

Monetary Policy Transmission Revisited

RBNZ Roundtable

Alex Li

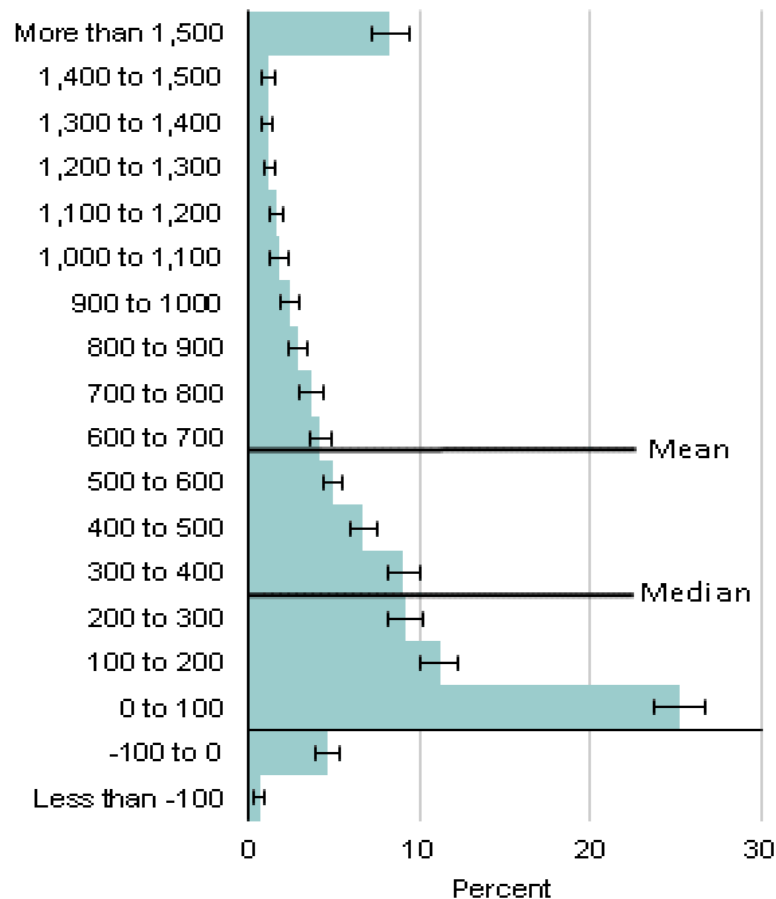
18 November, 2019

Economic Reality

Economic Reality

NZ Wealth Distribution

Source: Statistics New Zealand, Unit: **1000 NZD**, Year: **2015**



Economic Reality

Household Balance Sheet

Differences across groups of agents or regions in **four aspects**:

- **Nominal-term assets/liability**: Short-term Deposits, Long-term Bonds, (Most) Mortgages...

Economic Reality

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Economic Reality

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- **Unearned income**: Government Transfers, Pensions, Social Security, Unemployment benefits, Alimony, and Child Support...

Economic Reality

Household Balance Sheet

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- **Unearned income**: Government Transfers, Pensions, Social Security, Unemployment benefits, Alimony, and Child Support...
- **Wage income**: Salaries, Bonuses, Wages, Commissions, and Tips...

Economic Reality

Fiscal Policy

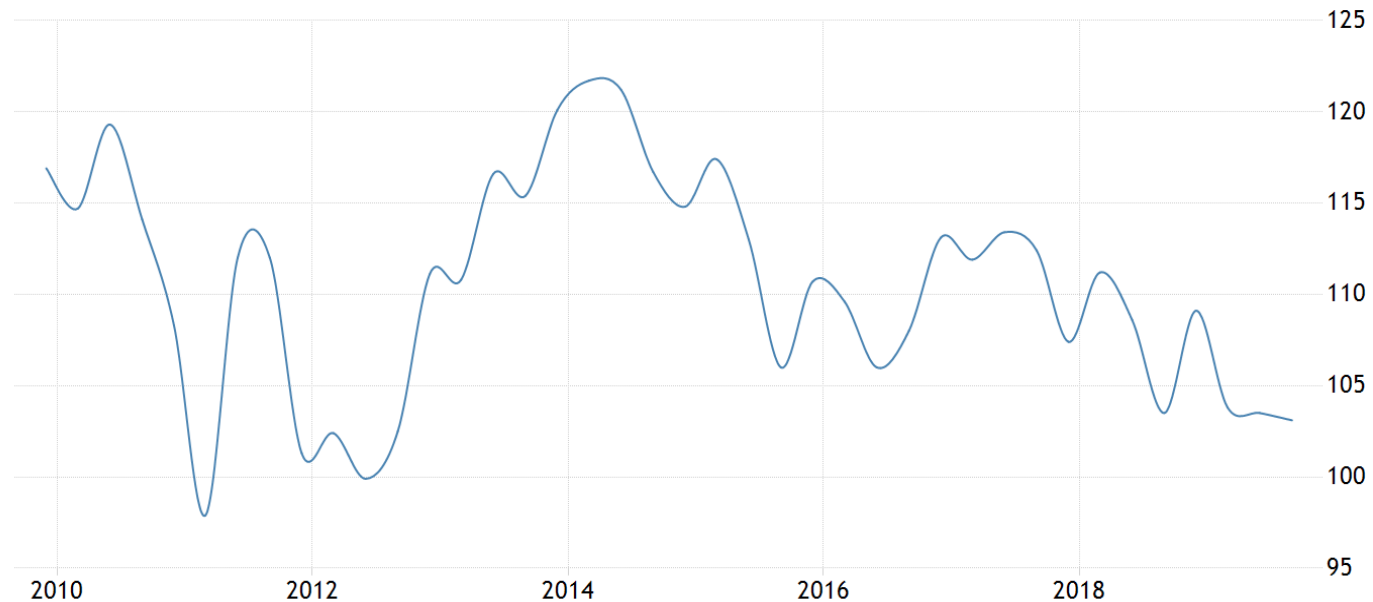
New Zealand counts all public debt owed by **all levels of government** in its national debt figure. (In millions)



Economic Reality

Consumer Confidence Index

Confidence index fluctuates **across time**.



