

Financial structure, institutional quality and monetary policy transmission: A Meta Analysis

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Abstract

The long-standing empirical literature of monetary policy transmission acknowledges weak transmission of monetary policy shock to real activities and inflation in emerging economies. Fragile financial system, low level of financial integration and weak institutions are often cited as the reasons for lack of monetary policy transmission in these economy. This paper investigates to what extent these factors explain the variation in the extent of monetary policy transmission in a comprehensive set of developed and developing economies using meta-analysis framework. We find that the degree of financial development captured by various financial indicators explain cross-country variations in the magnitude and time lag of monetary policy transmission. We also find the role of financial accelerator in transmission magnitude to output growth.

1 Introduction

The dominant channels of monetary policy transmission are different across countries, and also often changes over time as and when countries introduce new financial instruments, new macro-prudential regulations or change the degree of global integration. Nonetheless, a general consensus in the literature is that the transmission channels are not only different in emerging countries but also they are much

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weaker as compared to the developed nations Mohanty and Turner (2008)

There are several reasons; EMEs have less developed financial markets, less credible monetary policies, less integrated domestic as well as international markets, existence of large informal financial sector is among other specific reasons. Due to the presence of large informal financial sector in developing countries change in any policy rate that changes the lending rate impacts the marginal borrowers who switch to borrowing from informal sources Bhattacharya *et al.* (2011). Prerequisites for an efficient monetary process transmission are strong institutional environment, an independent central bank, a well-functioning and highly liquid inter-bank market for reserves, a well-functioning and highly liquid secondary market for government securities with a broad range of maturities, a well-functioning and highly liquid markets for equities and real estate, a high degree of international capital mobility, and a floating exchange rate. Developed economies, mostly, are observed to satisfy these criteria.

Mohanty and Turner (2008) have shown bank credit appears to have a significant influence on investment in EMEs. They mention that equities still constitute only a small part of household wealth in most emerging markets (for instance, between 1 and 2% in Colombia and India), hence working of asset price channel is rather not important. Poor development of domestic securities markets in the developing and emerging economies make both the short-run and long-run interest rate channels weak. Small and illiquid markets for assets such as equities and real estate weaken the asset channel. Countries that are imperfectly integrated with international financial markets and tend to maintain relatively fixed exchange rates have weak exchange rate channels (Mishra *et al.* (2012), Pandit *et al.* (2006)). Policy rate channel of transmission mechanism is a hybrid of the traditional interest rate channel and credit channel, as in other six EMEs considered by them viz. Brazil, Turkey, Chile, South Korea, South Africa, Mexico (Pandit and Vashisht, 2011). Neyapti (2003) tests the effects of financial sector development and CBI on budget deficits and inflation in 54 developed and developing countries from 1970-1989. She finds that when the financial sector is not developed, the positive effect of budget deficits on inflation is strong and CBI affects the degree of both current and future monetary accommodation of budget deficits.

In the recent decade many of the EMEs have adopted inflation targeting as a monetary policy instrument. Hove *et al.* (2017) shows that most EMEs which have implemented inflation targeting have continued to miss inflation targets, even for countries with good institutions. They also studied the importance of institutional quality such as cen-

tral bank independence (CBI), fiscal discipline and financial sector development for the achievement of inflation targets in EMEs in a panel ordered logit model and finds that improvement in institutional quality reduces the probability of inflation target misses and that monetary policy is more effective in countries with good institutions. Shu and Haichun (2009) and Batini and Laxton (2006) stress that the feasibility and success of IT depends more on the authorities' commitment to price stability and their ability to plan and implement institutional changes after adopting inflation targeting. Using both *de jure* and *de facto* measures of CBI for 72 countries for the period 1950-1989, Cukierman *et al.* (1992) find that legal CBI negatively affects inflation and its variability in developed countries and turnover rate of central bank governors (a *de facto* measure of CBI) has no correlation with inflation in developed countries but has significant effects on inflation in developing countries.

In separate strands of discussions in the literature it has been shown that MPT is weak in EMEs and efficient in most of the advanced countries. The methodology used is a meta-analysis in the line of Rusnák *et al.* (2011); however, we investigate how financial and institutional structure affect the extent and the time lag of monetary policy transmission across countries found in the literature, controlling for other factors in a pooled regression framework. We find that the degree of financial development captured by various financial indicators explain cross-country variations in the magnitude and time lag of monetary policy transmission. Cecchetti (1999) investigated a similar impact and the role of financial and legal structure on transmission of monetary policy (degree and lag) for Euro Area. We consider a broader frame of developed and emerging economies, focusing on financial development indicators consistently available for both developed and emerging economies.

