SKKU-KEIO Academic Conference

Impact of Financialization on Economic Growth and Industrialization

KCC

Ji Won Kim
Jieun Chung
YeonU Cho

“Definition of Financialization”

“Increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy” – *Epstein*

“Dominance of financial sector over other sectors of the economy, including manufacturing industry and agriculture” – *Imad Moosa*

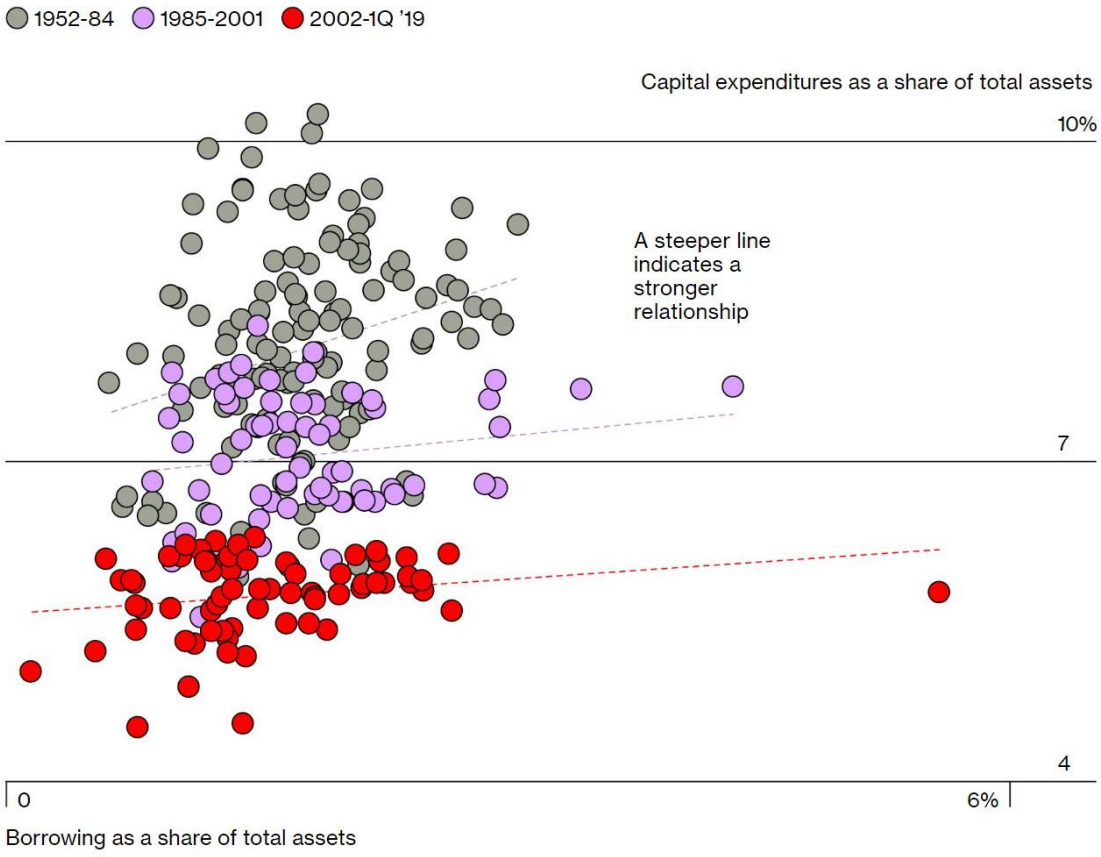
More than Half of All Stock Buybacks are Now Financed by Debt. Here's Why That's a Problem

(Fortune, August 20, 2019)

"Corporations are increasingly using debt to financial risk-taking like share buybacks, dividend and M&A"

(IMF, DECEMBER 17, 2019)

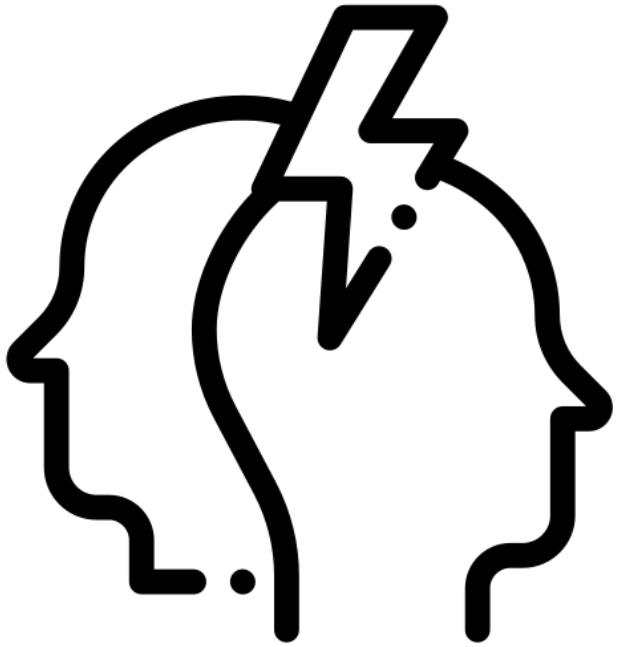
Weakened link
between capital expenditures and borrowing



Source: Bloomberg

Do you think growing credit by financial institutions has ***positive*** effect on economic growth?

