

Friday April 23, 2021

CSTO Problem

$$\Phi = K + R - A - F + X - (M) \mu Y$$

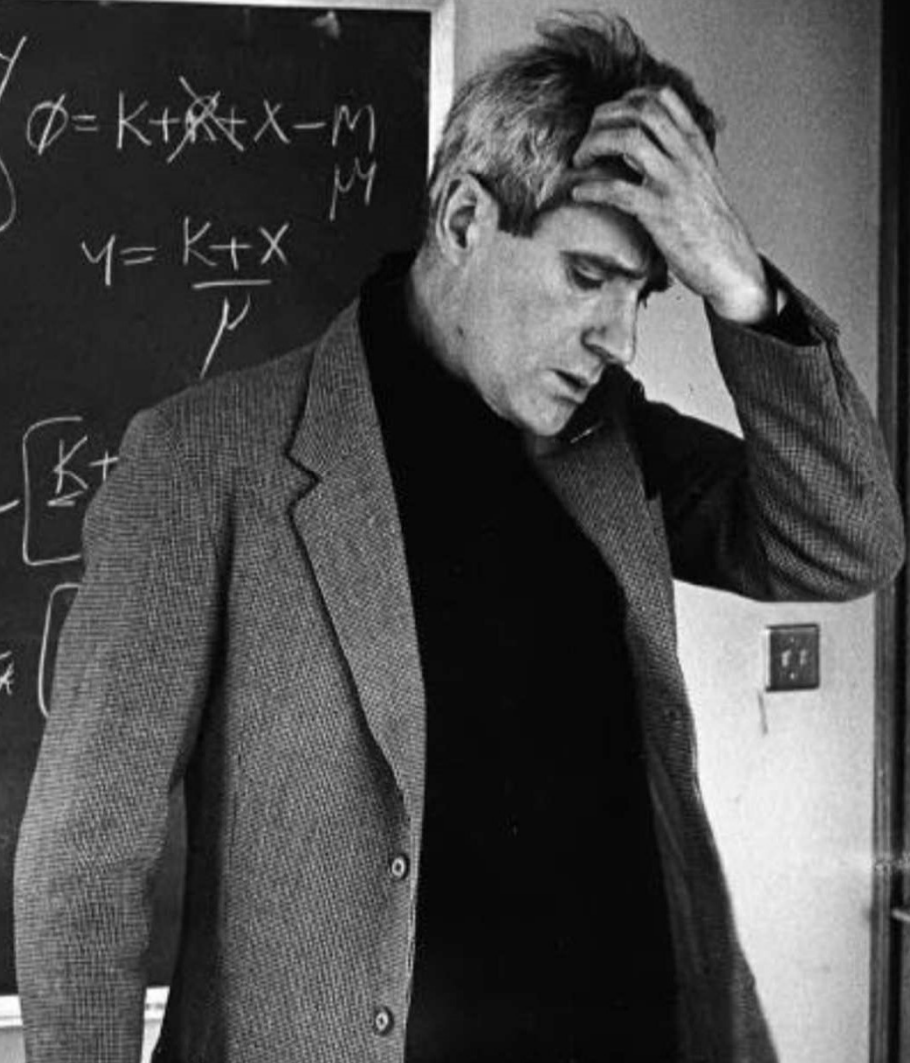
$\Phi = K + X - M$

$$Y = \frac{K + X}{\mu}$$

R: net. insidels
A: spent on food & mats
F: fuels
M: imports of mfs
X: exports

- o Aftab Chowdhury
- o Florian Hack
- o Davide Luzzati
- o Oktay Ozden
- o Weijie Pang

- o Ian Buckley
- o Kyle Lee
- o William White





Part I – CSTO problem

Problem statement



Part II – Methodology

7 Unsustainable Processes (7UP)

SFC models

Econometric studies



Part III – Empirical work

3UPs

- Asset price inflation

- Volatility of cross-border flows

- Financial tsunami

Scenarios



Part IV – Conclusions

Preliminary conclusions

Next steps

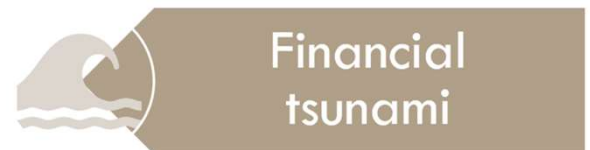
Part I - CSTO problem

- Problem statement
- Canadian economy

Problem statement

- The global **economic-stimulus** responses to the COVID-19 crisis far exceeded those of the global financial crisis of 2008, and large part of the COVID-19 stimuli were responded by governments in developed countries, where **capital movement** is generally **unrestricted**.
- In a post-COVID-19 world, how would the rapid increase in **money supply** impact on
 - the **volatility** of **cross-border capital flows**
 - **asset inflation**
 - the risk of **financial tsunami**, especially for countries with **small open economies**, like Canada?

Unintended consequences





Canada?

What are the **specific vulnerabilities** of Canada to **international capital flows**?

How does Canada's own internal **economic structure** and **international position** fair given the **domestic** and **international fiscal responses to Covid**?

Which **internal** and **external imbalances/divergences** given Canada's industrial and financial structure present the greatest **weaknesses** in the face of **financial tsunami**?

Part II - Methodology

- 7 Unsustainable Processes (7UP)
- SFC models
 - General
 - Relevant SFC models
- Econometric studies



7 UP



Seven Unsustainable Processes
A proto-SFC model

The Jerome Levy Economics Institute of Bard College

LEVY INSTITUTE

*“Moreover, if per impossibile the growth in **net lending** and the growth in the **money supply** growth were to continue for another eight years, the implied **indebtedness of the private sector** would then be so extremely large that a **sensational day of reckoning** could then be at hand.”*

Seven Unsustainable Processes

Medium-Term Prospects and Policies for the United States and the World

Wynne Godley

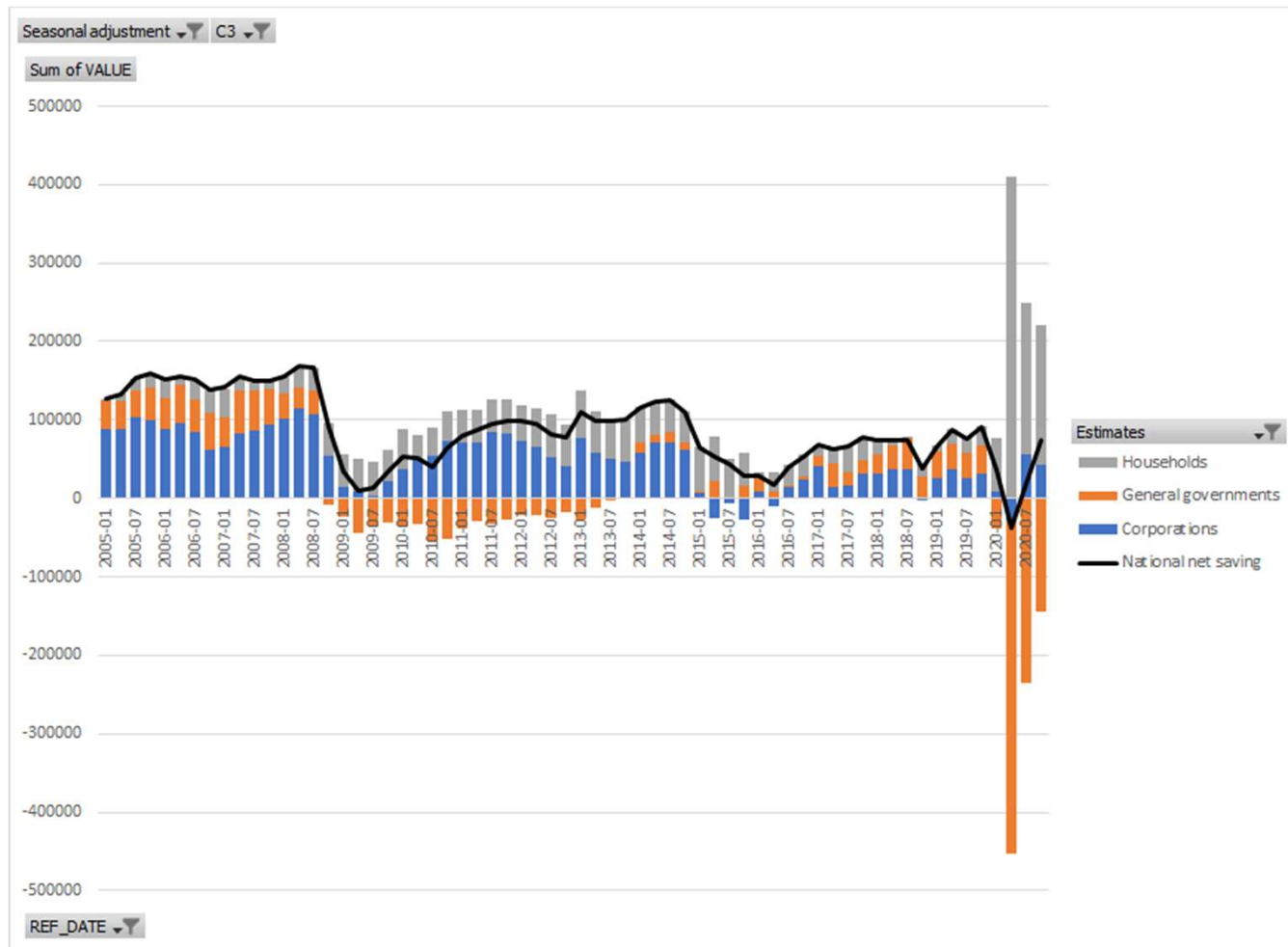


Godley's 7 Unsustainable Processes

- (1) Fall in **private saving** into ever deeper negative territory,
- (2) Rise in the **flow of net lending** to the private sector,
- (3) Rise in the **growth rate of the real money stock**,
- (4) Rise in **asset prices** at a rate that far exceeds growth of profits/GDP
- (5) Rise in the **budget surplus**,
- (6) Rise in the **current account deficit**,
- (7) Increase in the **net foreign indebtedness** relative to GDP.



Relevant
in
Canada
in 2020-



National net saving disaggregated into households, general governments & corporations



The Logic of Divergence

- Godley argues the economic trajectory of the US in 1999 is unsustainable.
- Argues that the US was in a growth regime predicated upon diverging sectoral balances.
- Growth required continuing creation of new debt, money and continual appreciation of financial assets which was out of step with the growth of balances elsewhere in the economy.
- Instability occurs when the system grows in a way which does not keep relative balances stable.***
- These processes are one directional in time and crisis occurs upon reversal of these processes.



7 Unsustainable Processes Today

- 7UP describes a world prior to the financial crisis where these processes are building up to a crisis.
- Post-Crisis how do we adapt this logic?
- Today we have a world of high debt and low interest rates.
- Economic stagnation.
- Widespread distressed balance sheets.
- Asset prices sustained by QE/monetary policy.
- Covid?



Adapting 7UP to the CSTO problem

Four key topics that are a good fit with the 7UP philosophy:

- a. Asset prices & housing
- b. Debt - households & government
- c. Trade imbalances (Godley sense)
- d. Capital flows - Canada



Monetary
policy



AB-SFC Model

The sectoral balances / flow of funds approach

Relevant SFC models

- Godley - SFC
- Caiani Godin - ABM
- Godin Yilmaz - Open economy
- Mazier- International
- Caverzasi Godin -
Financialisation
- Meiss - Shadow banking
- Zezza - International money
- Jackson Victor - Low growth 

SFC MODELS – KEY FEATURES

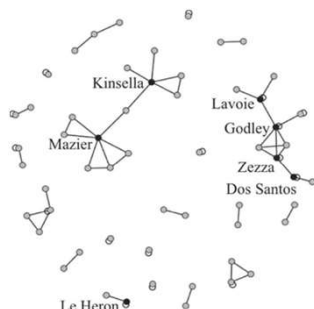
Stock-flow consistent models aka

- accounting
- flow-of-funds (FoF)
- from-whom-to-whom

(Re-)Introduced by:

- Wynne Godley (Cambridge)
- James Tobin (Yale)

Heterodox alternative to DSGE models



Which are the components of an SFC model?

1. Accounting part:

- Matrix approach
- Specify the balance sheet and transactions between sectors

2. Behavioral equations:

- Accommodate behavioural assumptions consistent with underlying accounting structure
- Reject RARE individual (representative agent with rational expectations) in favour of SAFE (sectoral average with flexible expectations)

STOCKS AND FLOWS

Flow consistency:

- Every monetary flow comes from somewhere and goes somewhere

Stock consistency:

- The financial liabilities of an agent or sector are the financial assets of some other agent or sector.