SOURCE: TRADINGECONOMICS.COM | WESTPAC

Economic Reality

New Perspectives

Revisit the monetary transmission mechanism through the lens of Heterogeneous-agent New Keynesian **(HANK)** models.

Economic Reality

New Perspectives

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- **New Keynesian** models with **extensions** on the household side. This is a rich environment where there are differences across the agents.

Economic Reality

New Perspectives

Revisit the monetary transmission mechanism through the lens of Heterogeneous-agent New Keynesian **(HANK)** models.

- **New Keynesian** models with **extensions** on the household side. This is a rich environment where there are differences across the agents.
- This type of models can incorporate the **previously-mentioned economic reality**

Economic Reality

New Perspectives

Revisit the monetary transmission mechanism through the lens of Heterogeneous-agent New Keynesian **(HANK)** models.

- **New Keynesian** models with **extensions** on the household side. This is a rich environment where there are differences across the agents.
- This type of models can incorporate the **previously-mentioned economic reality**
- It provides a more comprehensive framework for **policy analysis and help inform forecasts**.

Economic Reality

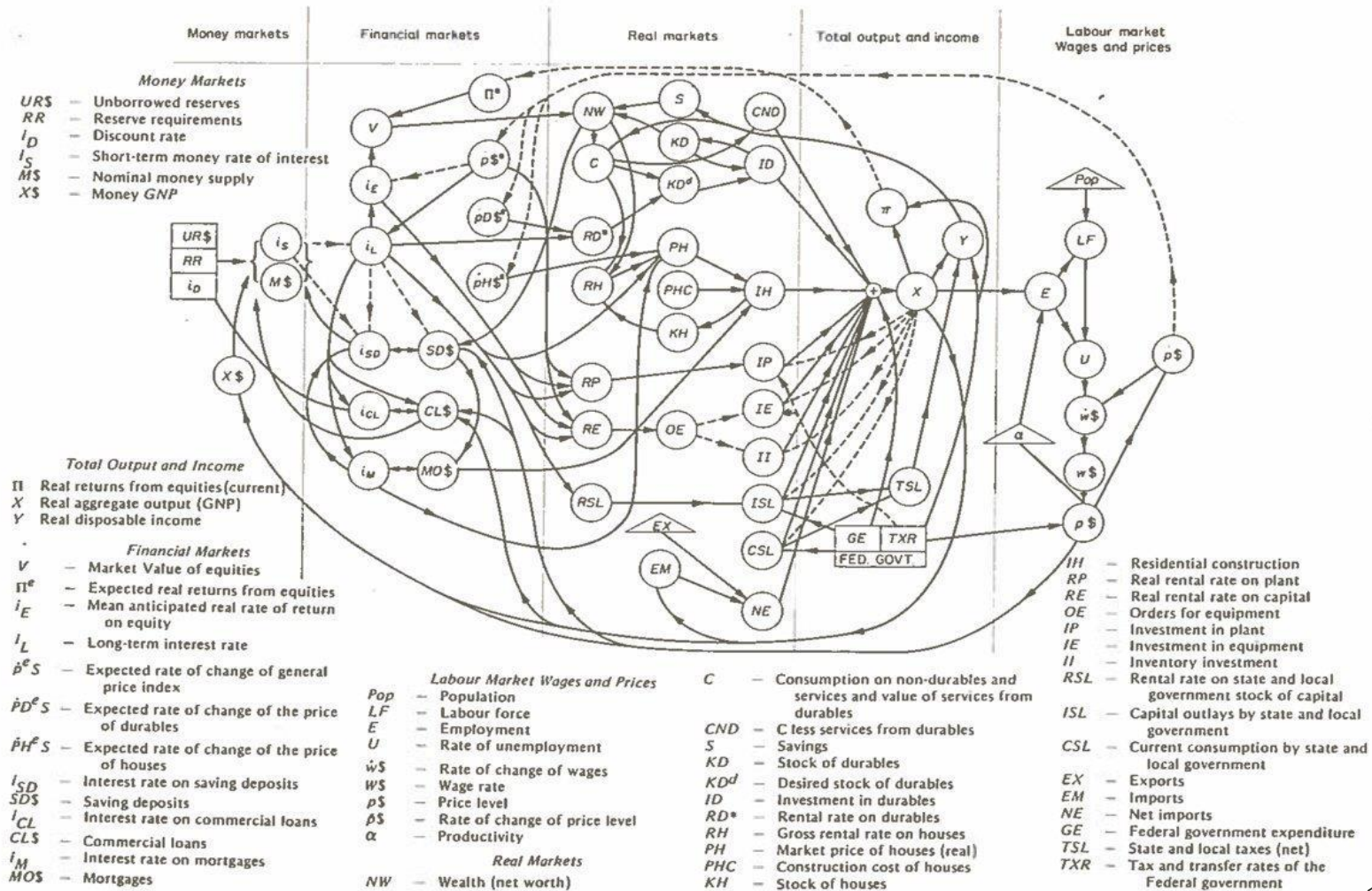
My Research

- **My research** explores the implication of **bounded rationality** based on a HANK model. Households do not know how exactly the economy works.
- The key difference is in the aspect of **expectation formation**.
 - If the agents have **adaptive expectations**: Agent-based Computational economics (ACE)
 - If the agents have **rational expectations**: Dynamic Stochastic General Equilibrium (DSGE)

