9)		3	16
Peru	-0.003530(5)		2	8
Philippines	-0.019701(10)	0.021799(6)	9	14
Spain	-0.000225(4)		2	6
Venezuela	-0.001264(4)		2	7
Average	-0.0053295		3.42	10.67
B. Common-law countries				
Australia	-0.017935(9)	0.028521(5)	8	13
Canada	-0.001503(9)	0.000952(4)	7	12
India	-0.001710(9)		4	16
Ireland	-0.001816(5)		2	9
Malaysia	-0.004496(10)	0.000939(5)	7	15
New Zealand	-0.000622(3)		2	7
Pakistan	-0.002320(6)		2	10
South Africa	-0.002115(8)		3	14
Singapore	-0.006225(9)	0.012715(3)	7	12
Thailand	-0.000607(3)		2	6
United Kingdom	-0.001374(8)		4	12
USA	-0.001279(9)	0.000303(4)	5	12
Average	-0.003500167		4.42	11.50

From Table 1, we find that the mean for the negative impacts on investment to appear in civil-law countries is 3.42 quarters, which is lower than common-law countries (4.42 quarters). Comparing the time taken for the negative impact on investment to disappear or for the impulse response functions to reach baseline after a negative shock, however, give a contradictory result. This paper finds that the negative impacts on investment in common-law countries take a slightly longer time to disappear compared with the civil-law countries. Table 1 shows the average period for the negative impacts to disappear in the civil-law countries is 10.67 quarters, compared with 11.5 quarters in common-law countries. All of these findings suggest that the effect of monetary policy on investment in civil-law countries is greater and more responsive than in common-law countries. However, the impact of monetary policy on investment in common-law countries is slightly longer-lasting than in civil-law countries.

Impact of the Interest Rate on Consumption

This section presents the results from the impulse responses analysis of the impact of interest rate innovation on consumption. The innovation in this analysis is an increase of one standard deviation in the interest rate, and the response is the change in consumption. The purpose of this analysis is to examine whether there is a difference in the effectiveness of monetary policy in affecting consumption in civil-law and common-law countries. The results from this analysis are presented in Figures 3 and 4. Figure 3 shows the impulse responses of consumption to an increase in the interest rate for civil-law countries, while Figure 4 presents the impulse response functions for common-law countries. Graphs for all countries, except for Colombia, used the same scale to facilitate comparison between them.

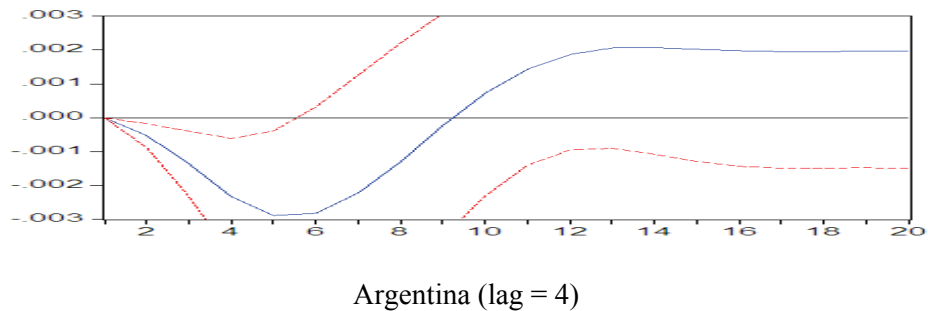
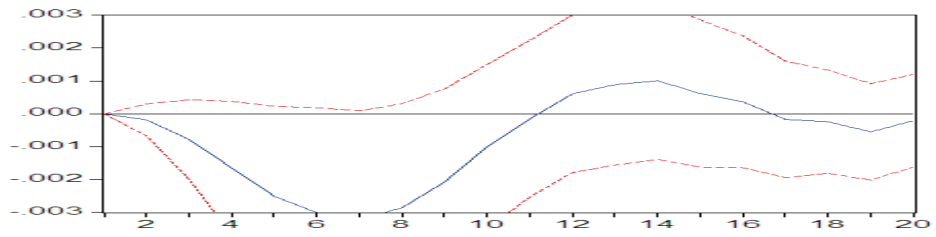
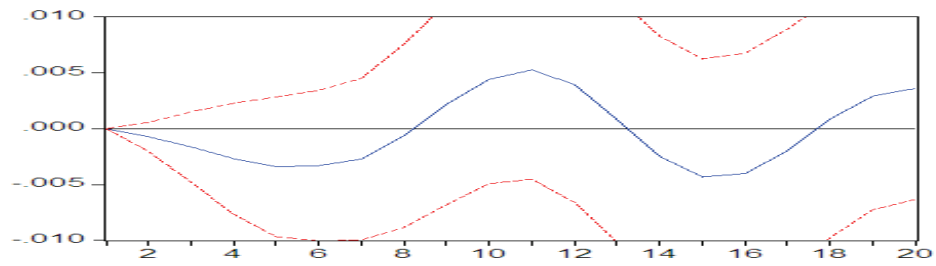