“ Efficiency of financial sector leads to economic growth ”



“ Excessive financialization retards economic growth ”

Literature Review

Literature Review

-The Effect of Financial Development on Economic Growth, (Park and Shin, 2011)

- Index for Financialization
  1. Capital market-based index: Market Capitalization
  2. Bank-based index: Bank credit

- Two groups of countries:
  Advanced & Asian Developing countries

- Results:

"The effects of financial development on economic growth are different across countries"

Literature Review

-The Effect of Financial Development on Economic Growth, (Park and Shin, 2011)

- Index for Financialization
  1. Capital market-based index: Market Capitalization
  2. Bank-based index: Bank credit

- Two groups of countries:
  Advanced & Asian Developing countries

- Results:

  Stock market size effect > Bank credit effect in Both countries

  Bank credit effect: Developing > Advanced

Our Objective:

1. Long-term relationship among 3 variables; financialization, industrialization and economic growth *in Korea*

2. Using Impulse-Response analysis, we analyze short-term relationship among 3 variables *in Korea*

Our Objective:

- How the relationship between financial sector and real sector has changed over time?
- Is the degree of financialization in Korea adequate?

Data

Sample Period: 1966Q2 - 2019Q1
Except Mkt Cap: 1996Q1 - 2019Q1

Financialization	Financial Deepening	Credit to GDP *(Credit)*
		Credit to Household *(Household)*
		Credit to Non-Financial Corporation *(NFC)*
		M2
	Sources of Finance	Market Capitalization *(Mktcap)*
		Bank Credit
Industrialization	Value-added of Manufacturing sector *(Mfr)*	
Economic Growth	Real GDP *(GDP)*	

Data source

Credit, Household, NFC, Bank Credit : BIS / M2, Mfr, RGDP: BOK / Mktcap: KRX

Financialization Index

- ✓ **Credit to GDP**
  Financial resources provided to the private sector by financial corporations
  - **Credit to Household**
  - **Credit to Non-Financial Corporation**

- ✓ **M2**
  M1 + saving deposits, money market securities, mutual funds, other time deposit

- ✓ **Market Capitalization**
  Total market value of a company's outstanding shares of stock

- ✓ **Bank Credit**
  Credit to the private sector by banks

Model

Cointegration

$$GDP_t = \beta_0 + \beta_1 Mfr_t + \beta_2 F_t + \varepsilon_t$$

GDP_t: real GDP

Mfr_t: value-added of manufacturing sector

F_t : financialization index

- FD: M2, Credit to GDP, Household, NFC
- Sources of finance: Market Capitalization, Bank Credit

Vector Error Correction Model (VECM)

$$\Delta Y_t = (\theta_0 + \phi_0 D) + \alpha Z_{t-1} + \sum_{i=1}^{p} (\theta_i \Delta Y_{t-i} + \phi_i D \Delta Y_{t-i}) + \mathrm{E}_t$$

D: dummy for crisis (Kim and Lee, 2008)

Currency crisis : 1997Q4 – 1998Q4

Financial crisis : 2007Q4 – 2008Q4

$$D = \begin{cases} 1\ (during\ crisis) \\ 0\ (otherwise) \end{cases}$$

Vector Error Correction Model (VECM)

$$\Delta Y_t = (\theta_0 + \phi_0 D) + \alpha Z_{t-1} + \sum_{i=1}^{p} (\theta_i \Delta Y_{t-i} + \phi_i D \Delta Y_{t-i}) + \mathrm{E}_t$$

$Y_t = (GDP_t, Mfr_t, F_t)'$
$\theta_0 + \phi_0 D$: intercept vector
$Z_{t-1} = GDP_{t-1} - \beta_0 - \beta_1 Mfr_{t-1} - \beta_2 F_{t-1}$
α: coefficient of adjustment speed vector

θ_i: coefficient vectors of ΔY_{t-i}
ϕ_i: coefficient vectors of $\mathrm{D}\Delta Y_{t-i}$
E_t: error term vector

Unit root test: ADF & KPSS

↓

Lag test: LR, FPE, AIC, SC, HQ

↓

Johansen Cointegration Test

↓

VECM

Cointegration Equation
Granger Causality Test
Impulse Response

Empirical Result

Johansen Cointegration Test

1) log GDP- log Mfr- Credit

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	45.85637	29.79707	32.03524	21.13162
At most 1	13.82114*	15.49471	13.75100*	14.26460
At most 2	0.070138	3.841466	0.070138	3.841466

2) log GDP- log Mfr- household- NFC (Whole period, After 1999)

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	77.68789	63.87610	34.91694	32.11832
At most 1	42.77095*	42.91525	27.00516	25.82321
At most 2	15.76578	25.87211	11.44404*	19.38704
At most 3	4.321743	12.51798	4.321743	12.51798

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	63.95933	63.87610	32.36025	32.11832
At most 1	31.59908	42.91525	15.50448	25.82321
At most 2	16.09460	25.87211	10.03494	19.38704
At most 3	6.059664	12.51798	6.059664	12.51798

Johansen Cointegration Test

3) log GDP- log Mfr- log M2

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	57.02387	42.91525	30.24506	25.82321
At most 1	26.77881	25.87211	17.60434	19.38704
At most 2	9.174461	12.51798	9.174461	12.51798

4) log GDP- log Mfr- log MktCap-Bank Credit

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	63.95933	63.87610	32.36025	32.11832
At most 1	31.59908*	42.91525	15.50448*	25.82321
At most 2	16.09460	25.87211	10.03494	19.38704
At most 3	6.059664	12.51798	6.059664	12.51798