Rusnák and Havránek (2013) consider only developed and transition economies and transmission lag for the analysis. We look at a broader group of countries, not only lag but magnitude as well. They proxy financial development by only credit to GDP ratio. We have considered various measures of financial development consistently available for both developed and developing economies. In our methodology the data points on the set of advanced countries and EMEs are based on the most recent studies in the literature. To our knowledge, our study attempts to fill the gap in the literature by looking at the issue bring both developed and emerging economies together in the frame.

The rest of the paper is organised as follows. Section 2 describes the sources of data and the descriptive statistics of the variables used

in our analysis. Section 3 discusses estimation method and results. Finally, Section 4 concludes the paper.

2 Data

The data on degree and lag of monetary policy transmission are sourced from various studies. Table B in Appendix B provides a complete list of these studies. The financial sector variables are sourced from the World Bank Financial Sector Database. Apart from the financial sector variables, we also use a number of other factors as control variables. These include growth and inflation rate, and dummies for whether the countries are developed or under the IT regime during the period of the study. The financial indicators, growth and inflation rates are taken as the average of their respective values during the period of the respective studies considered. We also control for the number of observation used in the studies, whether the studies have used GDP deflator, or consumer price index as a measure of prices, and also whether have included foreign variable or commodity prices in the studies.

Table 1 presents the descriptive statistics of the variables used in our study. It is found that on average, 1% rise in the policy rate leads to a 0.25% decline in output growth and 0.26% decline in inflation. On average, it takes 6 quarters for the monetary policy shock to transmit to output growth, while it takes around 8 quarters for the effect to be realised on inflation. Table 2 presents the descriptive statistics for degree and lag of monetary policy transmission in developed versus emerging economies. The table shows that surprisingly average inflation effect is higher in emerging economies and the transmission happens faster to both output and inflation in emerging economies.

3 Estimation and Results

We investigate how financial and institutional structure affect the extent and the time lag of monetary policy transmission across countries found in the literature, controlling for other factors in a meta-analysis framework. The role of various financial indicators on the transmission effects from the selected studies are investigated after controlling for respective growth and inflation rates, dummies for developed and IT countries, whether studies have used GDP deflator or CPI as underlying inflation indicator, and whether have included foreign variables or commodity prices using pooled regression analysis.

Table 3 shows how the extent of output effect (in absolute terms)

Table 1: Description and Summary Statistics of Explanatory Variables

Variable	Description	Mean	Std. Dev
Dependent variables			
Output response	Maximum percentage response of output after a tightening	-0.25	0.26
Inflation response	Maximum percentage response of inflation after a tightening	-0.26	0.36
Output lag	period after which maximum output response was achieved	6	4.34
Inflation lag	period after which maximum inflation response was achieved	8.15	7.28
Independent variables			
Dummy DC	=1 if a country is developed economy	0.641	0.486
Dummy IT	=1 if a country is inflation targeting country	0.615	0.493
Totvaltraded	Stock market average total value traded to GDP	33.65	32.23
Turnoverratio	Stock market turnover ratio	61.04	39.95
VT10	Value traded excluding top 10 traded companies to total value added	48.74	18.88
Stprice vol	Stock price volatility	21.81	7.85
NBFiasset	Non bank financial institutions asset to GDP	29.66	34.32
Bankcap asset	Bank capital to total asset	7.23	2.26
Pvt credit	Private credit by banks to GDP (%)	65.47	32.52
Bank dep	Bank deposits to GDP	56.16	21.06
GDPgrowth	The average growth rate of the country's real GDP	3.05	1.08
Inflation	The average inflation of the country	19.94	76.03
No. of observations	The logarithm of the number of observations used	4.12	0.53
GDP deflator	=1 if the GDP deflator is used instead of the consumer price index as a measure of prices	0.103	0.31
Foreign variable	=1 if at least one foreign variable is included	0.53	0.51
Commodity prices	=1 if a commodity prices is included	0.26	0.44

Table 2: Transmission lag and magnitude across developed and emerging countries

	Developed Economy	Emerging Markets
Output magnitude	-0.25	-0.23
Inflation magnitude	-0.26	-0.31
Output lag	6.68	4.8
Inflation lag	9.1	5.9

of monetary policy depends on various financial and institutional indicators after controlling for sample size effects, income growth, whether the transmission effects belong to Inflation Targeting (IT) regimes and controlled for commodity prices and foreign variables. Two alternative specifications are estimated, one with financial indicators related to banking sector, and the other with financial variables related to stock market. A strong banking sector captured by bank deposits to GDP ratio induce higher policy transmission to output and the effect is significant at 5% level. Studies gauging the degree of monetary policy transmission in an open economy framework including foreign variables find greater transmission effects on output. Inclusion of commodity prices may weaken the transmission effect on output. A developed stock market captured by total value traded in the stock market to GDP ratio strengthens the transmission effect, but the impact is not statistically significant. Credit to GDP ratio and higher growth rate shows a negative relation, indicating the presence of financial accelerator. Higher credit to GDP ratio or higher growth rate can indeed capture credit and business cycle boom, and hence potentially reduce the transmission effect via financial accelerator channel. The extend of transmission increases when the economy in the phase of an economic down turn.