Figure 3. Responses of *con* to the shock in the interest *r* in civil-law countries.

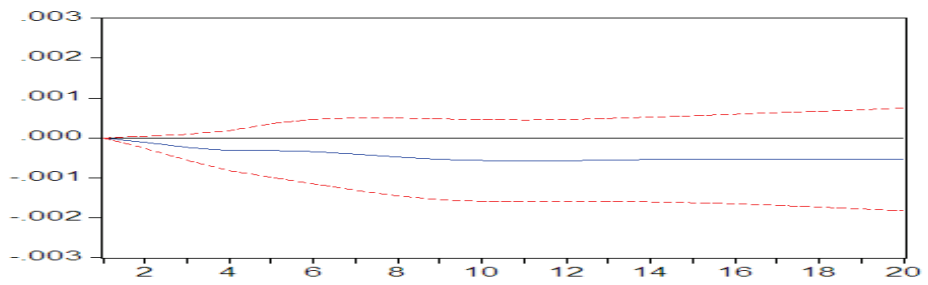
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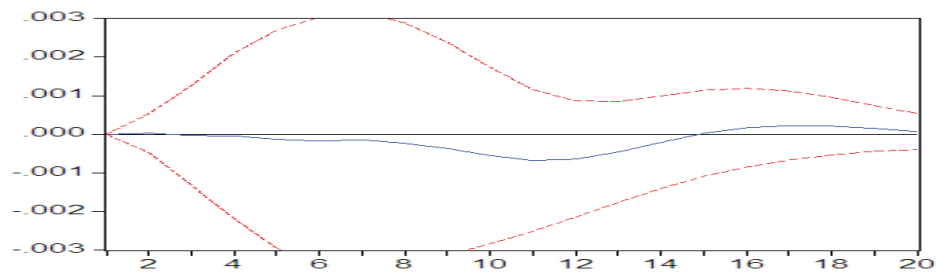
Chile (lag = 4)



Colombia (lag = 6)

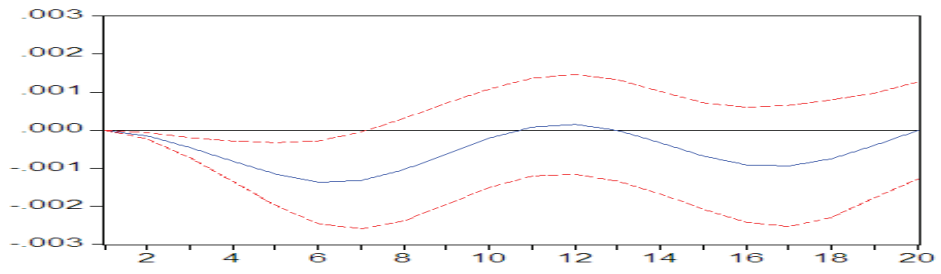


France (lag = 4)

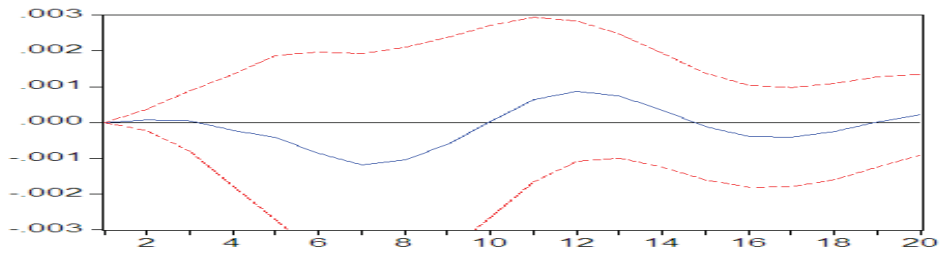


Indonesia (lag = 4)