VECM: Cointegration Equation

Credit to GDP		Household & NFC		
			Whole	After 1999
log GDP	1.000	log GDP	1.000	1.000
log Mfr	1.027 [−2.220**]	log Mfr	0.885 [−11.216***]	0.361 [−11.734***]
Credit	−0.025 [−2.137**]	Household	0.032 [−5.177***]	−0.006 [4.011***]
		NFC	0.005 [−2.946***]	−0.002 [6.005***]
c	1.452	c	3.514	7.699
ECT	0.009 [4.442***]	ECT	−0.040 [−2.478***]	−0.321 [−3.022***]

Lag for credit=6,
Lag for Household&NFC, Whole period=6
Lag for Household&NFC, After 1999=7

Significance level *: 0.10 **: 0.05 ***: 0.01

VECM: Cointegration Equation

M2			Mkt Cap &Bank Credit	
log GDP	1.000		log GDP	1.000
log Mfr		1.000	log Mfr	−0.309 [1.149*]
log M2	0.362 [−19.268***]	0.326 [−4.596***]	log Mktcap	0.306 [−4.054***]
			Bank Credit	−0.003 [2.715***]
c	6.989	6.158	c	13.341
ECT	−0.040 [−3.413***]	−0.019 [−4.559***]	ECT	−0.076 [−2.443***]

Lag for M2=4
Lag for Mktcap & Bankcredit=7

Significance level *: 0.10 **: 0.05 ***: 0.01

Granger Causality Test

- Household & NFC, Whole Period

Direction	Probability
Household → GDP	0.0727*
Household ↛ GDP	0.1123
Household → Mfr	0.0712*
Household ↛ Mfr	0.3535
Household ↛ NFC	0.1966
Household ← NFC	0.0113**
NFC ↛ GDP	0.6478
NFC ← GDP	0.0693*
NFC ↛ Mfr	0.4601
NFC ↛ Mfr	0.9999

- Household & NFC, After 1999

Direction	Probability
Household → GDP	0.0463**
Household ↛ GDP	0.1067
Household ↛ Mfr	0.2170
Household ← Mfr	0.0932*
Household ↛ NFC	0.1248
Household ← NFC	0.0021***
NFC → GDP	0.0348**
NFC ← GDP	0.0001***
NFC → Mfr	0.0606*
NFC ↛ Mfr	0.0327**

Granger Causality Test

- M2

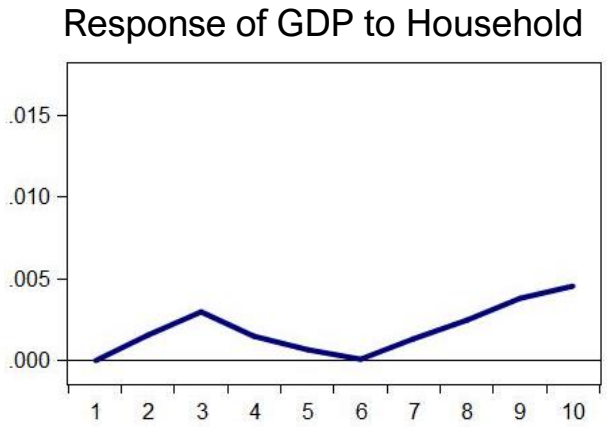
Direction	Probability
M2 → GDP	0.0537*
M2 ← GDP	0.0013***
M2 ↛ Mfr	0.4803
M2 ← Mfr	0.0011***

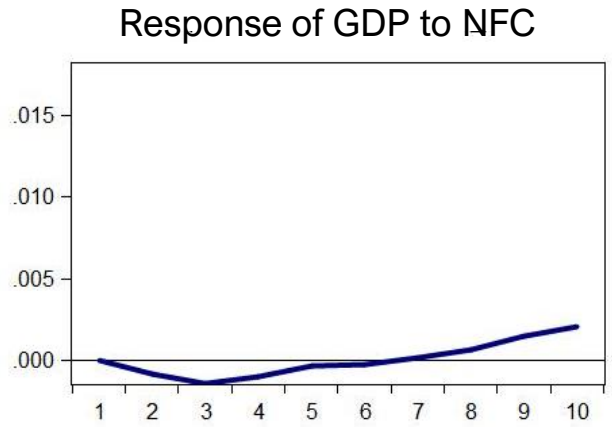
- Mktcap, Bankcredit

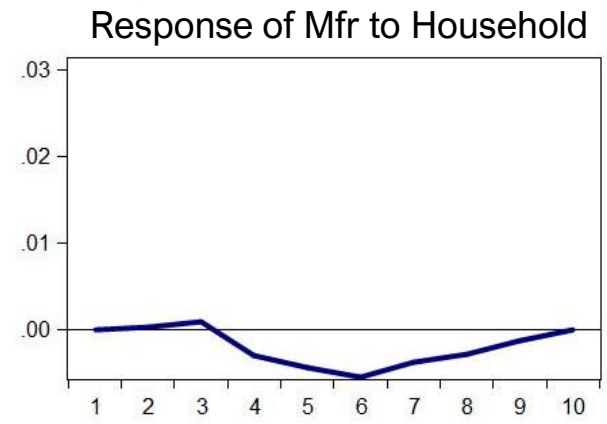
Direction	Probability
Mktcap → GDP	0.0711*
Mktcap ← GDP	0.0030***
Mktcap → Mfr	0.0287**
Mktcap ← Mfr	0.0248**
Mktcap ↛ Bankcredit	0.2138
Mktcap ← Bankcredit	0.0196**
Bankcredit → GDP	0.0185**
Bankcredit ← GDP	0.0000***
Bankcredit → Mfr	0.0348**
Bankcredit ← Mfr	0.0001***