Transmission Mechanism Review

Transmission Mechanism Review

Overview



Transmission Mechanism Review

Overview

- Transmission mechanism from **monetary policy** to **household consumption**.
- Different **Channels** for the transmission.
- **Representative** agents stories.
- **Heterogeneous** agents stories.
- **Bounded Rationality** Expectations.

Transmission Mechanism Review

Direct v.s Indirect Effects

Transmission Mechanism Review

Direct v.s Indirect Effects

Direct Effects:

- Effects that operate **without** change in household disposable **income**.
- **Intertemporal Substitution Effect**
- **Asset Revaluation Effect**

Transmission Mechanism Review

Direct v.s Indirect Effects

Direct Effects:

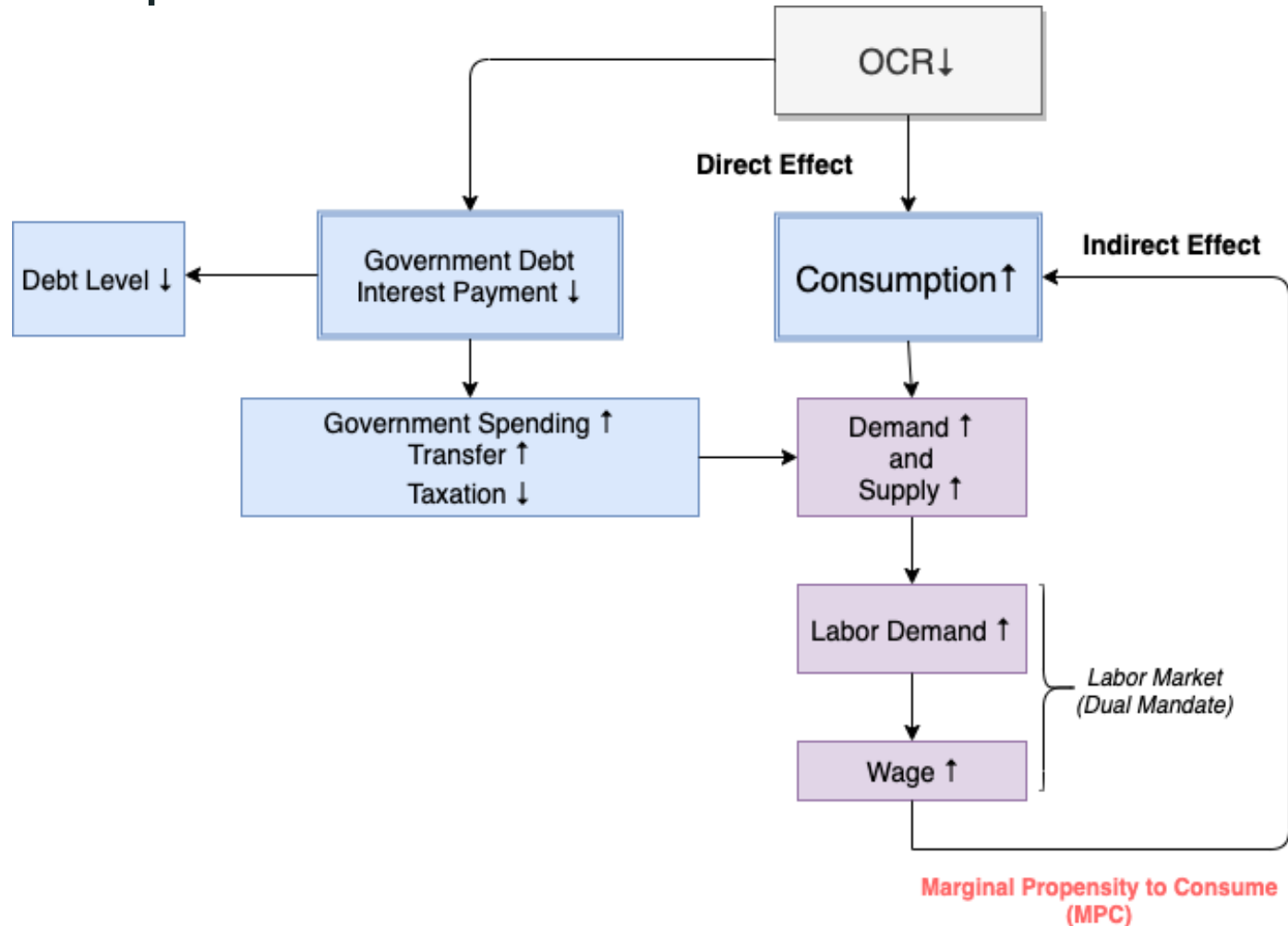
- Effects that operate **without** change in household disposable **income**.
- **Intertemporal Substitution Effect**
- **Asset Revaluation Effect**

Indirect Effects:

- Effects that arise from **changes in household disposable income**.
- **Labor Income, Fiscal Response,**

Transmission Mechanism Review

Consumption Channel



Transmission Mechanism Review

Potential Topics

There are a few potential topics HANK models can address

Transmission Mechanism Review

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- Stimulate the economy: **Small Persistent OCR Cuts** v.s. **Large but Transitory Cuts**

Transmission Mechanism Review

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- **Inflation-activity tradeoff** for the monetary authority depends on the **adjustment rule of fiscal policy**.