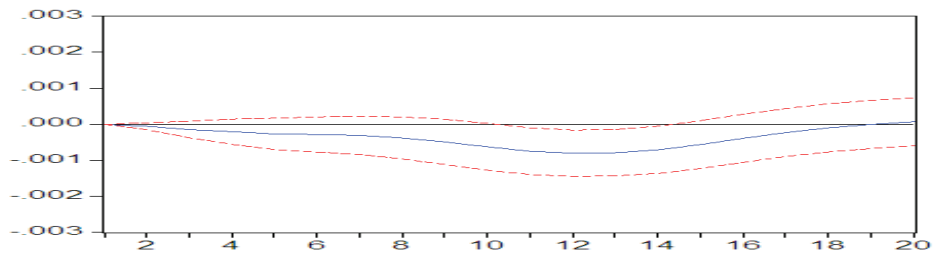
Figure 3. (continued)



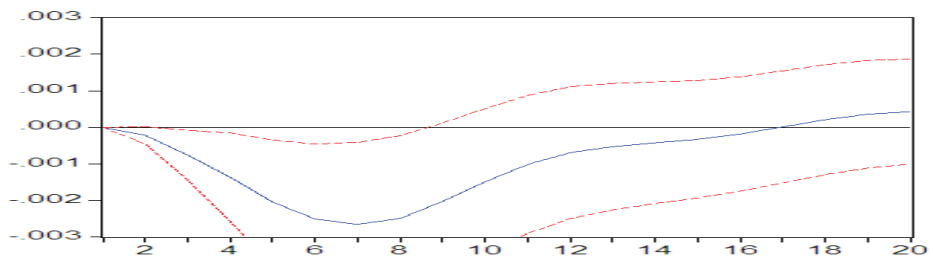
Italy (lag = 4)



Mexico (lag = 6)

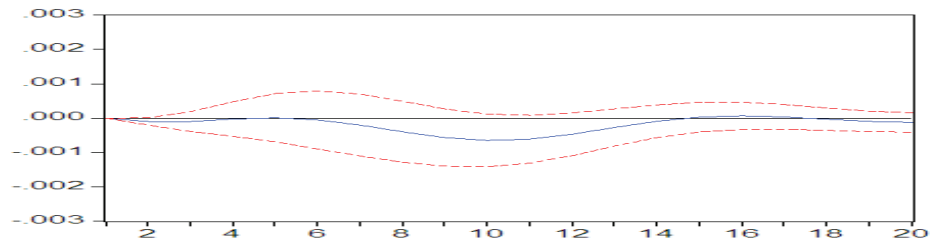


Netherlands (lag = 6)

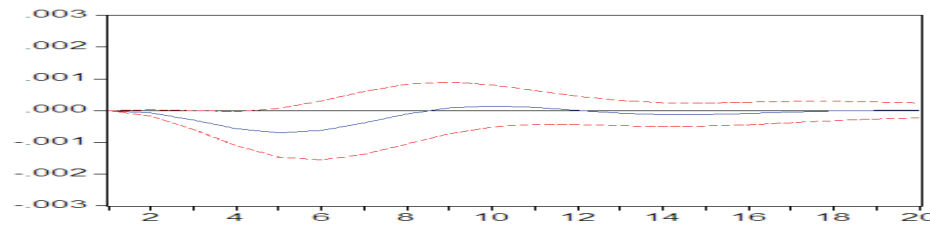


Peru (lag = 4)

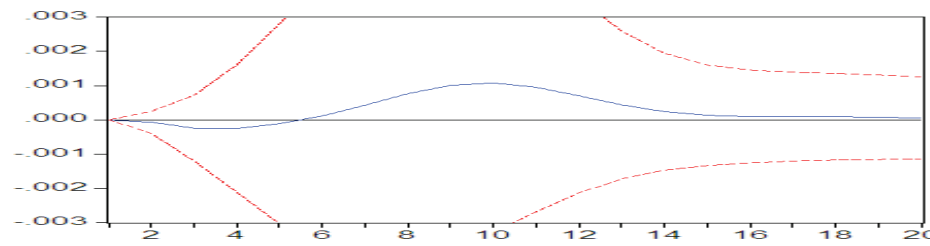
Figure 3. (continued)