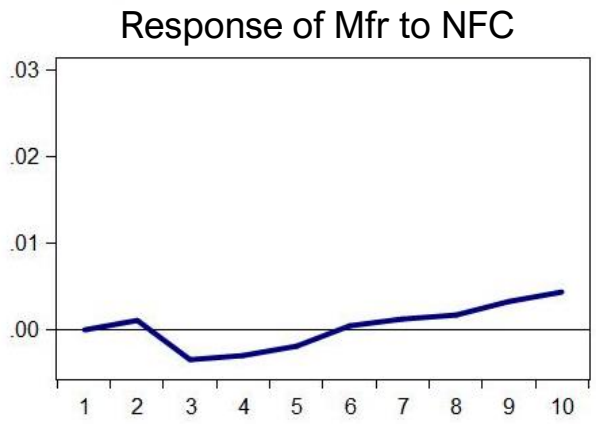
1. Financial Deepening: Household & NFC

- Impulse Response Analysis, Whole Period





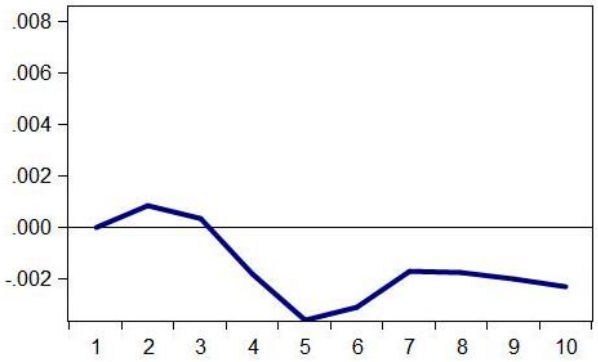




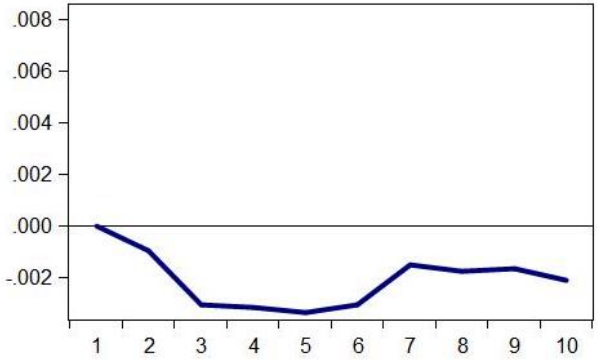
1. Financial Deepening: Household & NFC

- Impulse Response Analysis, After 1999

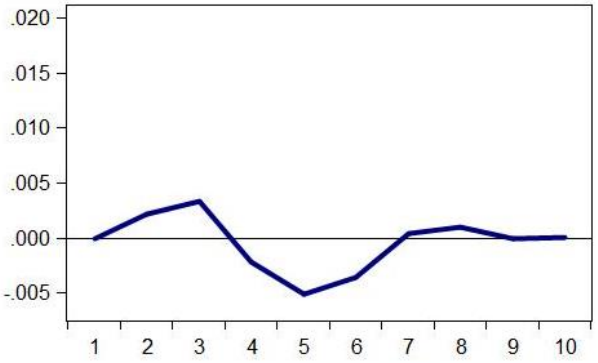
Response of GDP to Household



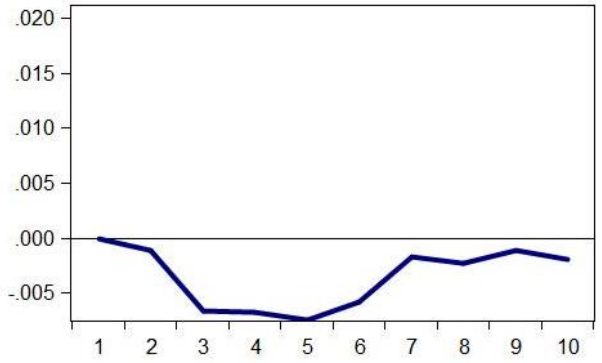
Response of GDP to NFC



Response of Mfr to Household



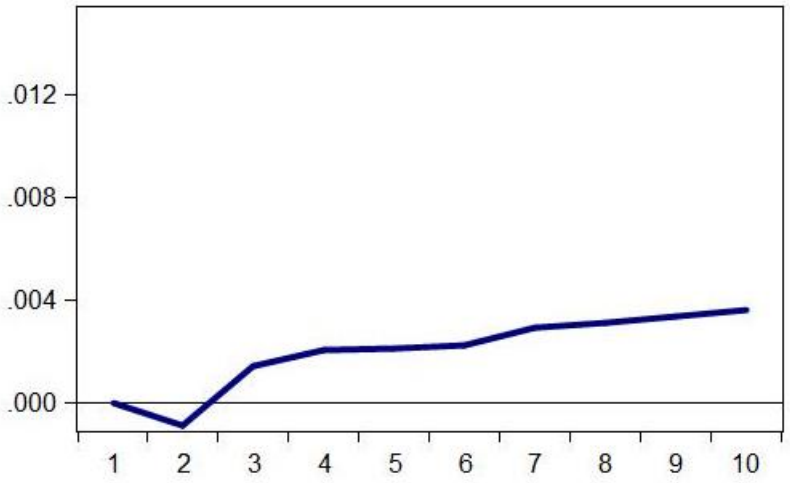
Response of Mfr to NFC



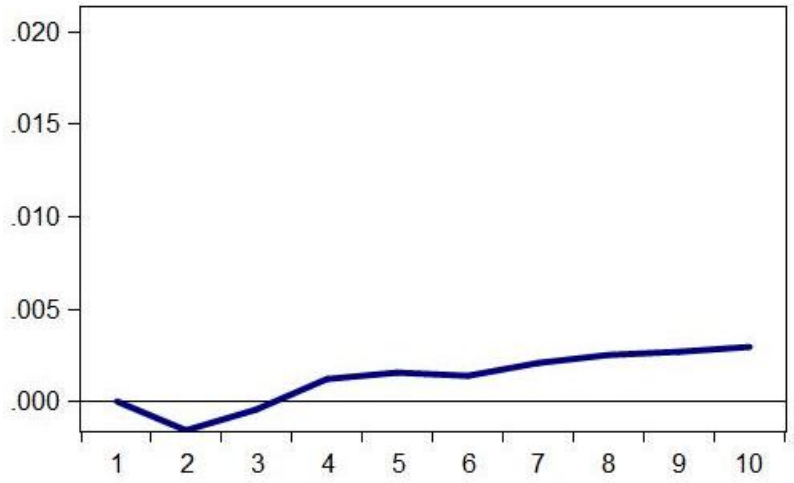
1. Financial Deepening: M2

- Impulse Response Analysis