Stock-flow consistency

- Every flow implies the change in one or more stocks

Quadruple entry:

- Every transaction involves a quadruple entry in accounting



AB-SFC Model

Major Institutional sectors of a minimal SFC :

- Households
- Financial Institutions
- Firms
- Public sector (Government)

Drawbacks of SFC: heterogeneity of agents

- Selection within markets
- Geographic space
- Network-based balance sheet relationship
- Organization of industries

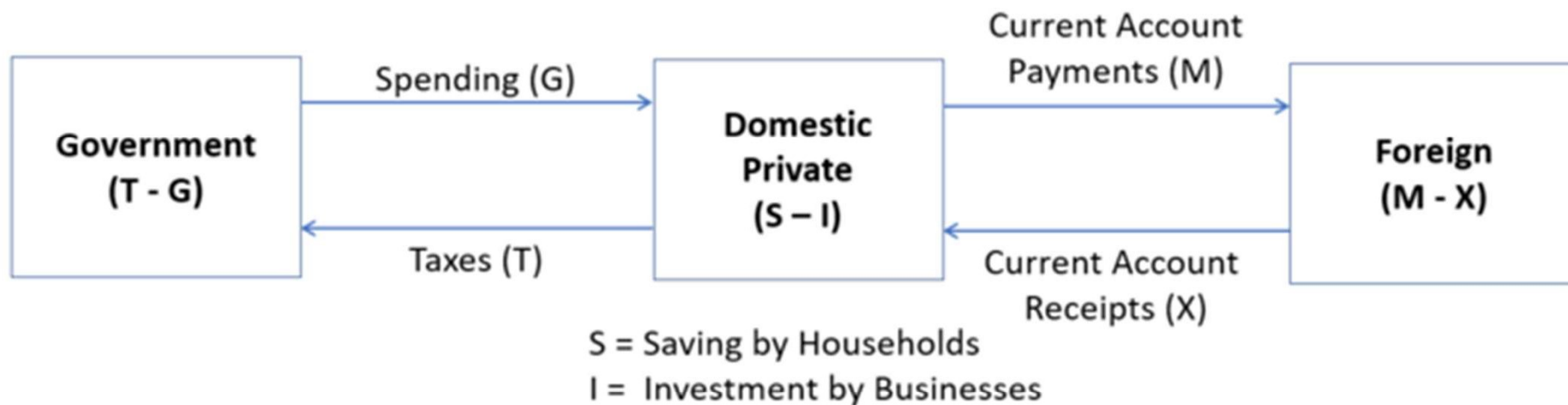
Part III - Empirical work

Scenarios

3UPs

- Asset price inflation
- Financial tsunami
- Volatility of cross-border flows

Sectoral Balances



Identity: Must hold true by definition
 $(T - G) + (S - I) + (M - X) = 0$

"[T]he deficit of the general government (federal, state, and local) is everywhere and always equal (by definition) to the current account deficit plus the private sector balance (the excess of private saving over investment)."

https://en.wikipedia.org/wiki/Sectoral_balances

Wynne Godley

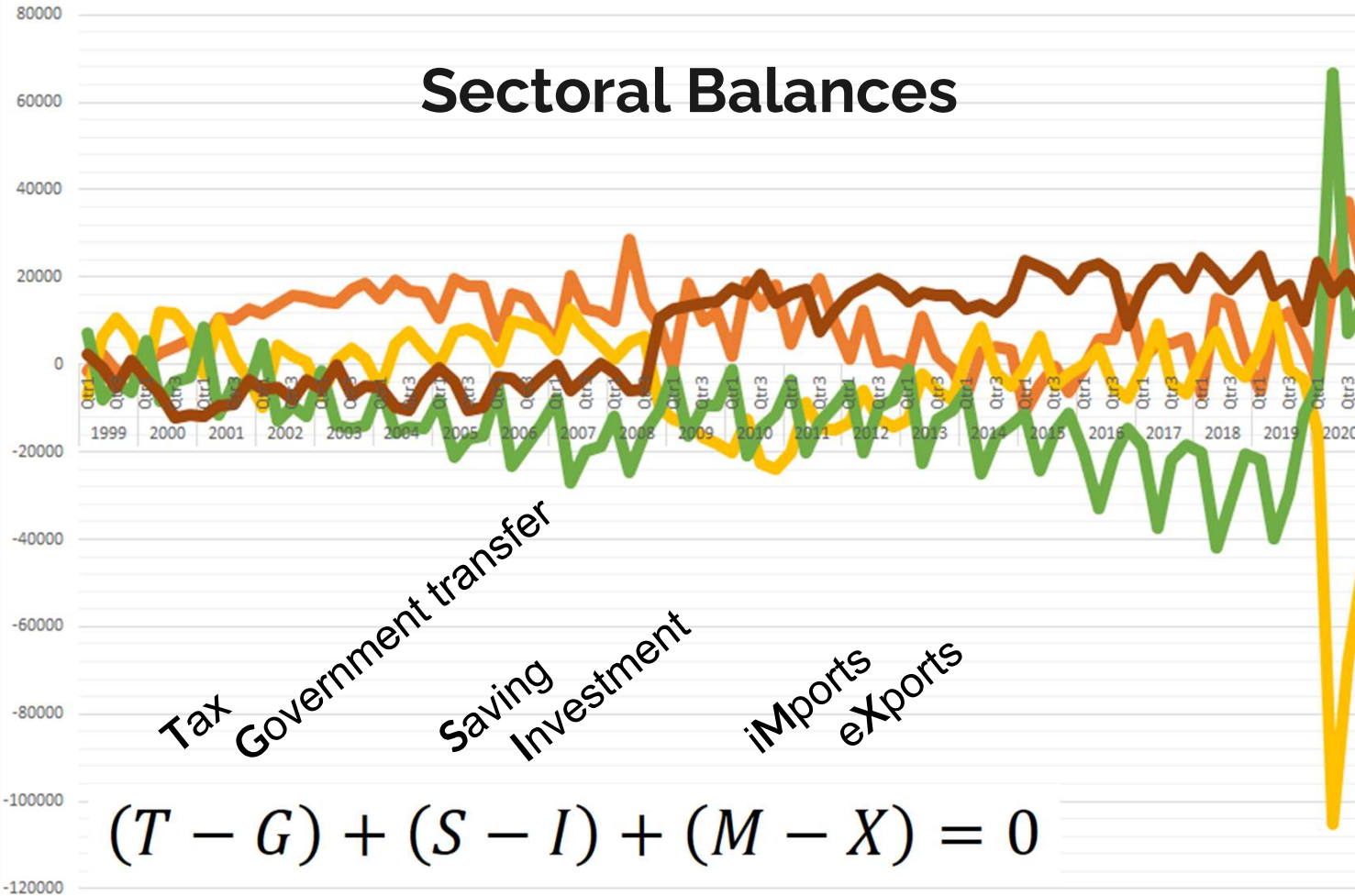
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Source: Wynne Godley – Levy Institute – "Some Unpleasant American Arithmetic" (June 2005)

Sectoral Balances

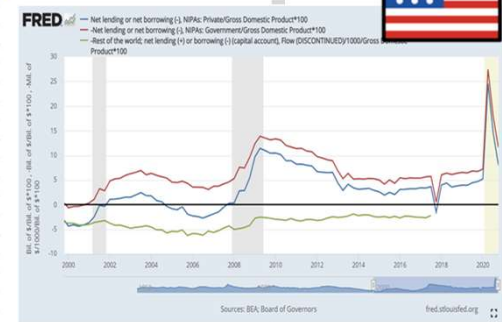


Sum of VALUE



- Sectors
- Corporations
 - General governments
 - Households
 - Non-residents

$$(T - G) + (S - I) + (M - X) = 0$$



Years Quarters REF_DATE

<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610057801>

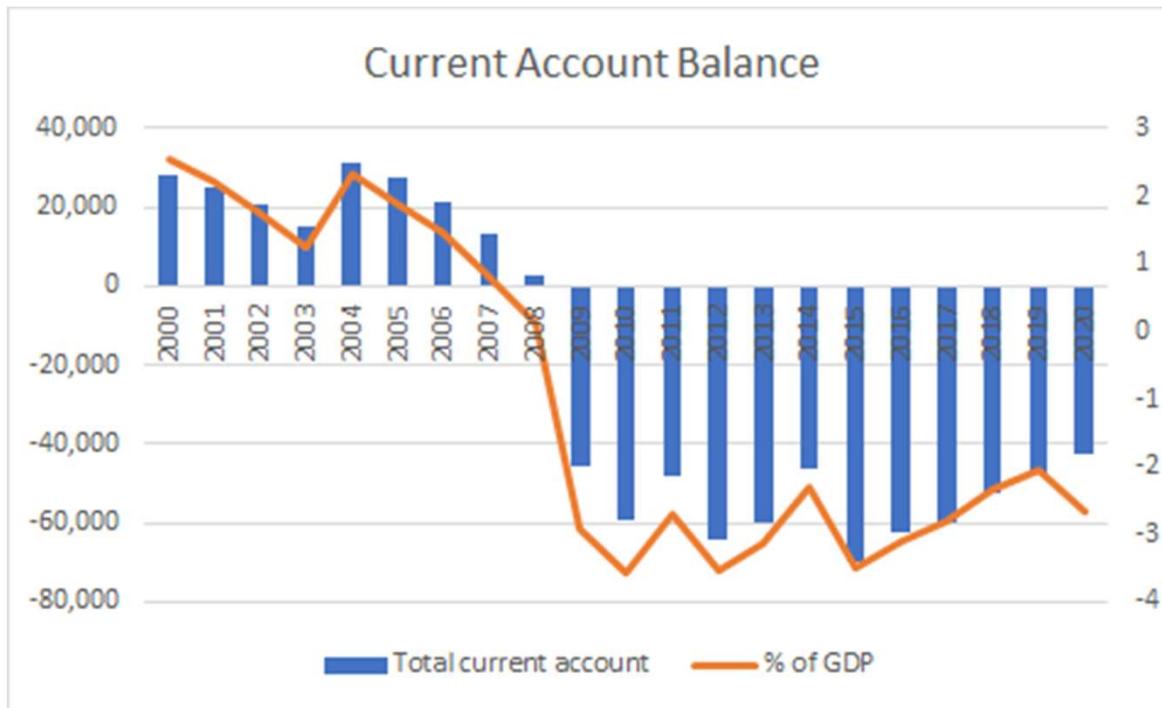
<https://fred.stlouisfed.org/graph/?g=ejty> 24

Standard accounting matrix in macro

Standard macro relies on the 1953 presentation of the UN system of national accounts

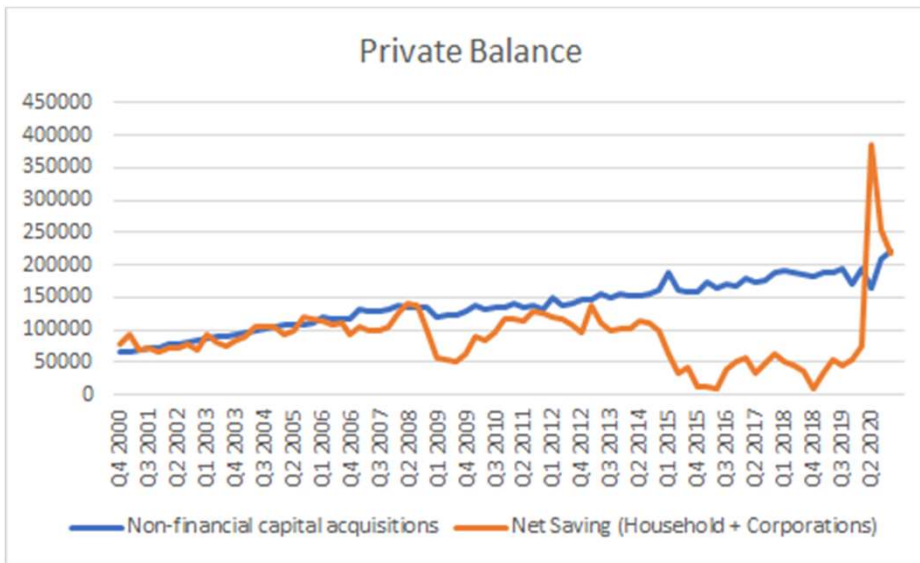
	Business			Government	Σ
	Households	Current	Capital		
Consumption	$-C$	$+C$			0
Govt. expenditure		$+G$		$-G$	0
Investment		$+I$	$-I$		0
[GDP (memo)]		[Y]			
Wages	$+WB$	$-WB$			0
Profits	$+F$	$-F$			0
Tax net of transfers	$-T$			$+T$	0
Σ	<i>SAVING</i>	0	<i>INVESTMENT (-)</i>	<i>GOVT SURPLUS</i>	0

Trade Balance (M-X)