Transmission Mechanism Review

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- Stimulate the economy: **Small Persistent OCR Cuts** v.s. **Large but Transitory Cuts**
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- Well-specified structural models can **offer guidance** on **previously-unused** policy instruments.

Transmission Mechanism Review

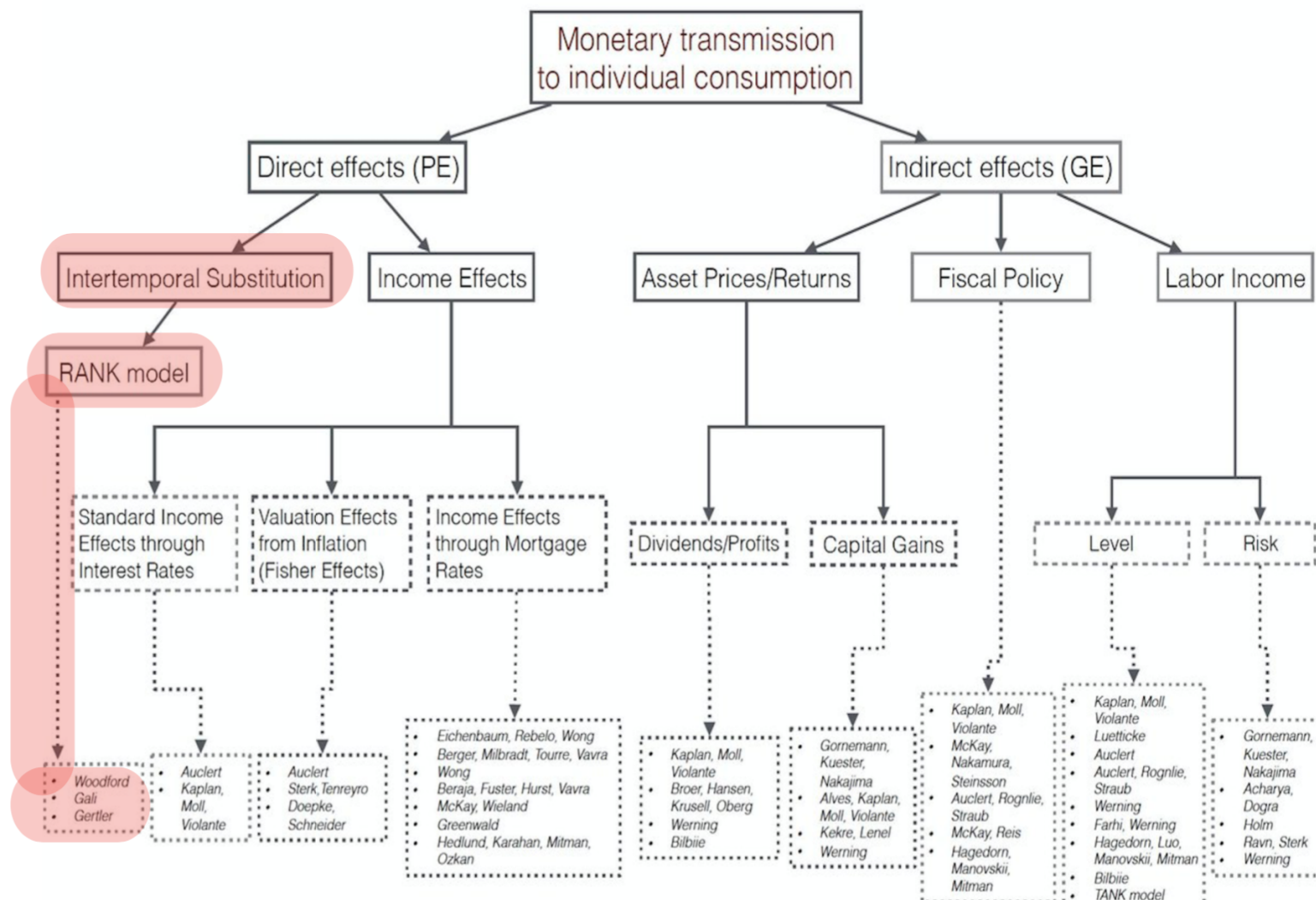
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- Stimulate the economy: **Small Persistent OCR Cuts** v.s. **Large but Transitory Cuts**
- **Inflation-activity tradeoff** for the monetary authority depends on the **adjustment rule of fiscal policy**.
- Well-specified structural models can **offer guidance** on **previously-unused** policy instruments.
- **Dual Mandate** acknowledge the impact monetary policy has on employment and economic activity through the **labor market**.

Transmission Mechanism Review

Literature



Representative Agent

Representative Agent

Definition

A **typical decision-maker** of a certain type (typical consume or firm). These models are **easy to use**.

The assumption is good when:

- All agents of the same type are **identical**.
- Agents' choices are **equivalent to the decision of one individual**.

Representative Agent

Implications for Transmission

- Households are **permanent income consumers**.
 - Consumption **smoothing**. They are **not responsive** to transitory income changes.
 - The representative-agent models implies the **marginal propensity to consume (MPC) is low**.