Response of GDP to M2



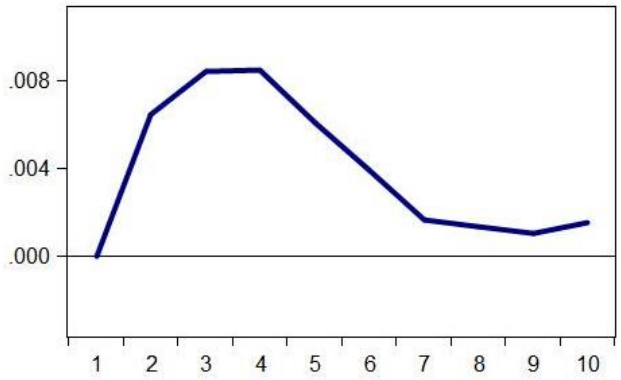
Response of Mfr to M2



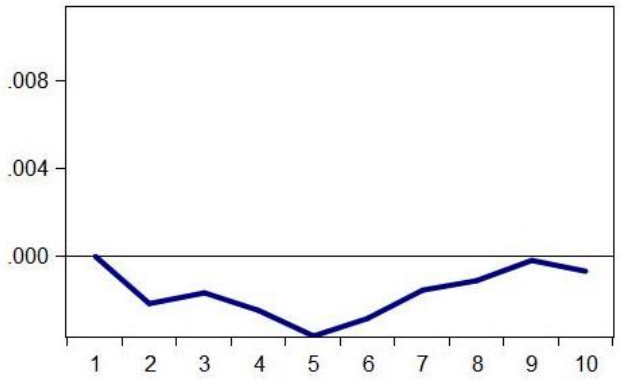
2. Source of Finance

- Impulse Response Analysis

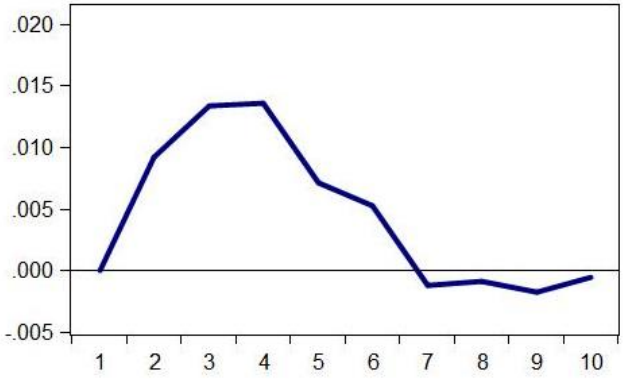
Response of GDP to Mktcap



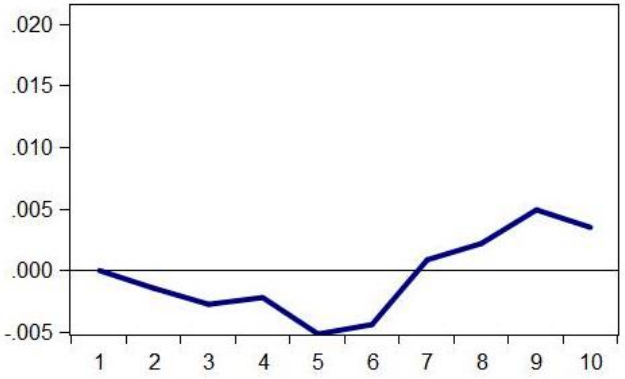
Response of GDP to bankcredit



Response of Mfr to Mktcap



Response of Mfr to bankcredit



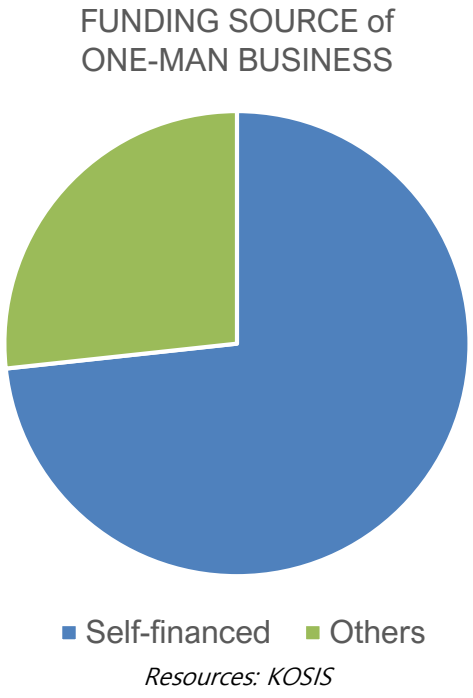
Interpretation

Credit to Household

✓ Whole Period

Positive relationship with GDP

- Encourage private consumption and boost market
- Use funds to finance small firms, start-ups and invest in human capital.