Philippines (lag = 4)



Spain (lag = 4)

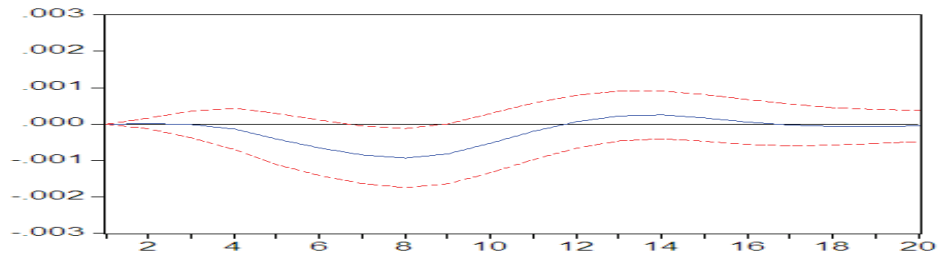


Venezuela (lag = 4)

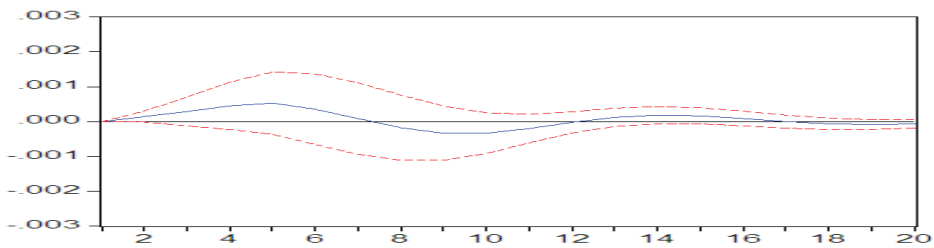
Figure 3. (continued)

Graphs in Figure 3 show the interest rate shocks in the civil-law countries have significantly large impacts on consumption in Argentina, Chile, Colombia, and Peru. The impacts are considerably smaller in the cases of France, Indonesia, the Netherlands, the Philippines, Spain, and Venezuela. The values of the maximum negative impacts on consumption range from -0.000248 to -0.003414 . Comparing the maximum negative impacts on consumption among the civil-law countries in the sample show that the highest impact is in the case of Colombia and the smallest impact is in Venezuela. The graphs in Figure 3 also show that in all civil-law countries studied, an increase in the interest rate affects consumption with a two quarter lag, except in Indonesia and Mexico, where the negative impacts on consumption can only be observed after quarter three and

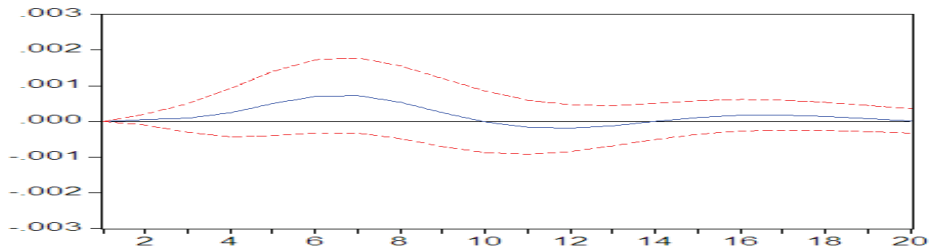
quarter four, respectively. The time taken for the negative impacts to disappear or the impulse response functions to reach baseline again after experiencing the negative impacts varies from 6 to 19 quarters. In case of France, the negative impact on consumption takes more than 20 quarters to disappear.