In the specification with stock market indicators we find similar results. A developed stock market captured by higher total value traded to GDP ratio strengthens the transmission mechanism. Higher GDP growth and being in IT regime potentially weakens the transmission effect on output. However we find a negative relationship of output effect with other financial sector indicators such as value of assets on non-bank financial institutions to GDP ratio and value of turnover in the stock market to GDP ratio.

From the two regression specifications for the lag of monetary policy transmission to reach the peak effect in Table 5, we find that stronger bank credit channel proxied by credit to GDP ratio and developed stock market captured by higher total value traded to GDP ratio make faster transmission of monetary policy shock to output. However broader bank based financial system captured via bank deposit to GDP ratio is found to increase the transmission lag. Developed countries and the countries in IT regime are found to have larger transmission lag. Countries with high income growth are found to experience faster transmission of monetary policy shocks to output growth. Monetary policy transmission estimated in open economy framework, including foreign variables find faster transmission of monetary policy.

We find similar insights for the transmission lag to inflation (see

Table 3: Regression Analysis: Output Magnitude

Variable	Reg 1	Reg 2
GDP growth	-0.97(-3.79)**	-0.07(-1.57)
Totvaltraded	0.08(6.47)**	0.01(0.21)
Commod price	-0.12(-2.65)**	-0.11(-1.02)
NBFIAasset	-0.01(-6.32)**	-
ln (obs)	-0.01(-1.75)*	-0.3(-3.1)**
Dummy IT	-0.14(-2.52)**	-
Turnoverratio	-0.02(-3.01)**	-
Foreign var	-	0.19(1.97)**
Private credit	-	-0.11(-3.11)**
Bank Dep	-	0.02(3.49)**
Constant	0.68(6.44)**	1.19(2.79)**
R-square	0.54	0.35

Table 6) as for transmission lag to output growth. A developed banking sector and stock market captured by higher private credit to GDP ratio, Bank capital assets to GDP ratio, and total value traded to GDP ratio reduce the transmission lag to inflation. However, higher bank deposits to GDP ratio and non-bank financial assets to GDP ratio are found to raise the transmission lag. As for transmission lag to output, we find developed countries and the countries under IT regime experience delayed transmission of monetary policy shock to inflation. The finding that developed economies experience higher transmission lag finds support in Havránek and Rusnák (2012). High inflation countries experience greater lag in policy transmission to inflation as also found in Rusnák *et al.* (2011). Studies that have included commodity price in the model to estimate monetary policy transmission find greater lag in the transmission process. However, we find counter-intuitive results for the relation between financial development and transmission magnitude to inflation (see Table 4).

4 Conclusion

We investigate how financial structure affect the extent and the time lag of monetary policy transmission across countries found in the literature, controlling for other factors in a meta-analysis framework. We find that the degree of financial development captured by various financial indicators explain cross-country variations in the magnitude and time lag of monetary policy transmission. We find the evidence for a positive relation between financial sector development and extent of monetary policy transmission to output growth. Developed finan-

Table 4: Regression Analysis:Inflation Magnitude

Variable	Coefficient	t-value
BankCap Asset	-0.11	(-2.87)**
Bank Deposit	-0.01	(-2.24)**
Stock price Vol	-0.21	(-1.95)**
Dummy DC	-0.49	(-2.72)**
GDP deflator	0.38	(1.77)*
Commodity price	-0.18	(-1.31)
Inflation X Dummy IT	-0.01	(-1.65)*
Constant	2.26	(3.99)**
R-square	0.35	

Table 5: Regression Analysis:Output Lag

Variable	Reg 1	Reg 2
Bank Deposit	0.21(2.99)**	0.27(3.4)**
Private Credit	-0.13(-2.67)**	-0.16(-2.95)**
TotValTraded	-0.41(1.78)*	-0.01(-0.51)
Dummy DC	4.8(2.82)**	-
Dummy IT	4.8(3.05)**	3.89(2.39)**
Foreign Var	-3.21(-2.37)**	-
GDP growth	-	-1.58(-2.2)**
Constant	-1.01(-0.39)	3.17(1.03)
R-square	0.42	0.40

Table 6: Regression Analysis:Inflation Lag

Variable	Reg 1	Reg 2
Private credit	-0.20(-2.36)**	-
Bank Deposit	0.4(3.3)**	0.5(3.26)**
BankCap Asset	-1.32(-2.13)**	-
Commodity price	1.59(0.59)	-
TotValTraded	-0.07(-1.97)*	-0.16(-2.55)**
Dummy IT	0.79(0.34)	12.04(2.49)**
Dummy DC		2.14(0.46)
NBFAsset		0.15(2.34)**
Inflation		0.019(1.11)
Constant	10.32(1.5)	-27.11(-2.81)**
R-square	0.46	0.63

cial sector is also found to reduce the transmission lag of monetary policy shock to output growth and inflation. We also find the role of financial accelerator in transmission magnitude to output growth.