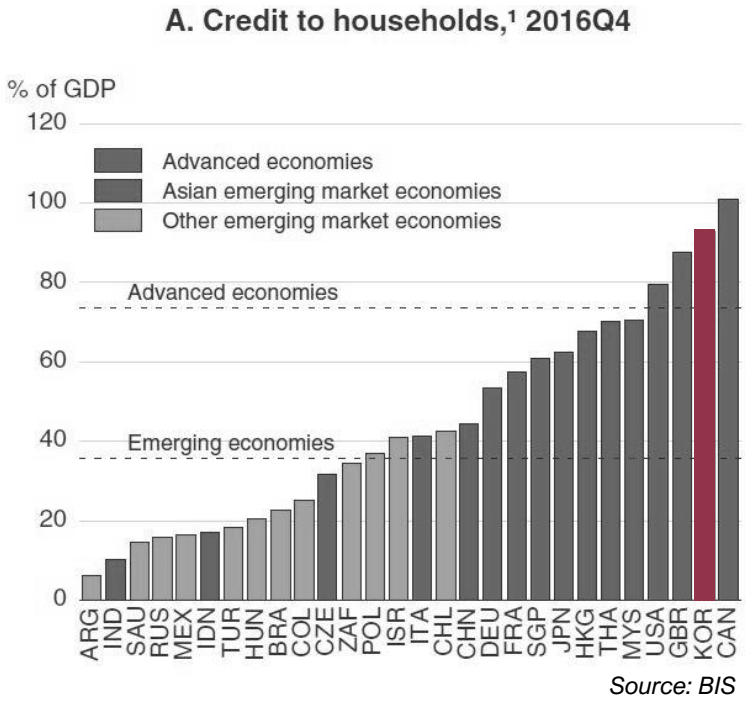
Resources: KOSIS

Credit to Household

✓ After 1999

Negative relationship with GDP

- Possibility of allocation to low productive sector.
- In Korea, consumer loan has increased rapidly.
- Contribution of household debt to consumption might have decreased. *(Jeon, 2019)*



Source: BIS

Credit to Household

✓ After 1999

Negative relationship with GDP

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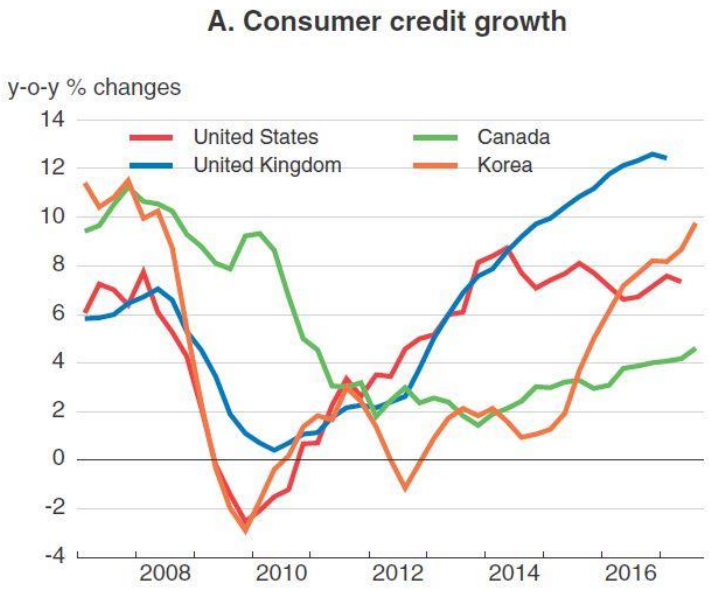


Source: Thomson Reuters; Bloomberg; and Federal Reserve.

Credit to Non-Financial Corporation

✓ Whole Period

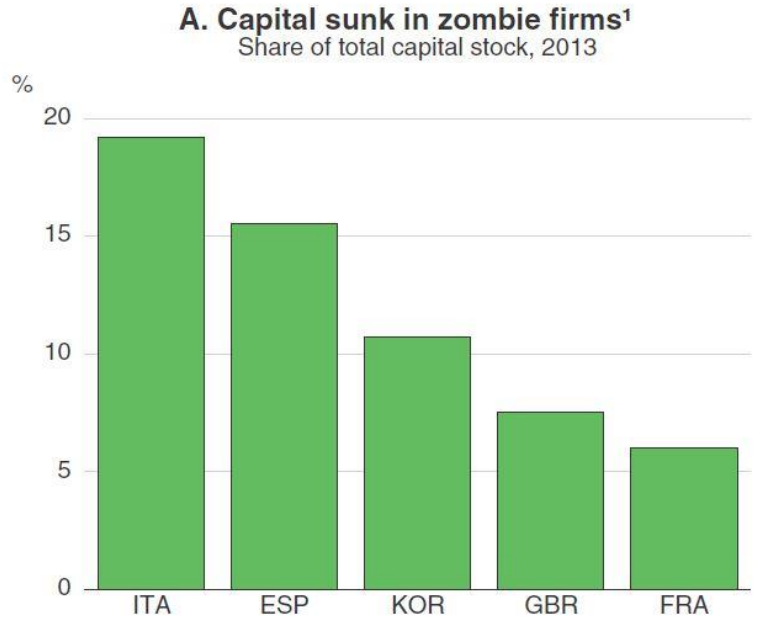
Positive relationship with GDP

- NFCs fund investment activities.