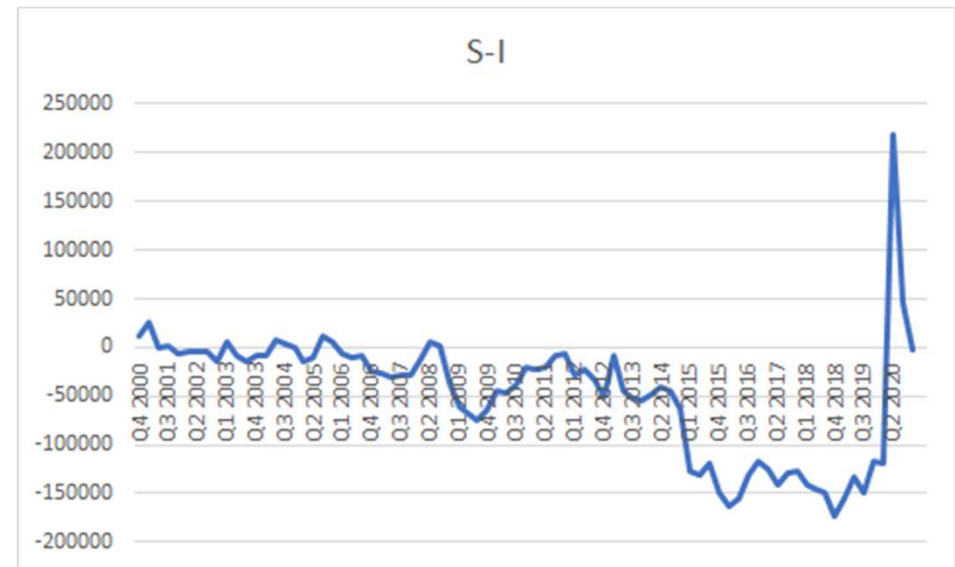


Source: STATCAN & OECD

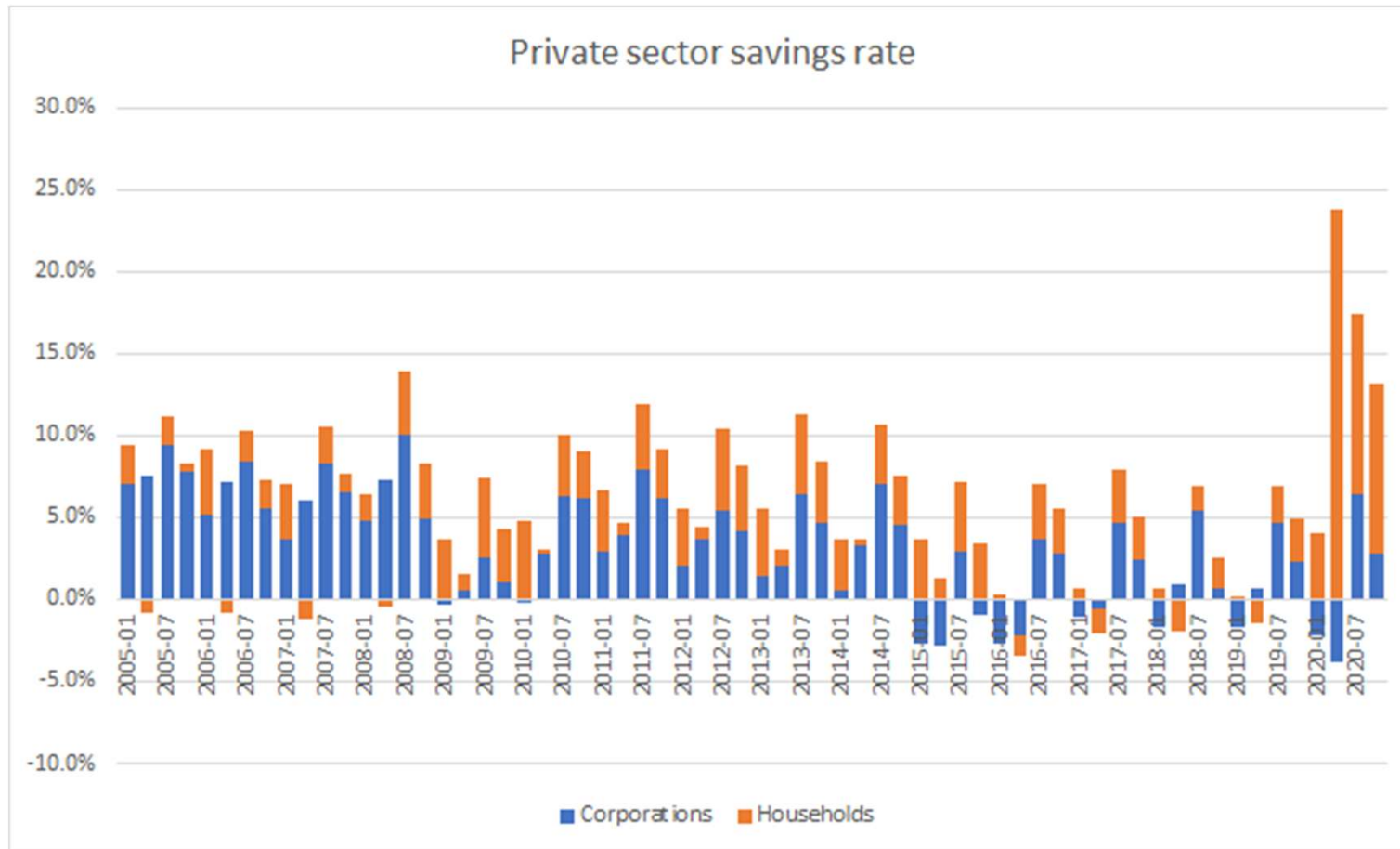
Private Savings & Investment Balance (S-I)



Source: Current and Capital Account, National, STATCAN

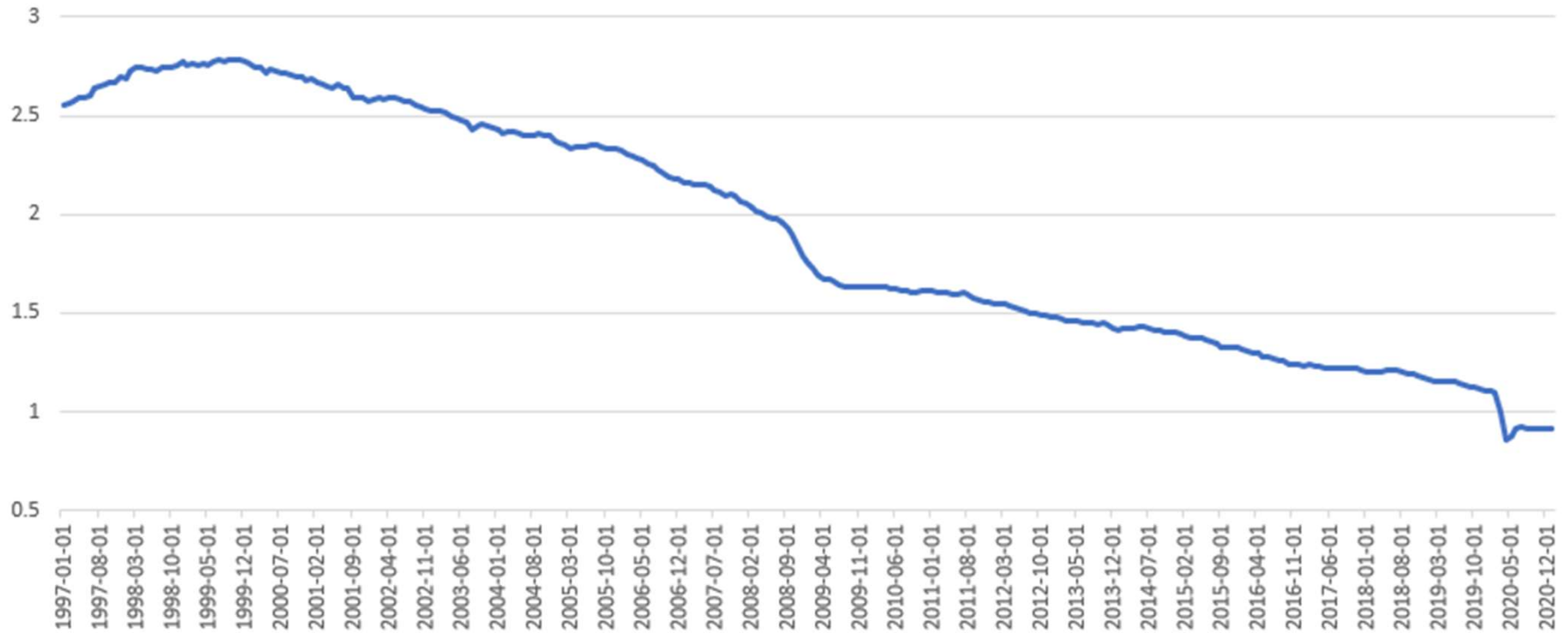


Source: Current and Capital Account, National, STATCAN



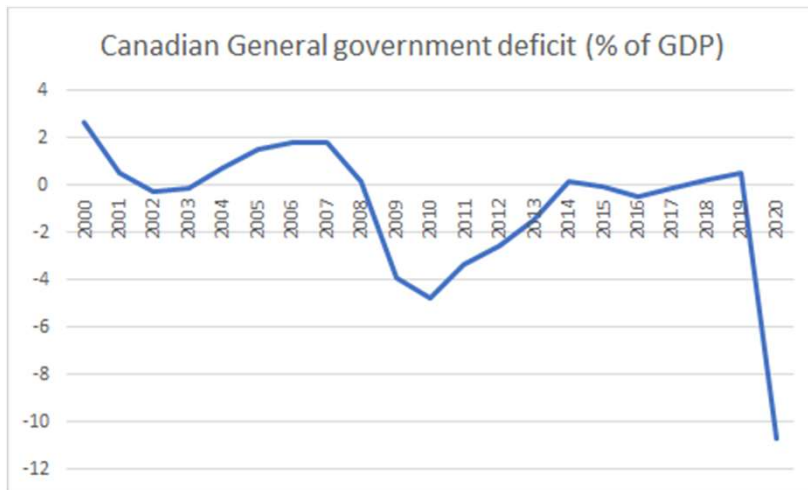
Private sector savings rate - households & corporations

Velocity of M2 Money Stock

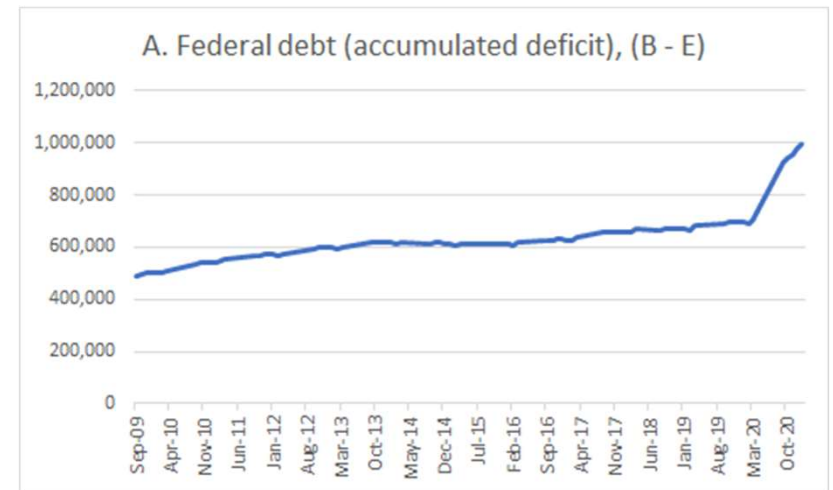


Velocity of M2 Money Stock - Canada

Government Budget Balance (T-G)