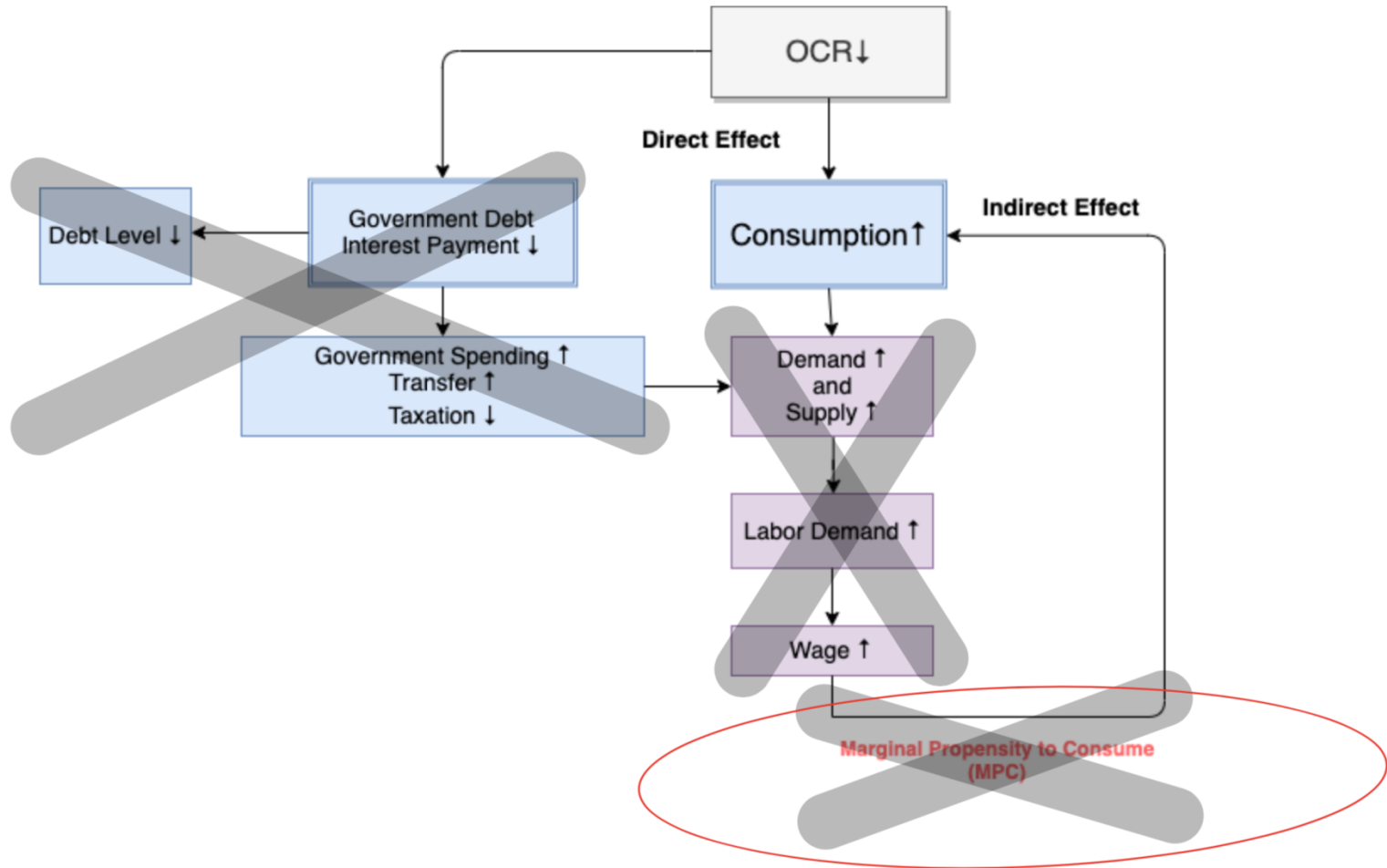
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 - The representative-agent models implies the **marginal propensity to consume (MPC) is low**.
- Monetary transmission mechanism: **the indirect effect is not important**. Households weakly respond to:
 - **Fiscal response**.
 - **Higher labor income**.