Australia (lag = 6)



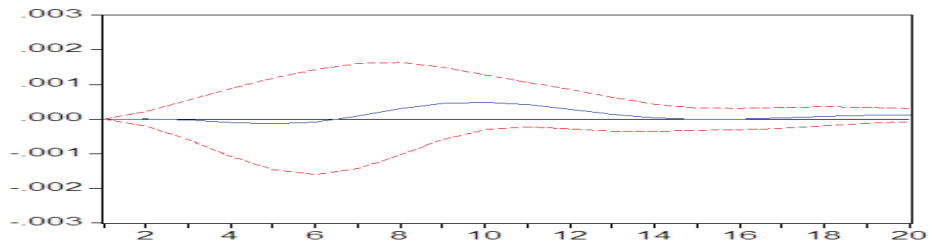
Canada (lag = 4)



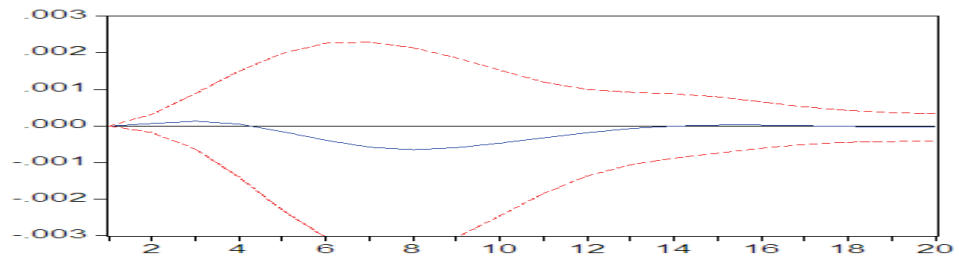
India (lag = 4)

Figure 4. Responses of *con* to the shock in the interest *r* in common-law countries.

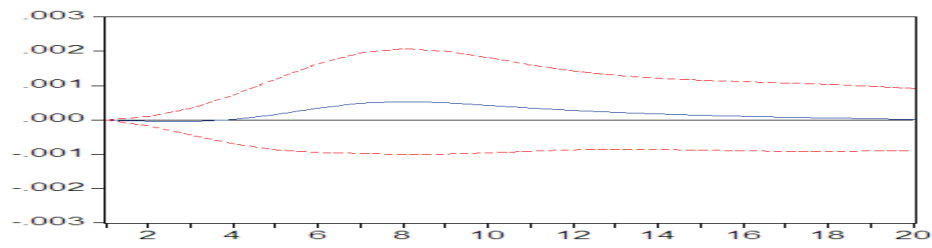
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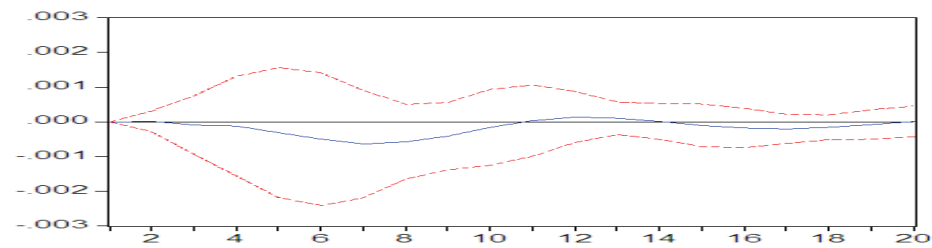
Ireland (lag = 4)



Malaysia (lag = 4)

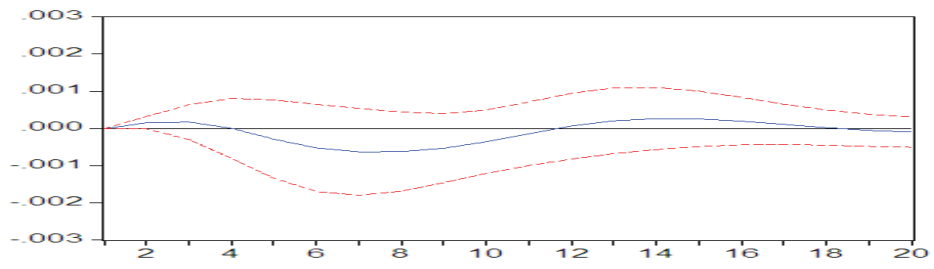


New Zealand (lag = 4)