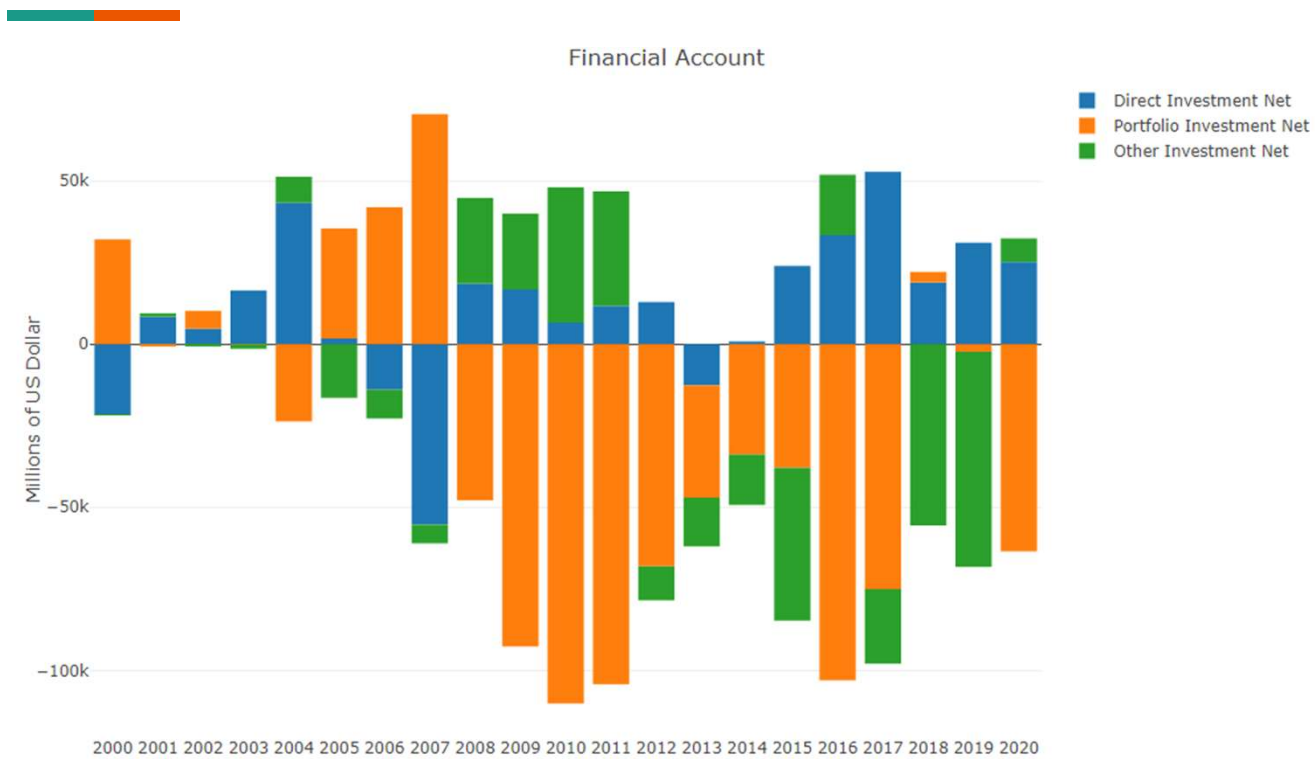


Source: OECD



Source: STATCAN

Large financial inflows – Financial account



Source: STATCAN



Scenarios - I

Oktaç

Monetary Policy

-QE

-I.R. Cut

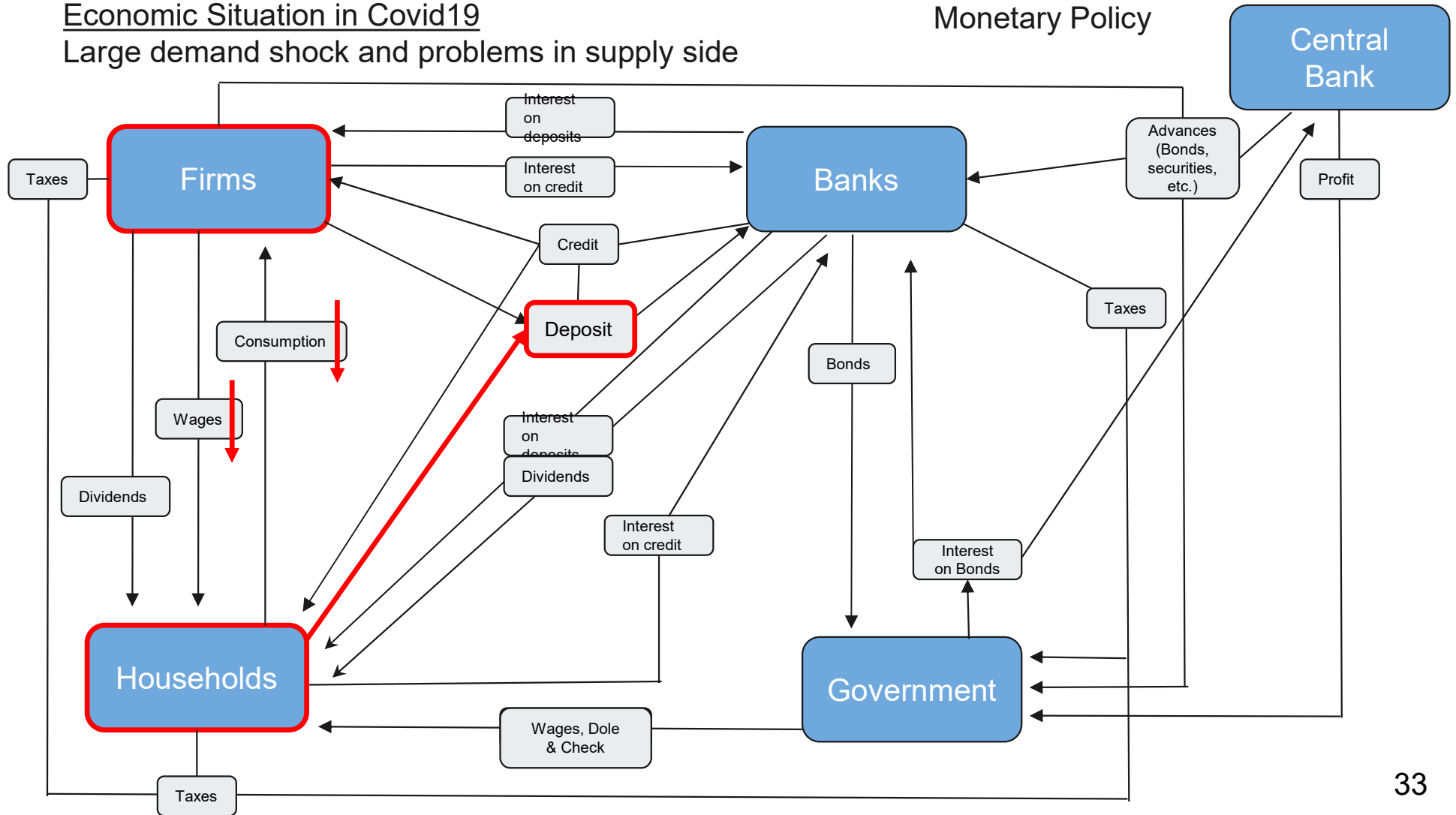
We explore the **causal relationships** between the **sectors** in the economy

- To **understand** the system
- In preparation for the development of more sophisticated **SFC models**

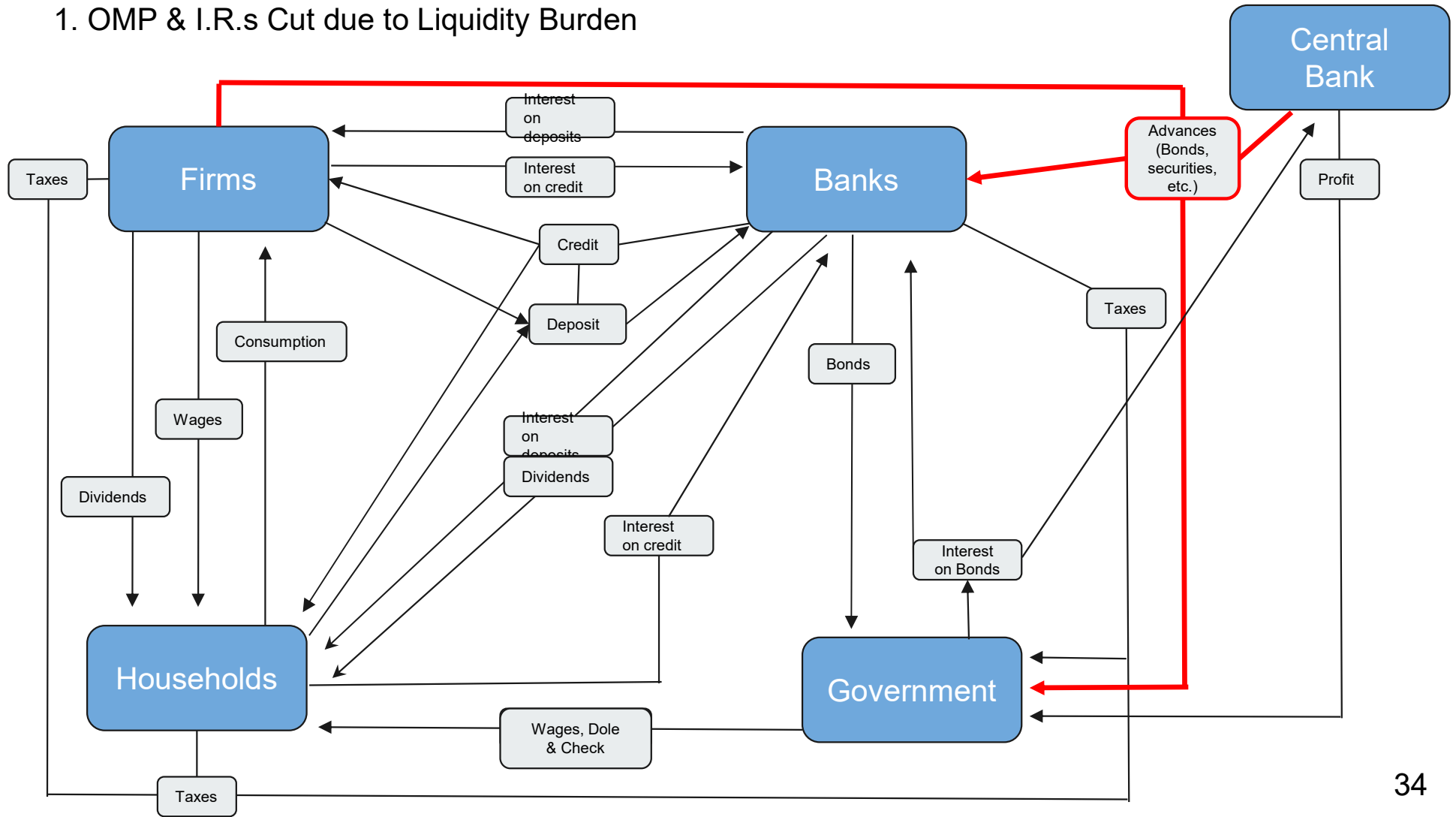
Economic Situation in Covid19

Large demand shock and problems in supply side

Monetary Policy



1. OMP & I.R.s Cut due to Liquidity Burden





Scenarios -II

Oktay

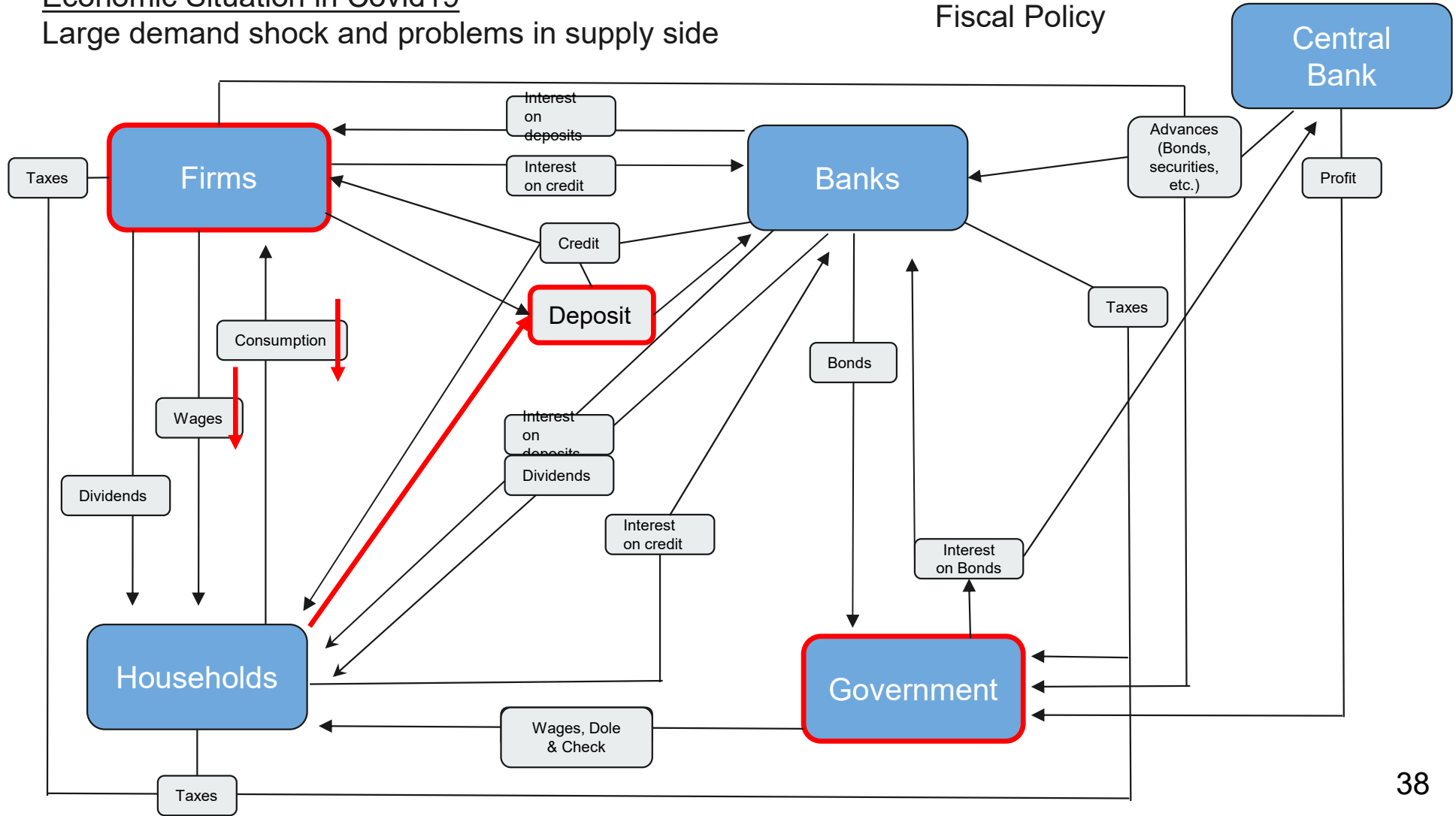
Fiscal Policy
-Dole & Check

In 2020, to a much greater extent than in 2008, an understanding of the effects of fiscal policy is important