Representative Agent

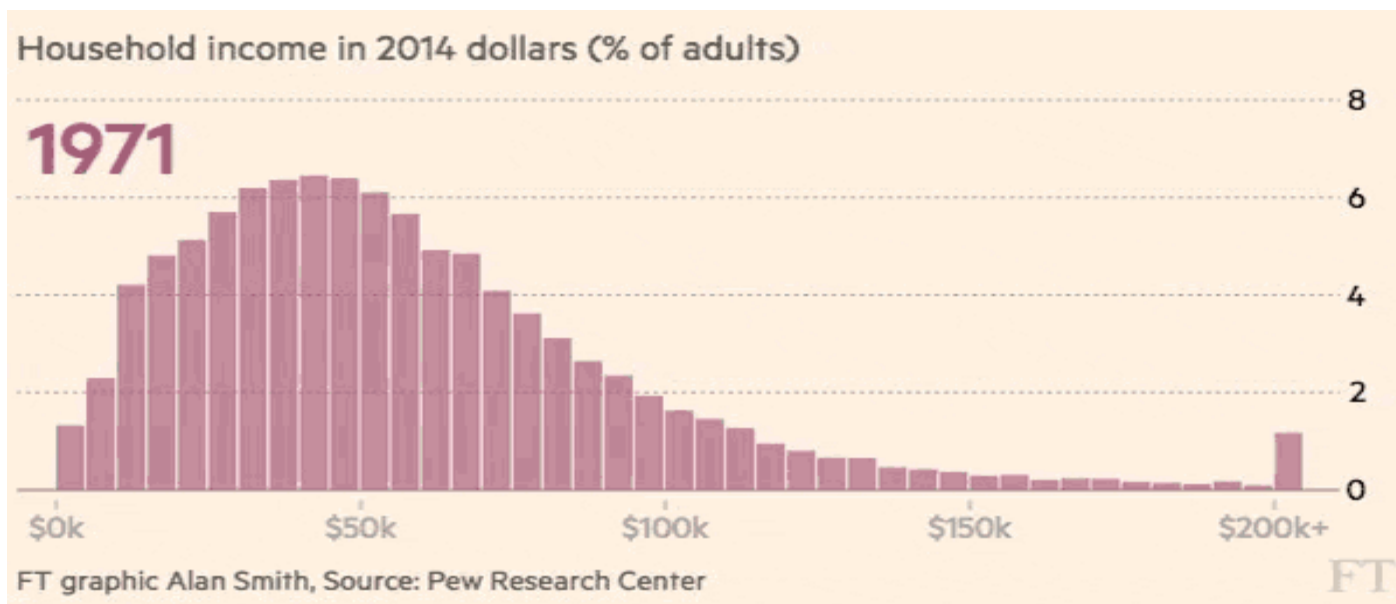
Implications for Transmission



Representative Agent

Comments on TANK

- **Two-Agent New Keynesian (TANK)** models are widely used to account for the hand-to-mouth households.
- However, the distribution of wealth/income is **exogenously imposed** by the modeler.



Heterogeneous Agent

Heterogeneous Agent

Definition

Heterogeneous models contain **different economic agents**, which can be modeled in terms of

- **Idiosyncratic productivity** shocks: Wealth Distribution, Labor Income Distribution
- **Asset Portfolio**: Nominal/Real Assets, Long/Short-term Assets
- **Other ways to model heterogeneity...**

HANK models usually assume **incomplete markets** and **binding borrowing constraint**

Heterogeneous Agent

Implications for Transmission

Direct effects are not prominent:

- Generate a sizable fraction of (poor and wealthy) **hand-to-mouth households** as in data.
 - These households are not responsive to interest rate cuts.

Heterogeneous Agent

Implications for Transmission

Direct effects are not prominent:

- Generate a sizable fraction of (poor and wealthy) **hand-to-mouth households** as in data.
 - These households are not responsive to interest rate cuts.
- Households are **no longer permanent-income** consumers.
 - Interest rate cuts lead to strong offsetting income effects on consumption.