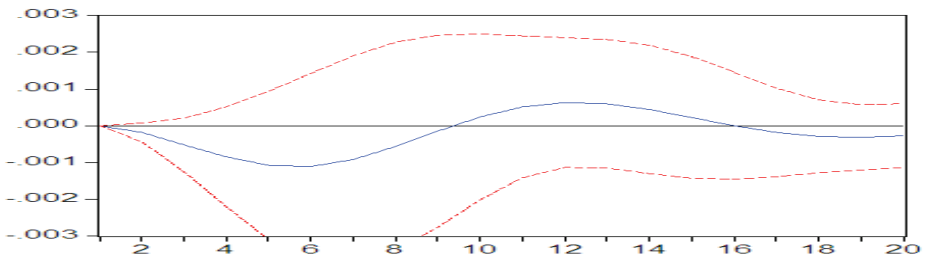


Pakistan (lag = 4)

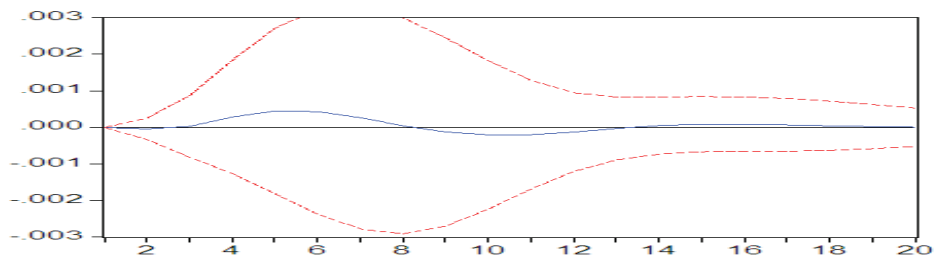
Figure 4. (continued)



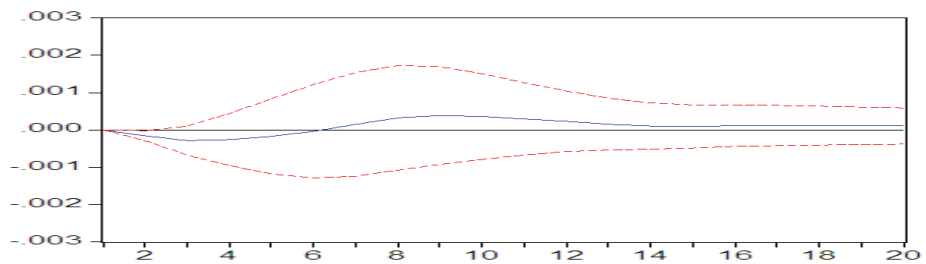
South Africa (lag = 4)



Singapore (lag = 4)



Thailand (lag = 4)



United Kingdom (lag = 4)

Figure 4. (continued)

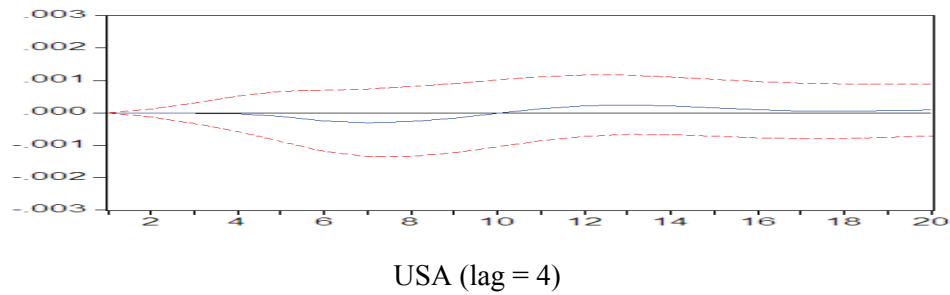


Figure 4. (continued)

The results of the impulse response functions of interest rate shock on consumption in common-law countries are presented in Figure 4. Unlike in the case of civil-law countries, for common-law countries, only in four cases (New Zealand, Singapore, United Kingdom, and USA) can the negative impacts on consumption be observed after quarter two. In other countries, the negative impact on consumption takes a longer period to materialise. In India and Thailand, for example, the negative impacts on consumption only appear after quarters ten and nine, respectively. In five cases (Canada, India, Malaysia, South Africa, and Thailand), the initial impact of the shock in the interest rate on consumption is positive. These temporary positive impacts only disappear after quarter five in Malaysia and South Africa, and after quarter eight in the case of Canada, India, and Thailand. The negative impacts on consumption are short-lived in Ireland, New Zealand, and United Kingdom. Figure 4 reveals the negative impacts on consumption in these countries disappear after quarter four in the case of New Zealand and quarter seven for Ireland and United Kingdom. In other countries, the negative impact on consumption dies out before quarter 14. With regard to the size of the negative impacts on consumption, the values of the maximum negative impacts on consumption in common-law countries range from -0.0000473 to -0.001102 . The highest negative impact can be found in the case of Singapore, while the smallest is in New Zealand.