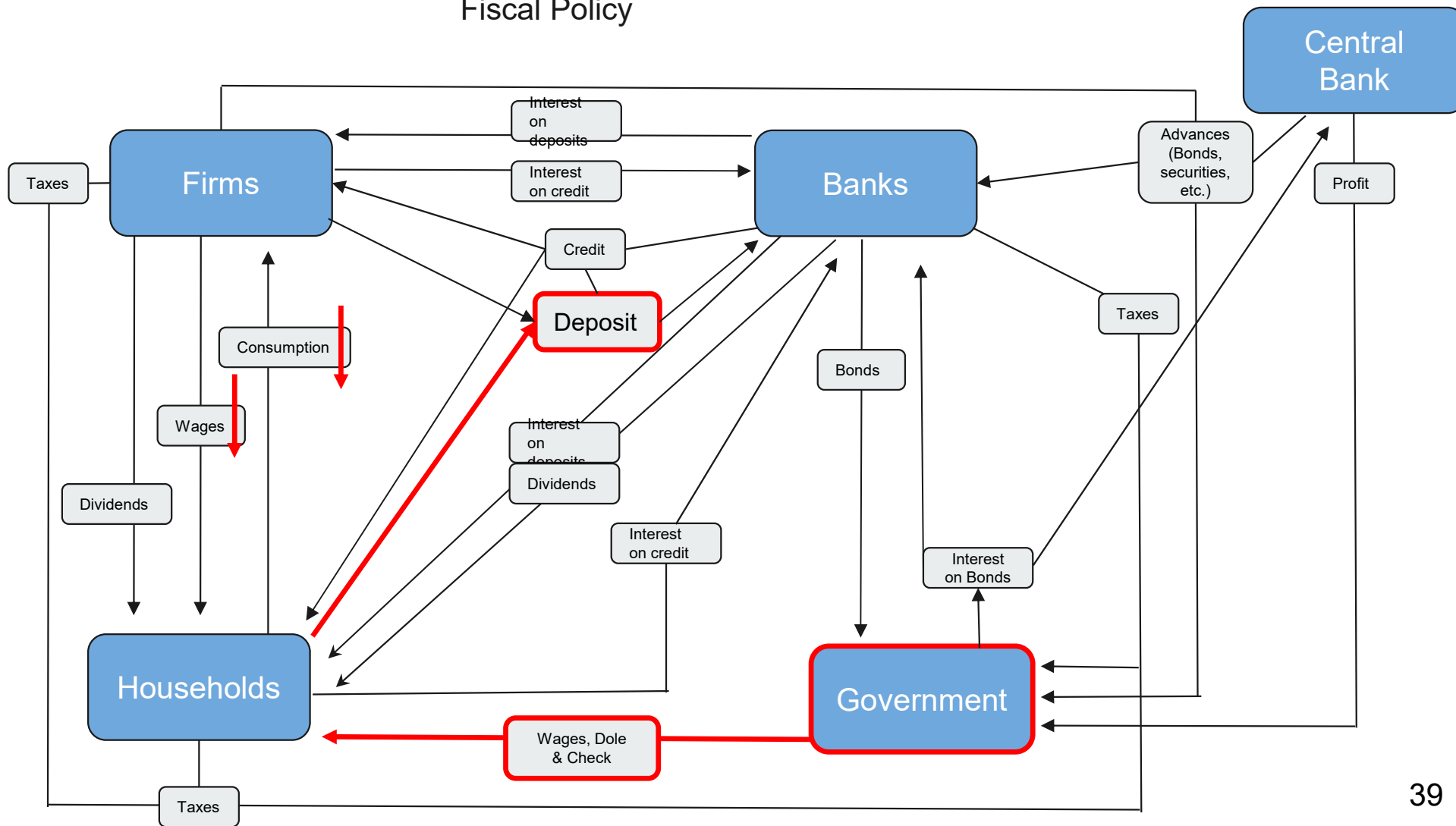
Economic Situation in Covid19

Large demand shock and problems in supply side

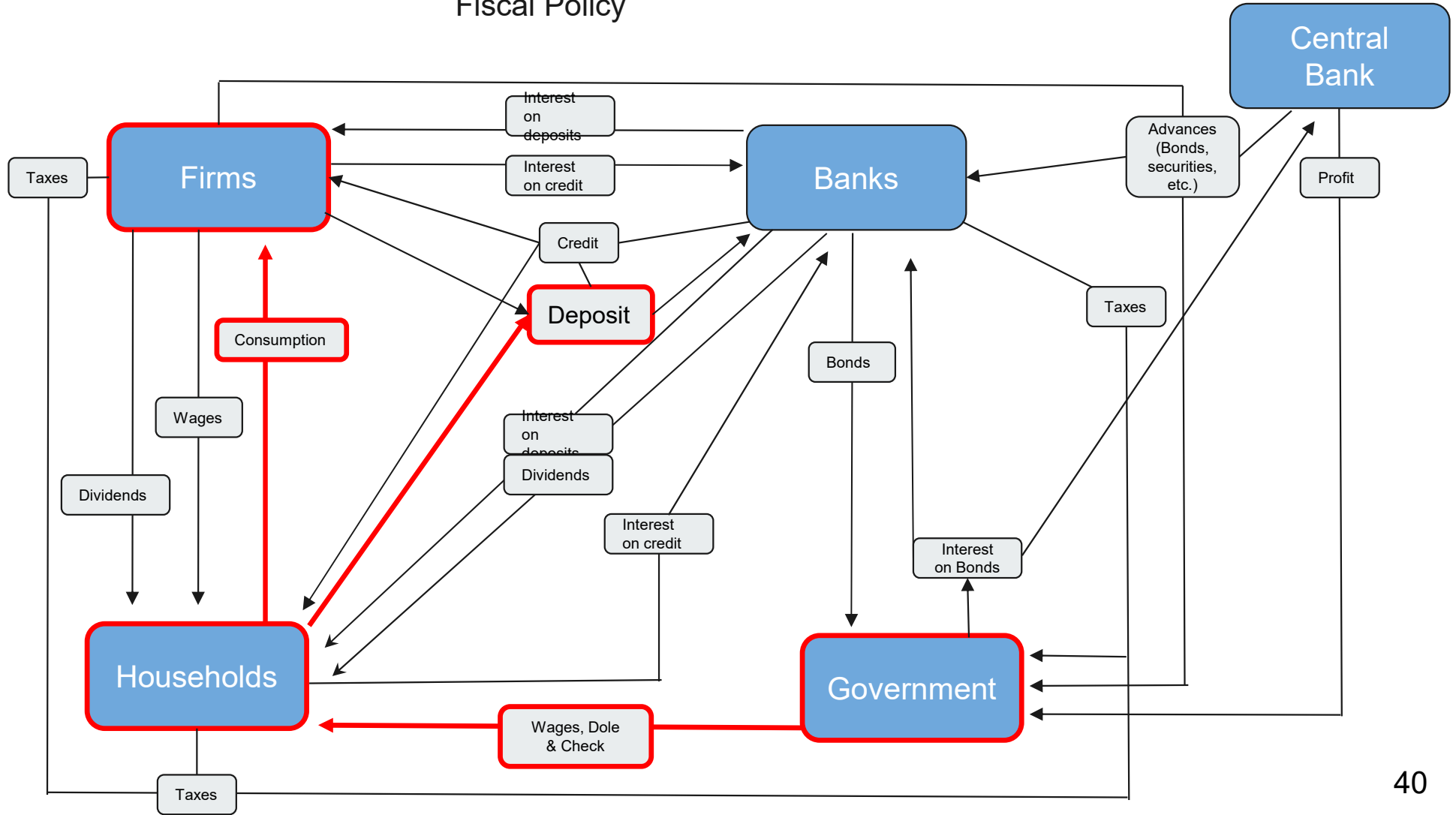
Fiscal Policy



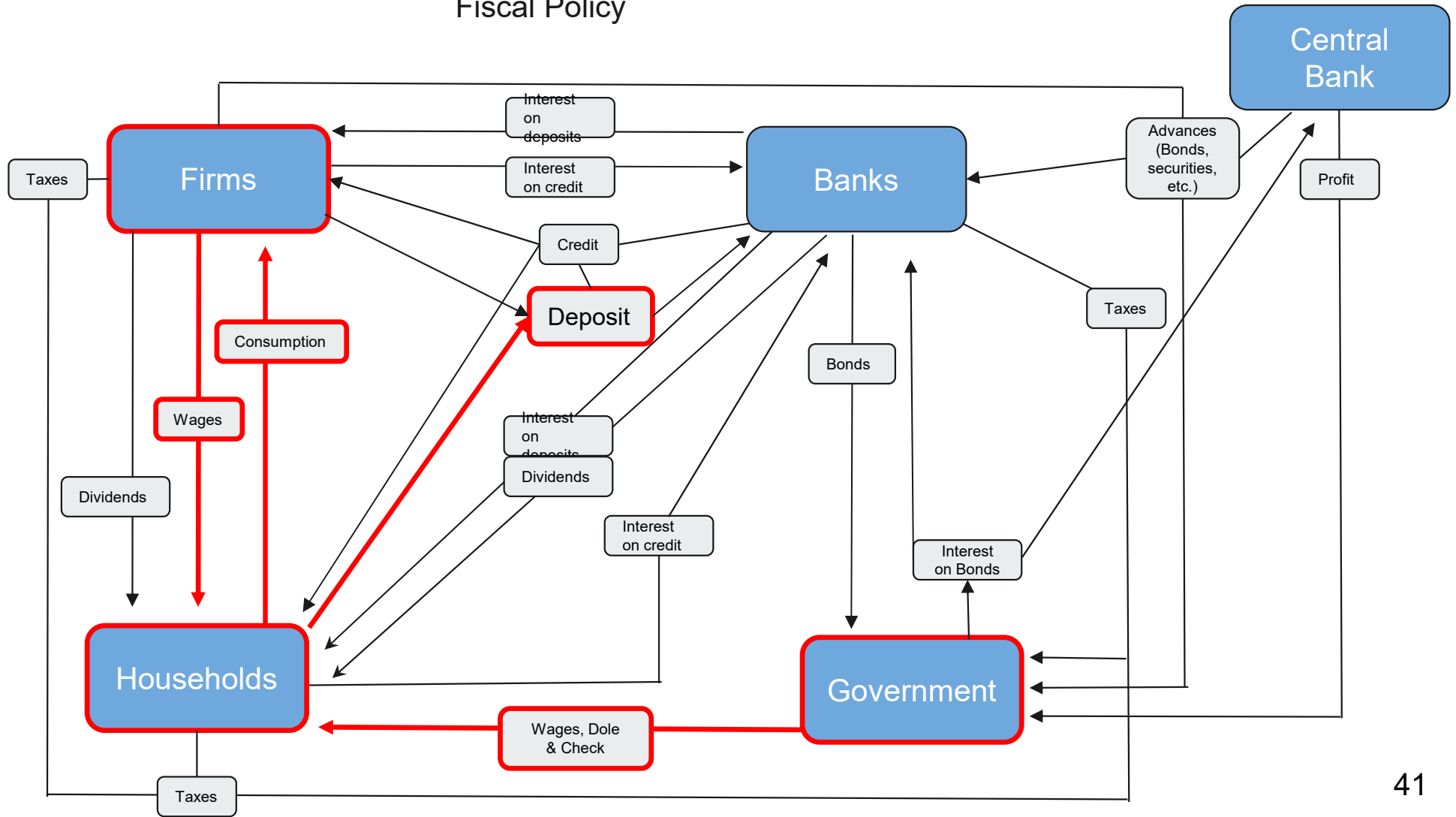
Fiscal Policy



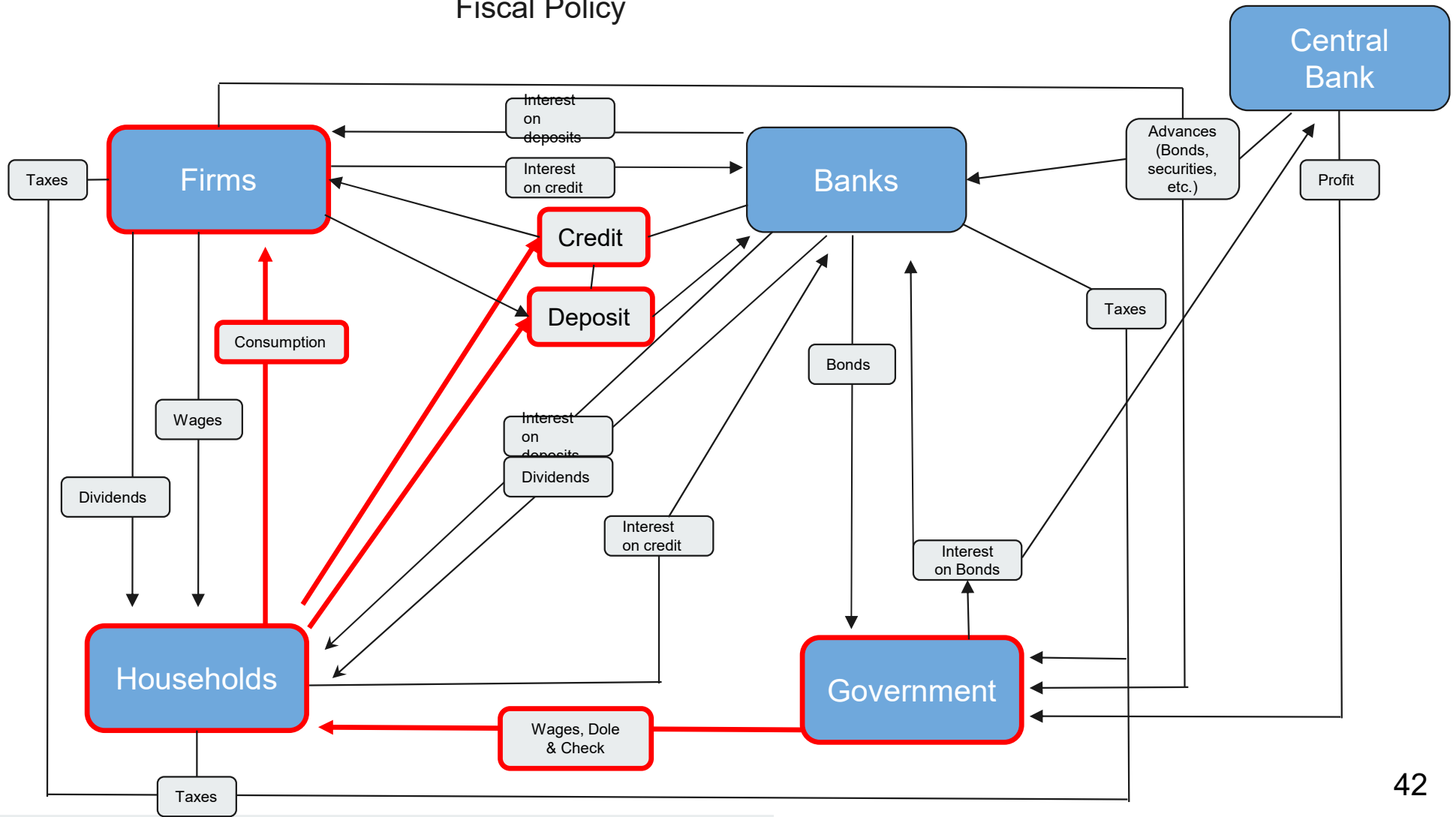
Fiscal Policy



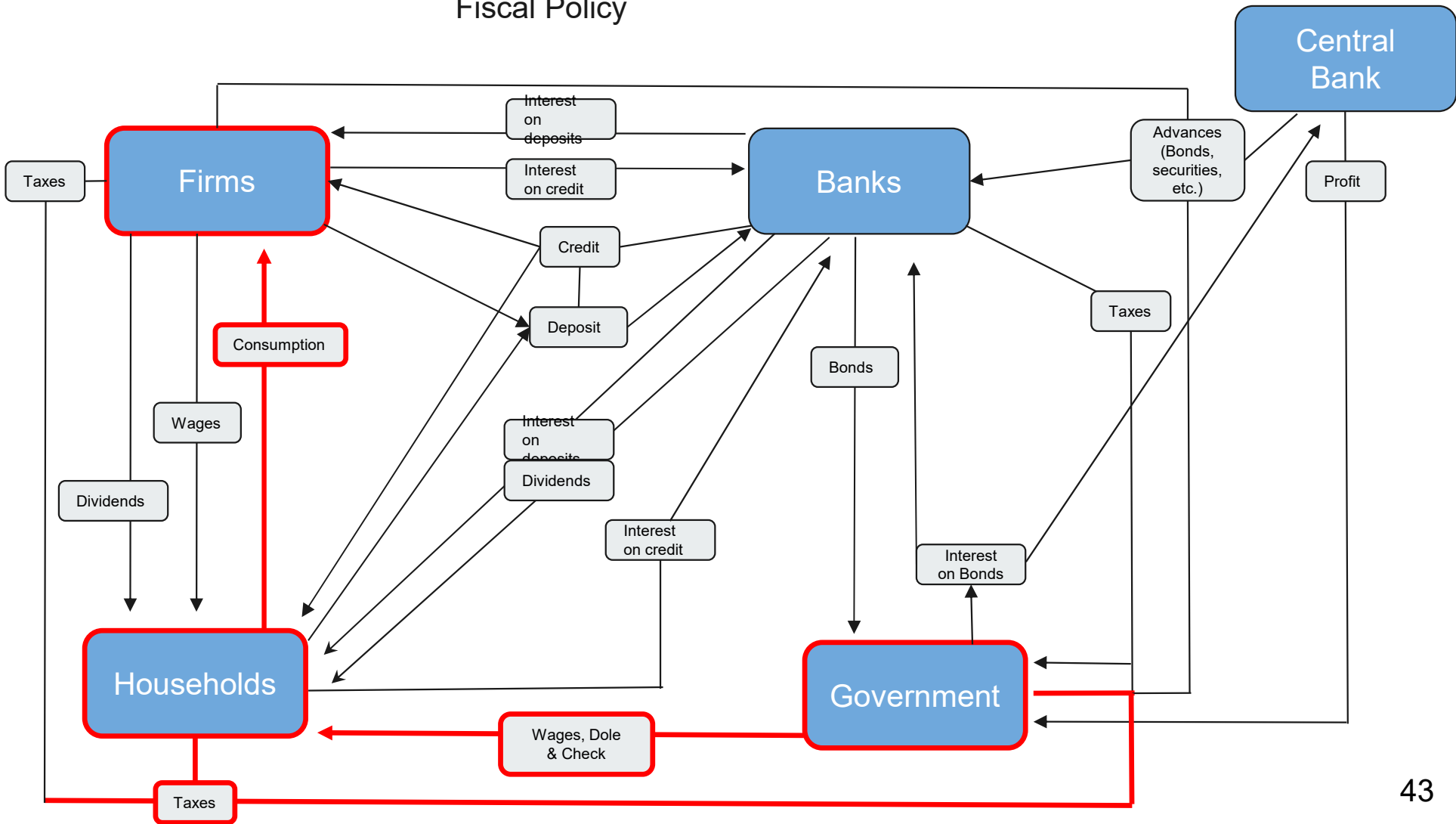
Fiscal Policy



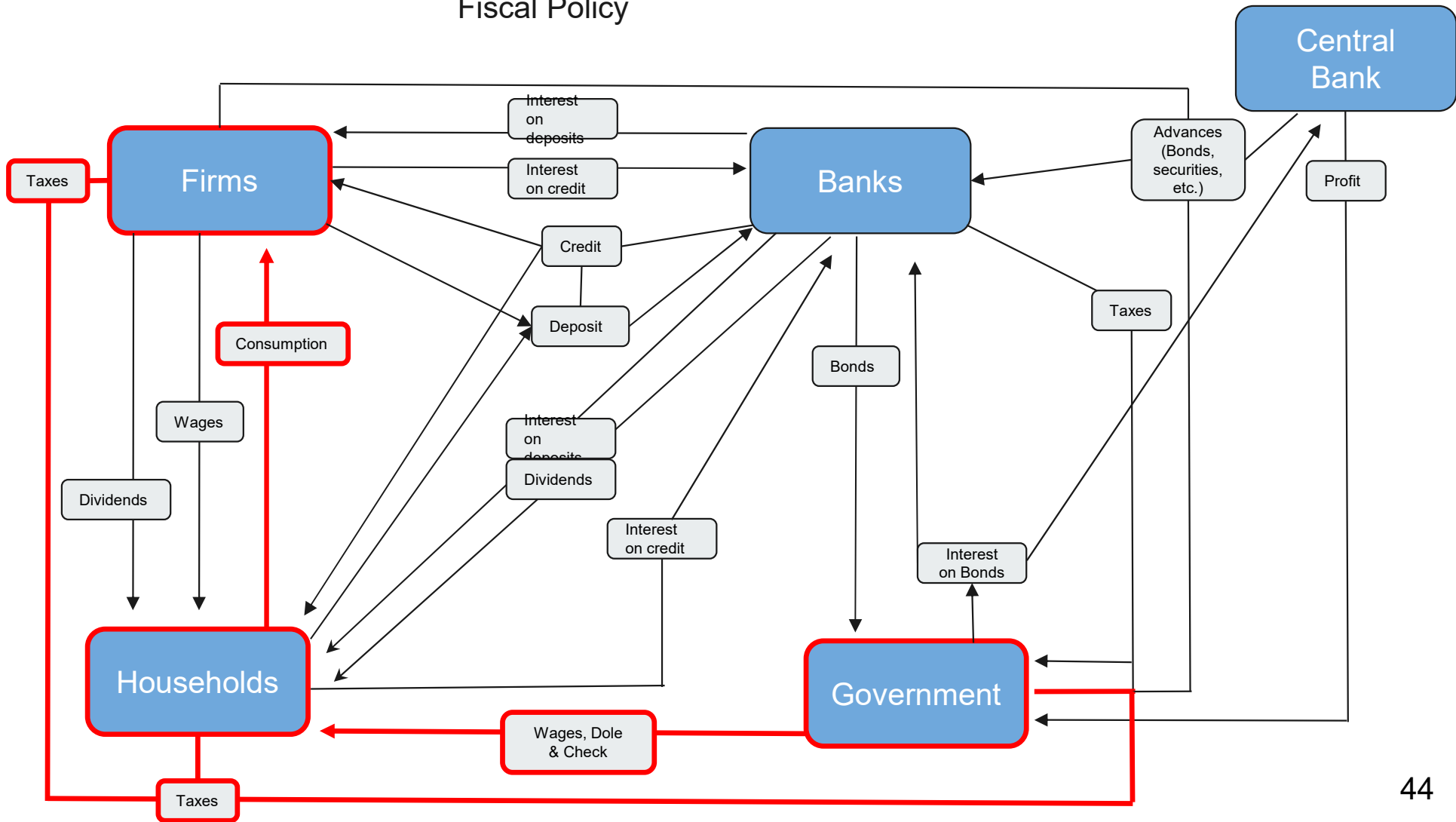
Fiscal Policy



Fiscal Policy



Fiscal Policy





What's to worry about?

- UP of Godley: **money stock, debt (private), asset prices (+housing)**
- Works by the BIS (2002, 2018) and the ECB (2015) use “Early warning indicators” to detect potential vulnerabilities in the financial sector
- **Credit-to-GDP** is found to be one of the high indicators of crises
- Interestingly, Canada scores high in these indicators, even though it has never had major internal crises → making our work harder
- Other measures generally include: **DSR ratios (Debt-to-service ratio)**
- **Housing!** Namely **price** but more specifically **price-to-rent** and **price-to-income**, combines with the high level of debt
- So: how does the **monetary policy** realm impact Canada's peculiar situation?