Our findings make a contribution towards understanding how the strength of financial system can explain the cross sectional pattern of monetary policy transmission across developed and emerging economies in a consolidated framework. While Cecchetti (1999) investigate the role of financial and legal structure on extent and lag of monetary policy transmission across EU countries, and the meta analysis by Havránek and Rusnák (2012) explore similar issues for developed versus transition economies, a comprehensive study for a broader set of developed and emerging economies are yet unexplored in the literature. Our study aims to fill this gap in the literature. However the limited sample size is the main limitation of the present analysis. Extending the sample size in panel set up would allow us to control for the country specific fixed effects as in Rusnák *et al.* (2011), and thereby improve the results and thereby provide richer insights in this matter.

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A Appendix A: List of Countries

1	Australia	1992:Q1 - 2013:Q4
2	Austria	1980:Q1 - 1998:Q4
3	Belgium	1983:Q1 - 2008:Q4
4	Brazil	2002:M1 - 2011:M12
5	Canada	1974:Q1 - 2007:Q4
6	Chile	1999:Q1 - 2009:Q4
7	Czech Republic	1997:M7 - 2002:M1
8	France	1999:Q1 - 2014:Q3
9	Germany	1991:Q1 - 2003:Q2
10	Hungary	1995:Q4 - 2002:Q1
11	Indonesia	2003:M1 - 2009:M11
12	Italy	1981:Q1 - 2006:Q4
13	Japan	1994:Q1 - 2015:Q2
14	Korea	2000:Q1 - 2010:Q3
15	Malaysia	1990:Q1 - 2015:Q1
16	Mexico	1992:M11 - 2005:M2
17	Netherlands	1980:Q1 - 1998:Q4
18	New Zealand	1983:Q2 - 2006:Q4
19	Norway	1983:Q1 - 2006:Q4
20	Peru	1990:Q1 - 2006:Q4
21	Philippines	1982:Q1 - 2015:Q2
22	Poland	1993:M1 - 2002:M12
23	Portugal	1998:Q1 - 2009:Q2
24	Russia	1995:M7 - 2004:M11
25	S.Africa	2000:Q1 - 2010:Q4
26	Spain	1980:M1 - 1998:M12
27	Sweden	1993:Q1 - 2007:Q4
28	Switzerland	1976:Q1 - 2006:Q4
29	Thailand	1993:Q1 - 2001:Q4
30	Turkey	2006:Q1 - 2013:Q2
31	UK	1974:Q1 - 2001:Q2
32	US	1979:M7 - 2012:M6
33	UK	1993:M1 - 2007:M12
34	UK	1983:Q1 - 2006:Q4
35	Germany	1980:Q1 - 1998:Q4
36	France	1980:Q1 - 1998:Q4
37	Spain	1970:Q1 - 1998:Q4
38	Sweden	1983:Q1 - 2006:Q4
39	Poland	1990:M1 - 2001:M10
40	US	1965:M1 - 2005:M12

B Appendix B: Studies used in meta-analysis

1	Gonzalez <i>et al.</i> (2006)
2	Mojon and Peersman (2003)
3	Dungey and Fry (2009)
4	Bjørnland and Jacobsen (2010)
5	Rossini <i>et al.</i> (2008)
6	Glindro <i>et al.</i> (2016)
7	Anzuini and Levy (2007)
8	Elbourne and de Haan (2006)
9	Gameiro <i>et al.</i> (2010)
10	Vymyatnina <i>et al.</i> (2005)
11	Thlaku (2011)
12	Svensson <i>et al.</i> (2012)
13	Assenmacher-Wesche (2008)
14	Disyatat and Vongsinsirikul (2003)
15	Kilinc and Tunc (2014)
16	Mountford (2005)
17	Gertler and Karadi (2015)
18	Cloyne and Hürtgen (2016)
19	Vargas-Silva (2008)
20	Cambazouğlu and Güneş (2011)
21	Rees <i>et al.</i> (2016)
22	Barigozzi <i>et al.</i> (2011)
23	Guimarães and Monteiro (2014)
24	Raghavan <i>et al.</i> (2016)
25	Catão and Pagan (2010)
26	Hülsewig <i>et al.</i> (2006)
27	Ascarya (2012)
28	Migliardo (2010)
29	Nakashima <i>et al.</i> (2017)
30	Alp <i>et al.</i> (2012)