✓ After 1999

Negative relationship with GDP

- Disconnection between corporate debt and investment.
- Use debt to buyback to increase their share prices.
- Zombie firms may hamper efficient allocation of resources.



Source: OECD

M2

Positive relationship with GDP

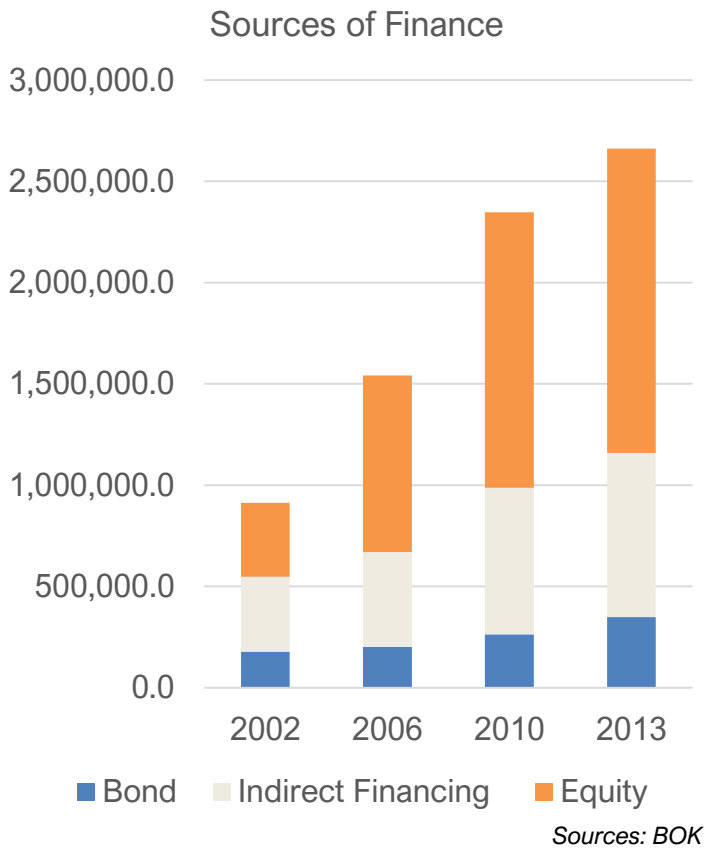
- As the liquidity in the economy increases, banks lower interest rate and increases lending.
- Transactions between economic agents rises so does the liquidity.
- Bank of Korea targeted Money Supply until 1997, but after they changed to inflation rate targeting.

Market Capitalization

Positive relationship with GDP

- Fund raised by equity financing could be invested into relatively new, long-term, riskier project.
- Recently, large corporations use direct financing more than indirect financing.
- High-tech industry grows faster by stock market development than by banking industry development.

  In the 2000s, the importance of high value-added industry increased. *(Lee, 2009)*

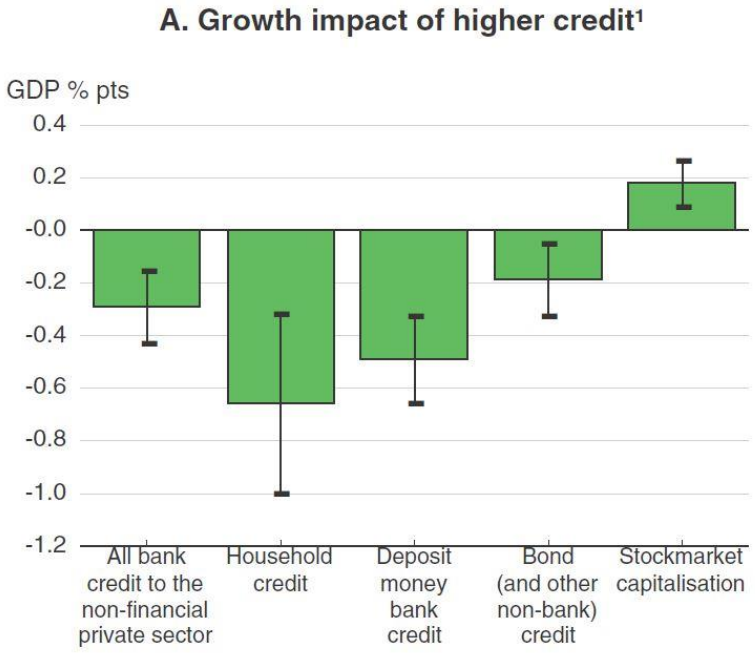


Sources: BOK

Bank Credit

Negative relationship with GDP

- Share of household debt in bank credit has risen from 37% to 45%.
- Banks focus on financing short-term, lower risk investment to increase short-term profitability.
- Importance of non-bank financial institution has risen in terms of size and profit.