The results of the impulse response functions in Figures 3 and 4 clearly show that, in general, the effects of the interest rate shock on consumption are higher in civil-law countries than in common-law countries. The statistics in Table 2 show that the average value of the maximum negative impacts on consumption in civil-law countries is substantially higher than in common-law countries. The graphs in Figures 3 and 4 reveal that, in general, consumption in civil-law countries responds more quickly to the shock in the interest rate compared with common-law countries. The impact of the interest rate on consumption in civil-law countries also takes a longer time to disappear than in common-law countries. All these findings suggest that monetary policy is

Table 2
Summary Statistics for Impulse Response Functions of Consumption to the Shock in the Interest Rate.

	Responses of consumption (<i>con</i>) to interest rate shock			
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.002881(5)		2	10
Chile	-0.003228(7)		2	12
Colombia	-0.003414(5)		2	19
France	-0.000571(11)		2	>20
Indonesia	-0.000675(11)		3	15
Italy	-0.001365(6)		2	11
Mexico	-0.001182(7)		4	10
Netherlands	-0.000800(12)		2	19
Peru	-0.002650(7)		2	17
Philippines	-0.000645(10)		2	15
Spain	-0.000696(5)		2	9
Venezuela	-0.000248(4)		2	6
Average	-0.001529667		2.25	(1 cases > 20)
B. Common-law countries				
Australia	-0.000930(8)		3	12
Canada	-0.000332(9)	0.000532(5)	8	13
India	-0.000187(12)	0.000727(7)	10	14
Ireland	-0.000135(5)		3	7
Malaysia	-0.000645(8)	0.00038(3)	5	14
New Zealand	-0.0000473(3)		2	4
Pakistan	-0.000634(7)		3	11
South Africa	-0.000627(7)	0.000176(3)	5	12
Singapore	-0.001102(6)		2	10
Thailand	-0.000202(10)	0.000451(5)	9	14
United Kingdom	-0.000283(3)		2	7
USA	-0.000302(7)		2	11
Average	-0.000452192		4.50	10.75

generally more effective in affecting consumption in civil-law countries compared with common-law countries.

CONCLUSION

This paper investigates whether there is a difference in the impact of monetary policy between two groups of countries, civil-law and common-law countries. Specifically, the paper investigates whether the effectiveness of monetary policy

actions depends on the countries' financial structures, which in turn depends on their differences in legal origin. This is consistent with empirical studies that found that the financial structures of common-law countries are more market-based, and the civil-law countries are more bank-based. The question of interest is to determine whether countries of common-law origin are less sensitive to monetary policy actions compared with civil-law countries. For this purpose, impulse response functions have been used to examine the impact on investment and consumption of a shock in monetary policy actions, which is represented by an increase in the interest rate. The impulse response functions were generated through the estimation of first differences VAR consisting of five variables: macroeconomic variables (investment and consumption), price, the interest rate, credit, and the exchange rate.

This paper finds that the impact of an increase in the interest rate on investment and consumption is relatively stronger, responds more quickly and is long lasting in civil-law countries compared with common-law countries. This finding may indicate that monetary policy is relatively more effective in influencing investment and consumption in civil-law countries than in common-law countries. This finding is in line with the earlier prediction that monetary policy would be generally less effective in common-law countries than in civil-law countries. This prediction is based on the fact that financial structures in most of the common-law countries are more market-based. Thus the firms in these countries have relatively better access to capital markets. Consequently, the substitutes for bank loans are more easily available in the common-law countries, and this might reduce the contractionary effect of monetary policy; a reduction in the supply of credit. The finding from this paper is consistent with the finding from Cecchetti (1999).