Bank of Canada concerns

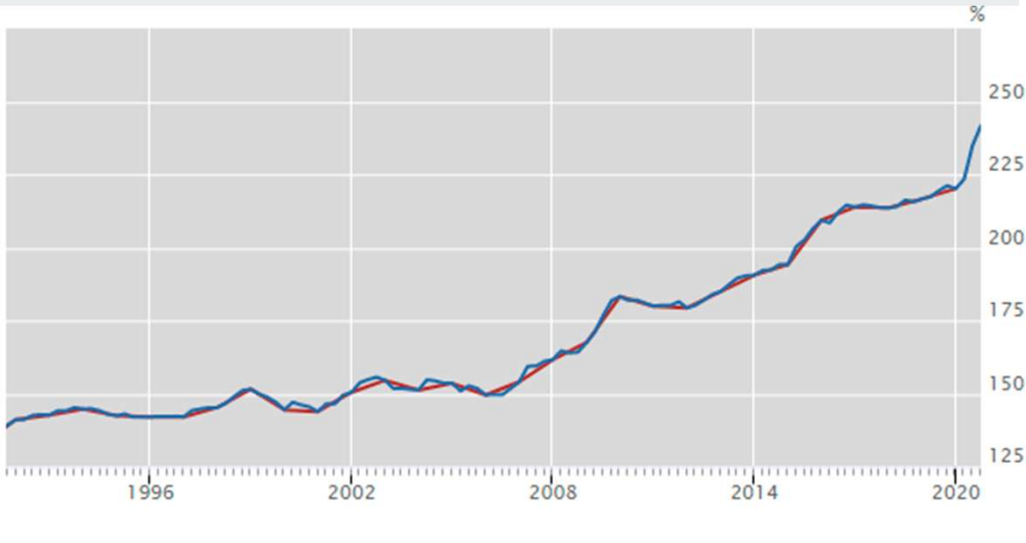
You won't be surprised to hear that we also spent some time discussing what is happening in the **housing market**. The pandemic has led to some unique circumstances. With so many households working and studying at home, we see many people wanting more living space. And **interest rates** have been **unusually low**, making borrowing more affordable. While the resulting house price increases are rooted in fundamentals, we are seeing some signs of **extrapolative expectations** and **speculative behaviour**.

Given elevated levels of **household debt** and the risks that households may overstretch in the face of **rising housing prices**, we welcome the recent proposal by the Superintendent of Financial Institutions to introduce a fixed floor to the minimum qualifying rate for uninsured mortgages. **New measures** just announced in the federal budget will also be helpful. We are watching developments in the housing market very closely, and we will have more to say about this in our **Financial System Review** next month.