Heterogeneous Agent

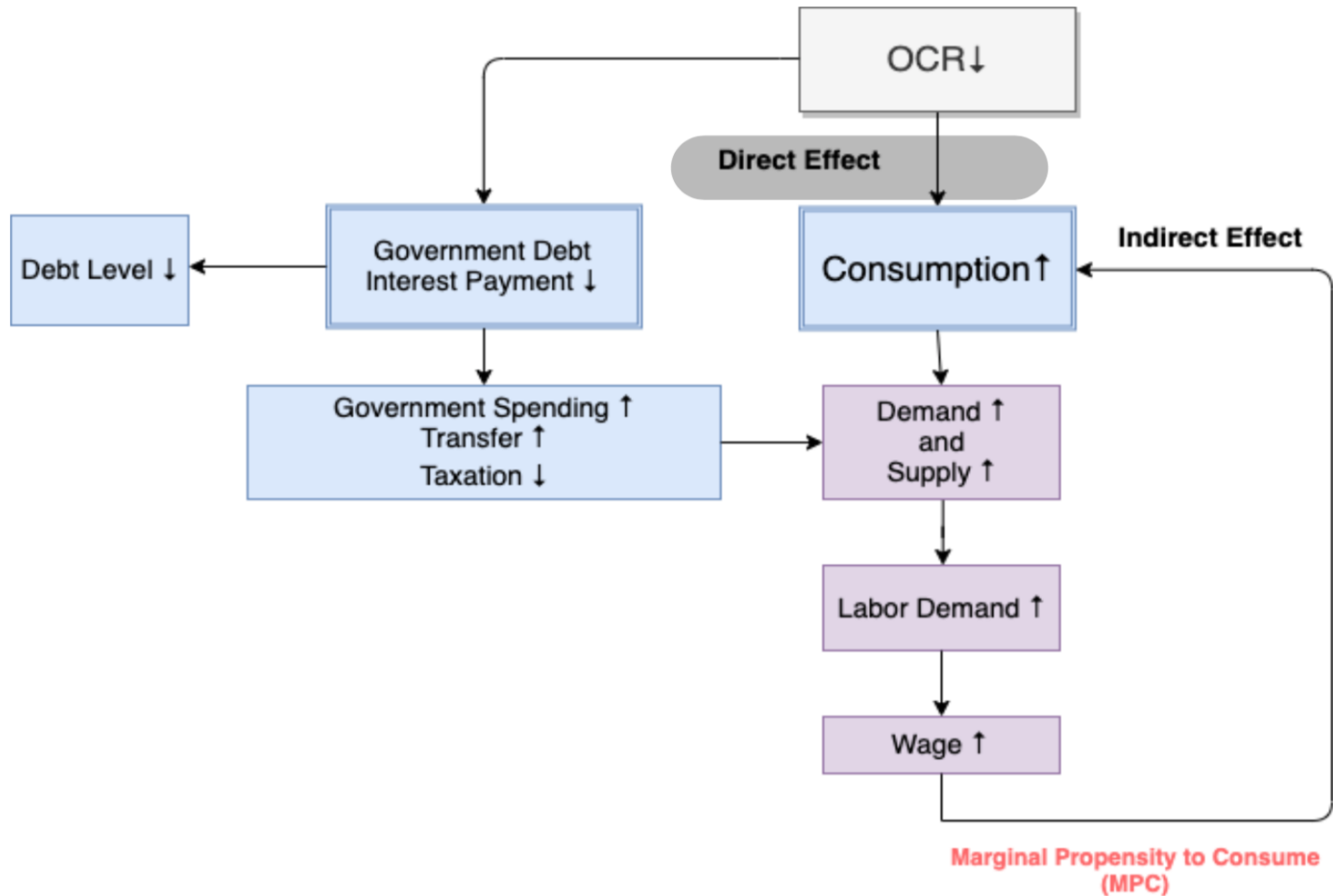
Implications for Transmission

Indirect effects are prominent:

- Monetary policy is effective only to the extent that it generates a **general equilibrium response** in household disposable income.
 - Higher **Labor Income**;
 - Higher **Government Net Transfers**;
 - Higher **Dividends**;
 - ...

Heterogeneous Agent

Implications for Transmission



Heterogeneous Agent

Overall Response

- The **overall response** of aggregate consumption to a cut in interest rates may be **larger or smaller** than in RANK models, depending on the **fiscal reaction to the monetary expansion**.
 - Higher **Government Spending**
 - Higher **Transfer**
 - Lower **Taxation**
 - Lower **Government debt**

Heterogeneous Agent

Policy Takeaway for RBNZ

Kaplan, Moll, and Violante (2018). **Fiscal reaction** to monetary expansion matters to the overall response of aggregate consumption. A combination of the following four can happen:

Heterogeneous Agent

Policy Takeaway for RBNZ

Kaplan, Moll, and Violante (2018). **Fiscal reaction** to monetary expansion matters to the overall response of aggregate consumption. A combination of the following four can happen:

- Study the Fiscal-Monetary Interactions in New Zealand
 - If the fiscal policy responds through changes in government debt, **a rate cut is less potent.**
 - if the fiscal policy responds through changes in government spending, debt, transfers, taxation, **a rate cut is more potent.**

Heterogeneous Agent

Policy Takeaway for RBNZ

Monetary policy designs to improve the potency of monetary effects?

Kaplan, Moll, and Violante (2018)

A **transitory large** change in interest is **more potent** than a **persistent small** change, **given the accumulative changes are the same.**

Heterogeneous Agent

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- When shocks are persistent and small, a large portion of the interest rate cut, and the associated relaxation of the government budget constraint and increase of labor income, **happen in the future.**

Heterogeneous Agent

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- When shocks are persistent and small, a large portion of the interest rate cut, and the associated relaxation of the government budget constraint and increase of labor income, **happen in the future.**
- Hand-to-mouth households **do not respond** much to future changes.

Heterogeneous Agent

Policy Takeaway for RBNZ

Auclert (2019) offers a decomposition method for the monetary transmission mechanism. A monetary shock triggers the following things to change. Each household has **different exposures** to each of the following change

Heterogeneous Agent

Policy Takeaway for RBNZ

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- **Nominal prices** rise.
- **Real discount rates** rise.
- **Unearned and earned income** rise.

Heterogeneous Agent

Policy Takeaway for RBNZ

- Joint consumption, income and asset **data**.
- A better empirical understanding of **household balance sheet**.
- Better understanding the **winners and losers** from interest rate changes.

Bounded Rationality

Bounded Rationality

Rational Expectations

Heterogeneous-agent models are solved under **rational expectations**. They make the following strong assumptions. Agents know:

- **Structure of the economy.**
- **Current distribution** of wealth, labor productivity, and other individual states.
- **How distribution evolves** across time and affects the interest rate and wage.

Bounded Rationality

Concept

HANK with Local Rationality by Li (2019)

- **Local rationality** is a novel bounded rationality concept developed by Evans, Li, and McGough (2019)
- Agents are locally rational in the sense that they make **optimal decisions without any OCR changes**.
- Agents learn from their past experience to respond to **OCR changes**.

Bounded Rationality

Model

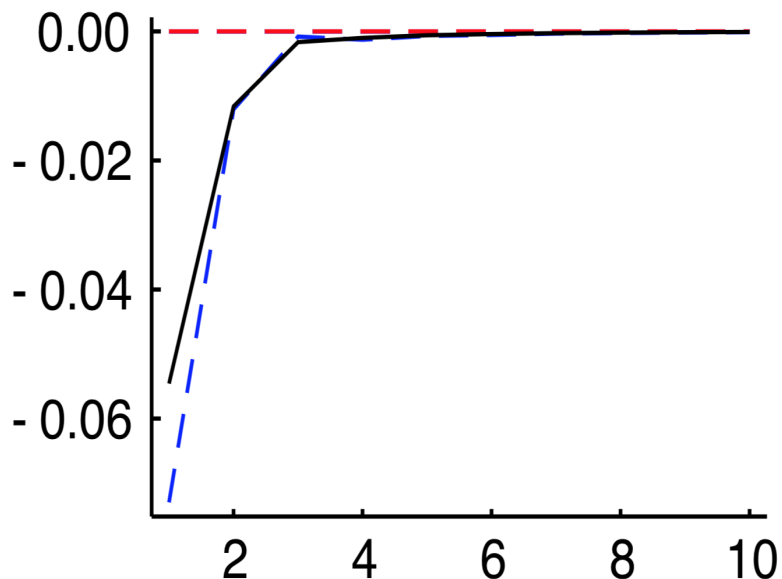
- To accommodate **aggregate shocks**, agents **estimate econometric models to forecast future states** and make choices which are optimal up to their forecasts.
- Both **households and firms** need to make forecasts about the future to make decisions about today.
 - **Households** decision on consumption: Marginal utilities from consumption
 - **Firms** decision on price: Inflation