The findings that macroeconomic variables in civil-law countries are more sensitive to shocks suggest that improvements in regulations and increases in the quality of enforcement of the law could help to reduce this instability. Since the legal structure is closely related with the financial structure, the instability of macroeconomic variables in the civil-law countries could also be reduced by having a more market-oriented financial structure. This is because the market-based financial structure was found to be more efficient in absorbing shocks compared with a bank-based financial structure. However, from the monetary policy point of view, the finding suggests that monetary policy in civil-law countries is more effective in controlling the movement of macroeconomic variables than in common-law countries. In other words, monetary policy in civil-law countries is more capable of achieving the macroeconomic targets set by the policy makers.

APPENDIX

List of countries and classification of legal structures

Civil-law countries	Data period	Common-law countries	Data period
Argentina	1985:1–2003:4	Australia	1980:1–2003:4
Chile	1980:1–2003:4	Canada	1980:1–2003:4
Colombia	1983:1–2003:4	India	1980:1–2003:4
France	1980:1–2003:4	Ireland	1980:1–2003:4
Indonesia	1980:1–2003:4	Malaysia	1980:1–2003:4
Italy	1982:1–2003:4	New Zealand	1982:1–2003:4
Mexico	1982:1–2003:4	Pakistan	1980:1–2003:4
Netherlands	1980:1–2003:4	South Africa	1980:1–2003:4
Peru	1982:1–2003:4	Singapore	1980:1–2003:4
Philippines	1980:1–2003:4	Thailand	1980:1–2003:4
Spain	1980:1–2003:4	United Kingdom	1980:1–2003:4
Venezuela	1984:1–2003:4	United States of America	1980:1–2003:4

In this paper, the classification whether a country's legal structure is civil-law or common-law follows the classification used by La Porta et al. (1997, 1998). In general, legal families come from two broad traditions: common-law, which is English in origin, and civil-law, which is derived from Roman law. The common-law family includes the law of England and those laws modelled on English law. The common-law is formed by judges who have to resolve specific disputes. Precedents from judicial decisions shape common-law. The common-law as well as civil-law traditions have spread around the world through a combination of conquest, imperialism, outright borrowing, and more subtle imitation. The resulting laws reflect both the influence of their families and the revisions specific to individual countries. Common-law has spread to the British colonies, including the United States (US), Canada, Australia, India, and many other countries (La Porta et al. 1998). In this paper, 12 common-law countries are studied.

Meanwhile, civil-law uses statutes and comprehensive codes as a primary means of ordering legal material and relies heavily on legal scholars to ascertain and formulate its rules (Merryman, 1969). In general, there are three common families of civil-law tradition: French, German, and Scandinavian. This paper, however, only focuses on French civil-law tradition due to the fact that French civil-law is the most widely distributed around the world. The French Commercial Code was written under Napoleon in 1807 and brought by his armies to Belgium, the Netherlands, and part of Poland, Italy, and the Western regions of Germany. In the colonial era, France extended its legal influence to the Near East and Northern and Sub-Saharan Africa, Indochina, Oceania, and the French Caribbean islands. French legal influence has also been significant in Luxembourg, Portugal, Spain, some of the Swiss cantons, and Italy. When the Spanish and Portuguese empires in Latin America dissolved in the nineteenth century, it was mainly the French civil-law that the lawmakers of the new nations looked to for inspiration (La Porta et al. 1998). Twelve French civil-law countries are studied in this paper.

In most cases, classification of a country's legal structure based on legal origin is uncontroversial. In a few cases, however, although the origin of the laws is clear, the laws have been amended over time to incorporate influences from other families. For example, Thailand's first laws were based on common-law but have received enormous French influence, and Italy is a French civil-law country with some German influence. In these and several other cases, La Porta et al. (1998) have classified a country's legal structure based on the origin of the initial law it adopted rather than on the revisions. In the case of the US, where every state has its own laws, La Porta et al. (1998) relied on Delaware law because a significant fraction of large US companies are incorporated in Delaware law. Meanwhile, in the case of Canada, classification is based on Ontario laws, even though Quebec has a system based on French civil-law. Thus, La Porta et al. (1998) have classified the legal structure of both the US and Canada as common-law.

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