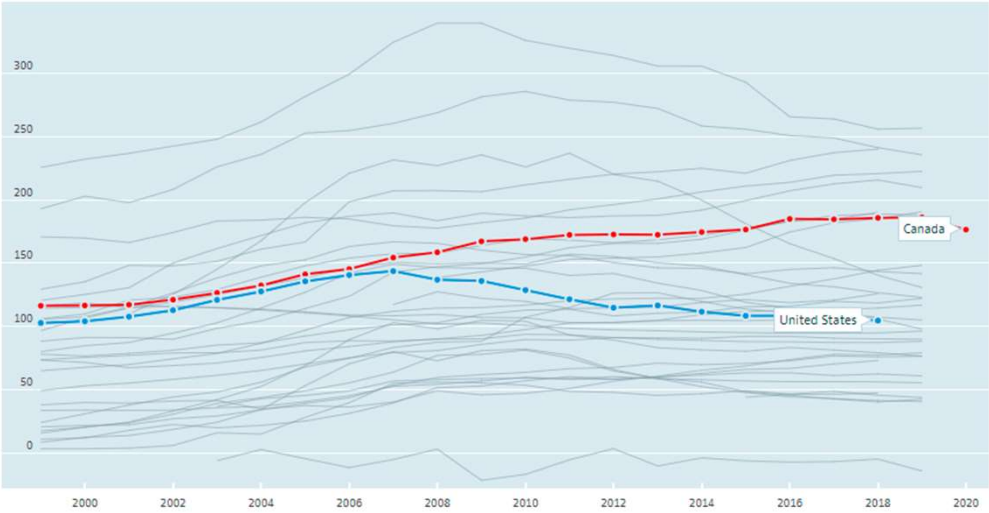
Statement of Tiff Macklem on 21/4/2021 for the new Monetary Policy report



Debt

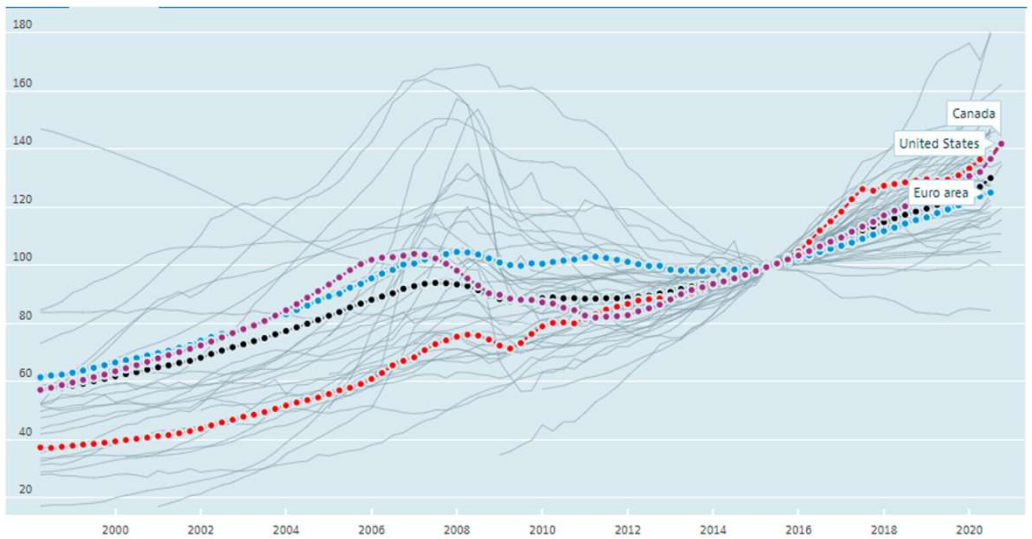


Credit-to-GDP of tot. Private non-fin. sect

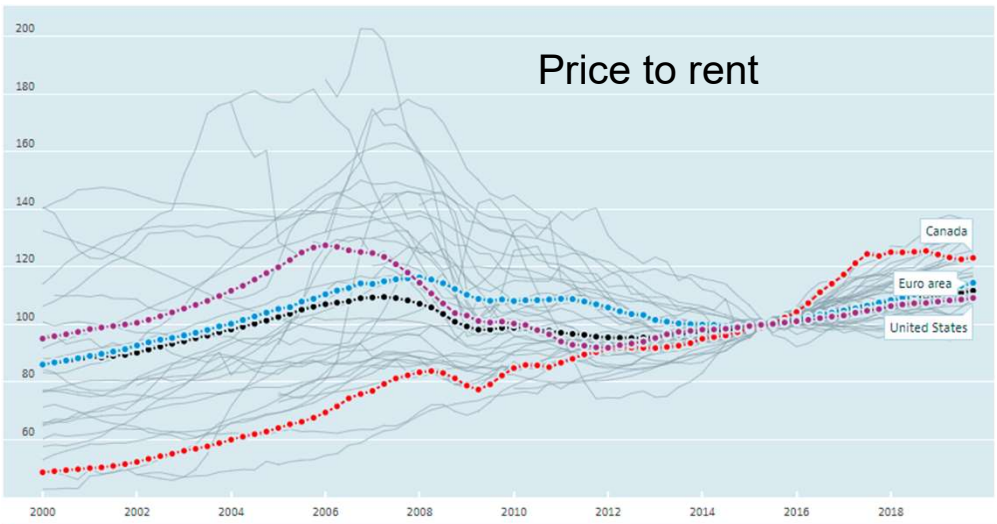


Household debt as % of disposable income

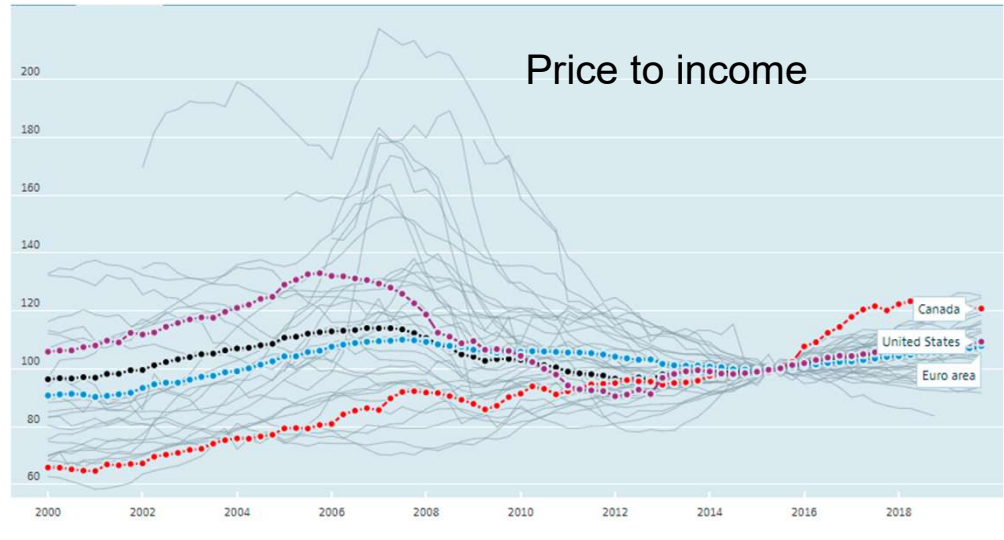
→ Question is: how much is this sustainable? As long as it does not deviate too much from GDP?!



Nominal house prices



Price to rent

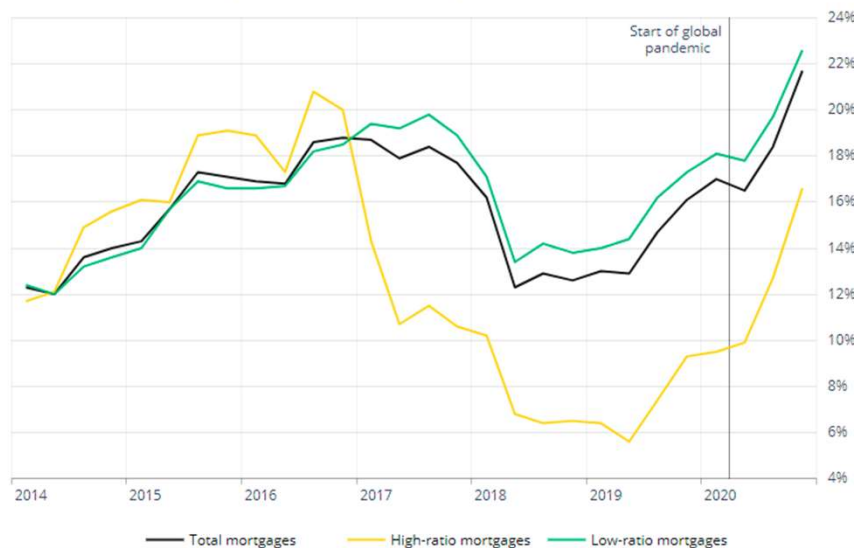


Price to income

And some more (recent) analysis...



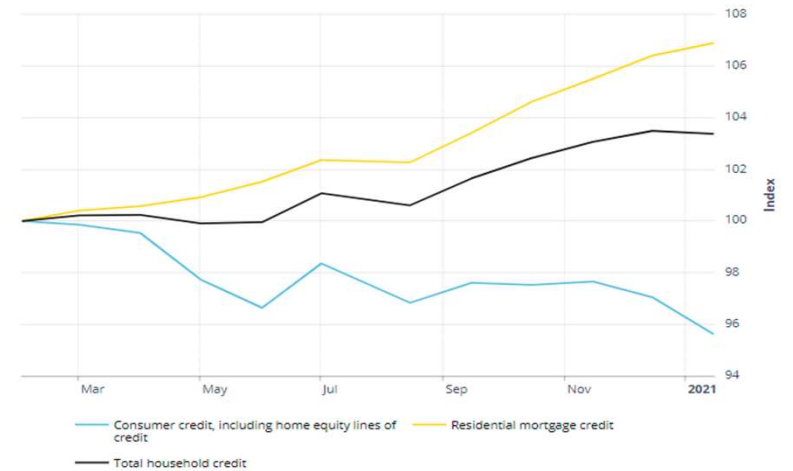
Chart 10: The proportion of new mortgages with high loan-to-income ratios is trending up
Share of new mortgages with a loan-to-income ratio greater than 450 percent, quarterly data



Households are accumulating more debt

Since the onset of the pandemic, the outstanding stock of household debt has risen by close to 3½ percent. This reflects an increase in mortgage debt (Chart 8), despite a pause in the first half of 2020.²

Chart 8: Growing mortgage credit is leading to a rise in total household debt
Aggregate balances by type of household credit, index: February 2020 = 100, monthly data



Bank of Canada april 2021 - update on housing and debt

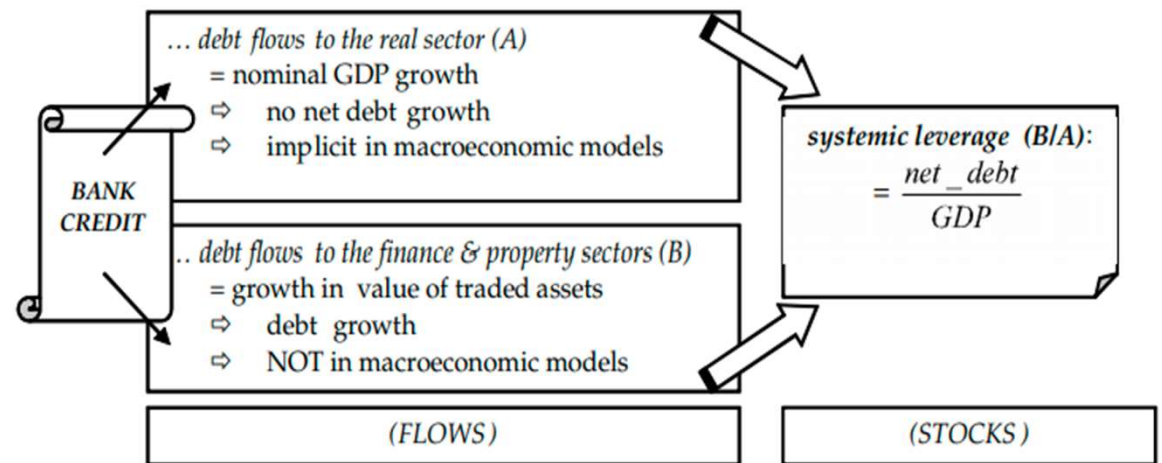
Searching unsustainability

- How much is too much credit and debt?
- Debt too high à la Godley
- Debt trap
- Housing and/or asset price bubbles
- More vulnerable parts of society impacted by sudden changes (e.g. of interest rates)

How do we model this?

- No data on previous crises + every crisis is different
- SFC models (Godley, Zezza)
- Scenario testing of several problems
- Issue: “shadow banking”


Figure 1: Credit, Debt and Systemic Leverage





Financial tsunami

- Started thinking about it relatively late
- Mobility of capital
- Realm of monetary policy - not only domestic but globally!
- What happens if interest rates start picking up, as a result of (maybe) future overheating?



Modelling? An ABM of country?
Network of countries with agents
(investors) who move capital
across?