Bounded Rationality

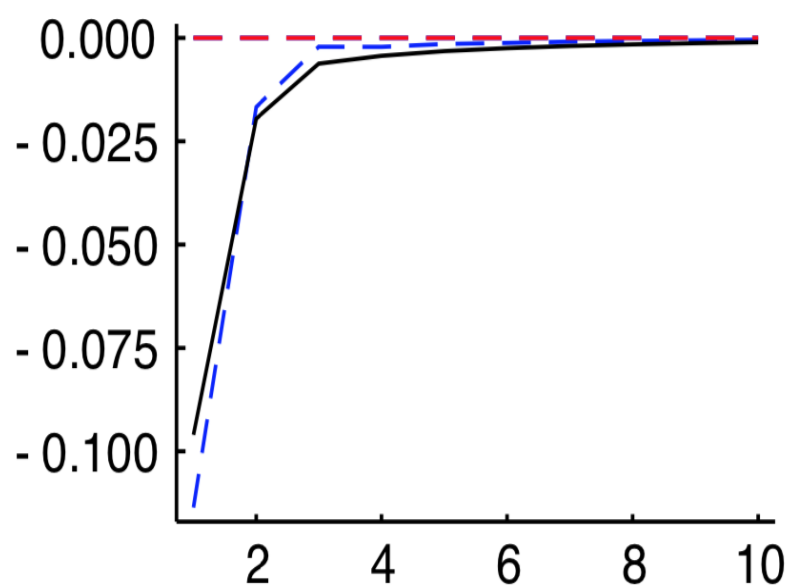
Impulse Response Functions

Monetary Policy: 25 basis points increase

Consumption



Inflation

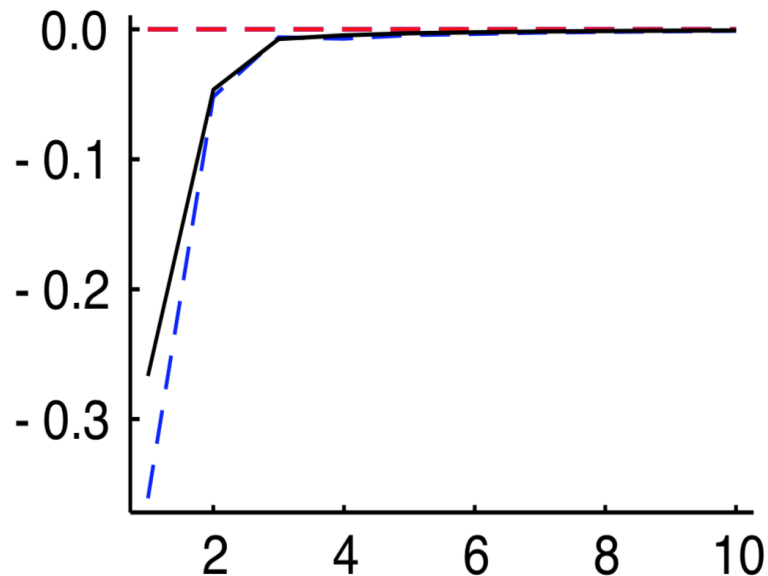


Bounded Rationality

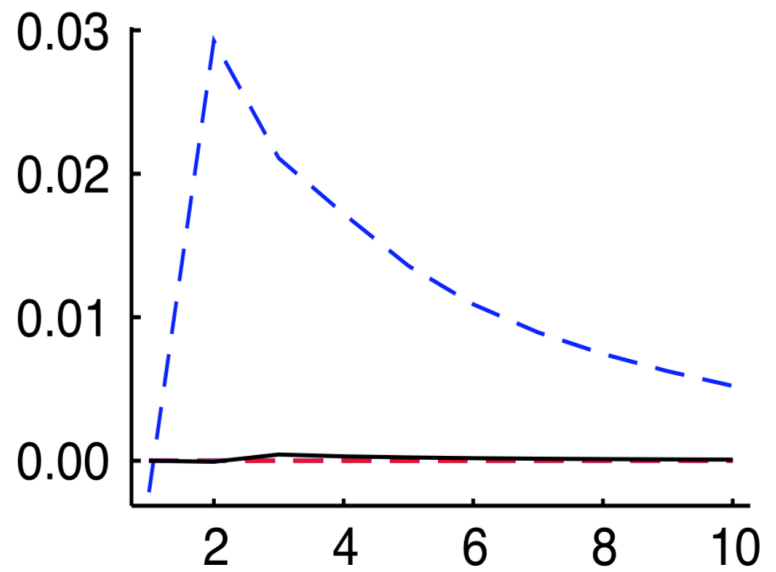
Impulse Response Functions

Monetary Policy: 25 basis points increase

Wage



Gini Index (Inequality)



Bounded Rationality

Policy Implication

- Expectation adjustments **across households**. Consider a simple setting:
 - **Asset-poor households** are more sensitive to the labor income change. Higher expectation adjustment
 - **Asset-wealthy households** are more sensitive to interest rate change.

Thank You!