Source: OECD

Policy Implication

- ✓ Should strengthen equity finance and competence of investment bank in Korea to promote innovators, start-ups.
  - Uber, Facebook, wework were financed by IB.
- ✓ Should improve credit allocation.
  - Reduce ratio of consumer loan in household debt

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THANK YOU

Appendix

Data Summary

	CREDIT	BANKCREDIT	NFC	GDP
Mean	160.9343	117.0478	92.47380	281113.2
Median	162.9789	120.3000	94.33726	286574.8
Maximum	187.5922	138.2000	115.8848	404051.9
Minimum	134.0006	96.70000	72.96286	164753.2
Std. Dev.	16.55440	10.68985	9.784774	72527.96
Skewness	-0.094893	-0.421650	-0.109275	-0.026438
Kurtosis	1.505654	1.993620	2.659640	1.776456

	M2	HOUSEHOLD	MFR	MKTCAP
Mean	1358038.	42.55714	73428.13	821.9076
Median	1215850.	44.95000	73077.40	784.8000
Maximum	2700355.	92.10000	118074.2	1909.000
Minimum	383546.9	3.300000	32081.10	66.30000
Std. Dev.	670535.6	26.01260	26733.85	543.2750
Skewness	0.377615	0.186976	-0.009808	0.242522
Kurtosis	1.915348	1.760533	1.661150	1.785228

Unit Root Test

ADF: Augmented Dickey-Fuller
KPSS: Kwiatkowski-Phillips-Schmidt-Shin

Variable	ADF		KPSS	
	t-statistics	p-value	LM-statistics	critical value(5%)
log GDP	0.372162	0.9989	0.474819	0.146000
log Mfr	-0.962394	0.9458	0.467095	0.146000
Credit	-0.819266	0.8114	1.920482	0.463000
Household	-2.711221	0.2332	0.205669	0.146000
NFC	-1.747368	0.4059	1.522252	0.463000
log M2	-0.993230	0.9416	1.890255	0.463000
log MktCap	-2.564996	0.2972	0.224969	0.146000
Bank Credit	-1.606995	0.4772	1.692460	0.463000

Lag Test

1) log GDP- log Mfr- Credit **(Lag=6)**

Lag	LR	FPE	AIC	SC	HQ
1	2810.364	4.45e-07	-6.111188	-5.867209	-6.012494
2	56.70733	3.64e-07	-6.312276	-5.921909*	-6.154365*
3	20.26209	3.58e-07	-6.329026	-5.792271	-6.111899
4	18.08208	3.56e-07	-6.335959	-5.652817	-6.059616
5	6.343277	3.76e-07	-6.281645	-5.452115	-5.946085
6	35.97960*	3.38e-07*	-6.388951*	-5.413033	-5.994175
7	12.59698	3.45e-07	-6.370312	-5.248007	-5.916320
8	6.405683	3.63e-07	-6.318064	-5.049371	-5.804855

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Lag Test

2) log GDP- log Mfr- Household- NFC, Whole Period **(Lag=6)**

Lag	LR	FPE	AIC	SC	HQ
1	3704.496	1.45e-07	-4.394394	-4.004027*	-4.236484
2	62.97346	1.23e-07	-4.562137	-3.911525	-4.298953*
3	39.76228	1.17e-07	-4.614549	-3.703693	-4.246091
4	34.00220	1.14e-07	-4.640494	-3.469393	-4.166762
5	23.67497	1.17e-07	-4.613713	-3.182368	-4.034708
6	48.50359*	1.04e-07*	-4.729343*	-3.037752	-4.045064
7	13.30963	1.13e-07	-4.648972	-2.697137	-3.859419
8	17.48651	1.20e-07	-4.594971	-2.382891	-3.700145

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Lag Test

2) log GDP- log Mfr- Household- NFC, After 1999 **(Lag=7)**

Lag	LR	FPE	AIC	SC	HQ
1	1004.877	1.09e-08	-6.985989	-6.276522*	-6.701342*
2	23.32955	1.17e-08	-6.919512	-5.737068	-6.445100
3	38.38911	9.86e-09	-7.097422	-5.442001	-6.433246
4	33.37371	8.76e-09	-7.232102	-5.103703	-6.378160
5	53.30250	5.40e-09*	-7.740473	-5.139096	-6.696766
6	15.41070	6.30e-09	-7.625605	-4.551251	-6.392134
7	26.47072*	5.87e-09	-7.749577*	-4.202245	-6.326341
8	13.93839	6.97e-09	-7.651077	-3.630768	-6.038076

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Lag Test

3) log GDP- log Mfr- log M2 **(Lag=4)**

Lag	LR	FPE	AIC	SC	HQ
1	3159.083	1.38e-10	-14.18742	-13.94993*	-14.09143
2	26.43825	1.32e-10	-14.23211	-13.85212	-14.07853
3	42.94735	1.16e-10	-14.36088	-13.83839	-14.14970
4	28.44074	1.10e-10*	-14.41961*	-13.75463	-14.15084*
5	13.84837	1.11e-10	-14.40572	-13.59824	-14.07936
6	14.53805	1.12e-10	-14.39654	-13.44656	-14.01258
7	9.115988	1.17e-10	-14.35986	-13.26739	-13.91831
8	24.93301*	1.11e-10	-14.40901	-13.17404	-13.90986

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Lag Test

4) log GDP- log Mfr- log MktCap- Bank Credit **(Lag=7)**

Lag	LR	FPE	AIC	SC	HQ
1	926.5721	1.02e-09	-9.350403	-8.655884*	-9.071212
2	48.68233	7.78e-10	-9.627320	-8.469788	-9.162002
3	35.40451	6.92e-10	-9.752146	-8.131602	-9.100701
4	52.00340	4.67e-10	-10.15912	-8.075567	-9.321551
5	49.83451	3.13e-10	-10.58195	-8.035384	-9.558254
6	23.89515	3.14e-10	-10.61299	-7.603404	-9.403160
7	48.26893*	1.97e-10*	-11.12590	-7.653308	-9.729949*
8	19.16017	2.10e-10	-11.12815*	-7.192546	-9.546073

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The End