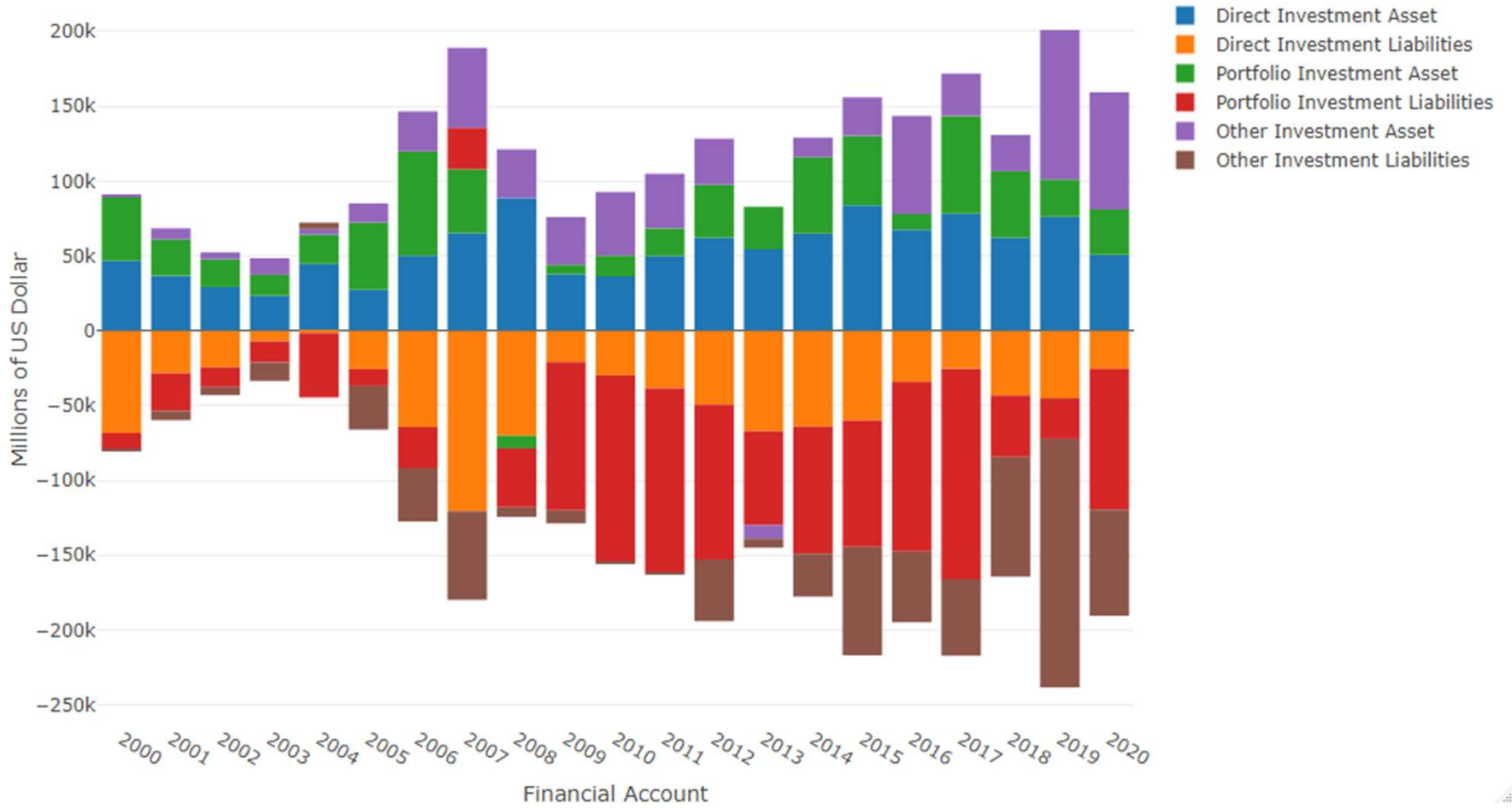
Cross-border flows

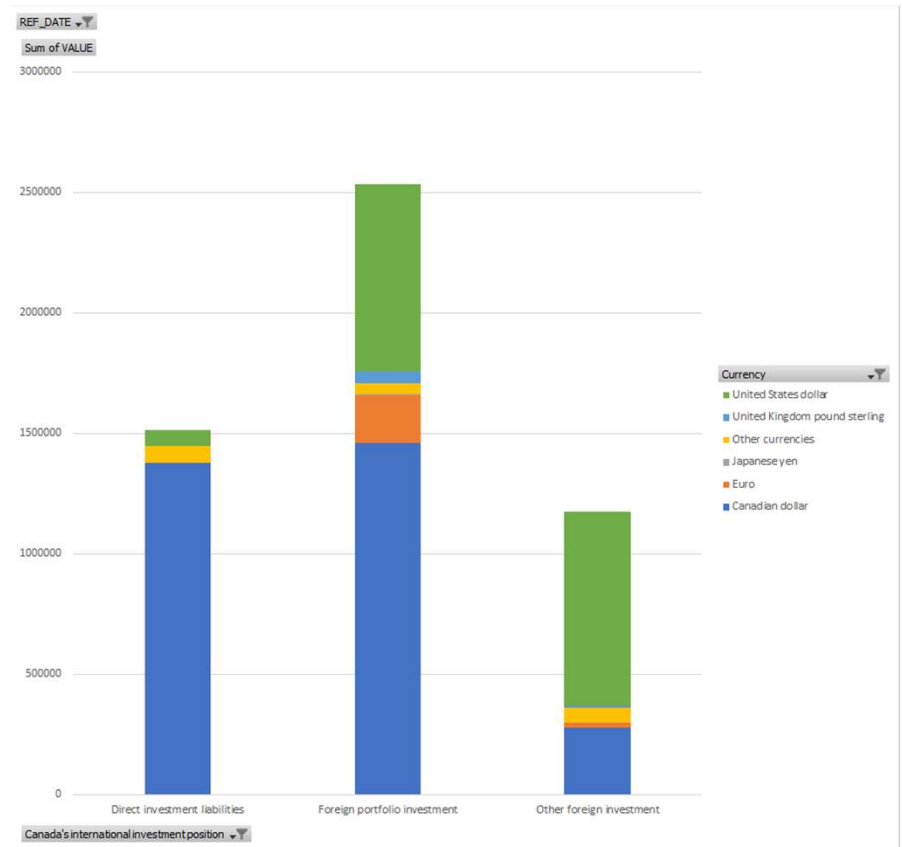
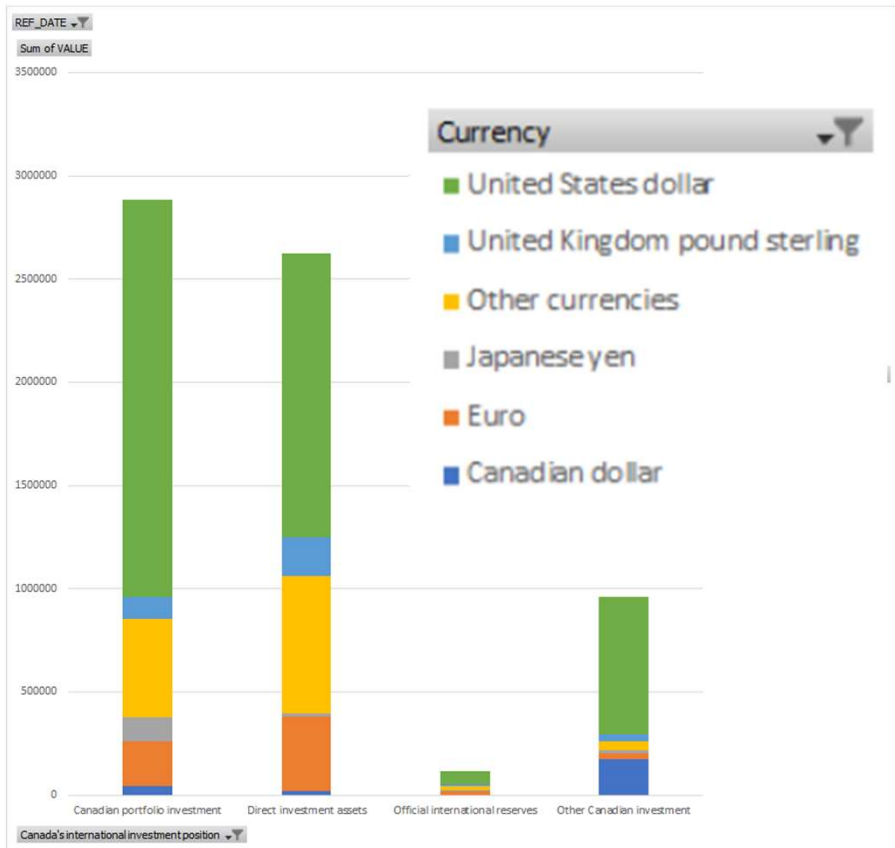
Without capital controls money moves freely in & out of open economies

Would Canadian borrowers struggle to meet their obligations if the **Loonie** (Canadian dollar) **falls**?

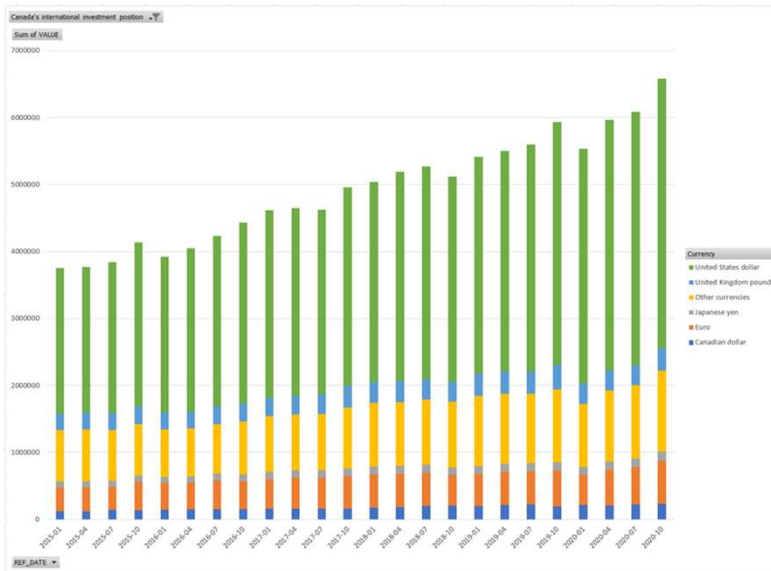
What is the **currency** composition of the **international investment position (IIP)**?

Financial Account

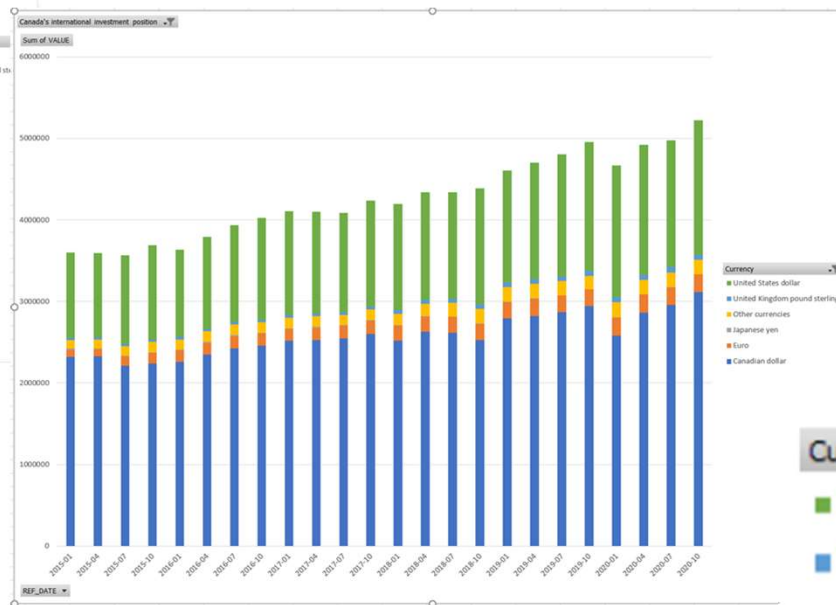




International investment position - A&L, by FX



Asset



Liability



International investment position - A&L, by FX

Part IV - Conclusions

- Preliminary conclusions
- Next steps



Preliminary conclusions

- Collected economic data before and during this pandemic
- Analysis data to find Canadian internal and external vulnerabilities
- Point out several unintended consequences of COVID-19 stimulus
- Reviewing related methodology to modeling these problems world
- Listed potential revision of current models to use these post-COVID
- *Financial System Review* to be published in May 2021



Preliminary evidence

Good

- Private surplus
- Positive (net) **direct investment position** (see trade deficit)
- Some mortgage debt used to reduce other household debt?
- (Overestimating cost of financing public debt due to QE?)

Bad

- Twin deficits
 - Current account (trade) deficit
 - Government budget deficit
- Massive house price bubble
- Debt (Federal & Corporate) affordability reliant on interest rates being kept low
- Dependence on commodities
- Excessive quantity of money in circulation

Next steps – research agenda



Aspect of problem	Methodology	Goal	Benchmark model
Sustainability	Sectoral balances 7UP, AB-SFC	Is the Canadian economy on a path to prosperity?	Godley 1999
Asset price inflation	VAR / VEC, Cointegration Analysis, Granger Causality	Establish causal link between stimulus / MP & house, equity, commodity price rises	Hofmann (2001), Hofmann & Lorenz (2006), Goodhart & Hofmann (2008), Wilkins (2004), Abdullah & Lee (2019)
Capital volatility	GARCH, EGARCH	Heightened risk due to international investing	Lee (2009)
Financial tsunami	Network model, quantile regression	As a SOE, does Canada share vulnerabilities with EMEs?	To do

Thank you

Alan, Angus, Matheus, William H,
William W

Questions? Comments?

