

Monetary Policy in the Zero Lower Bound

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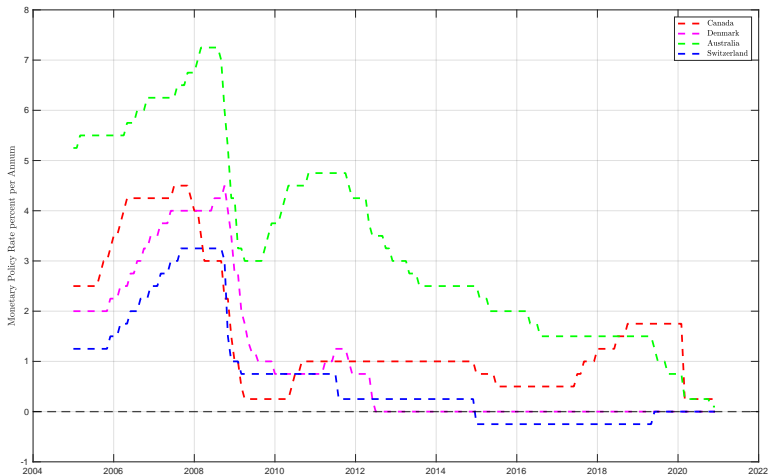
Outline

- Motivation: nominal interest rates declining towards zero lower bound (ZLB) around the world.
- Implications of ZLB for policy and modeling.
 - Conventional monetary policy ceases to be an effective tool for stimulating the economy.
 - Fiscal policy is potentially very potent, but many countries have little 'fiscal space', given expenditures undertaken to deal with Covid.
- Sterilized exchange rate intervention:
 - A possible way that monetary policy could be effective after all in the ZLB.
 - The mechanism.
 - Potential costs and benefits of sterilized intervention.

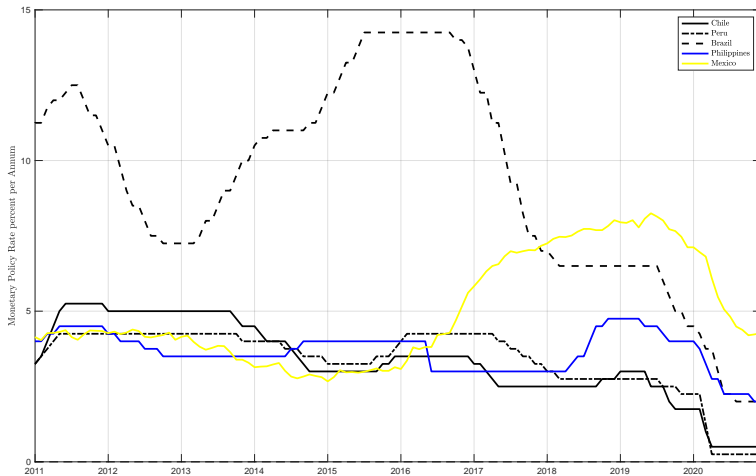
Background

- Nominal interest rates low all over the world.

Advanced Economies



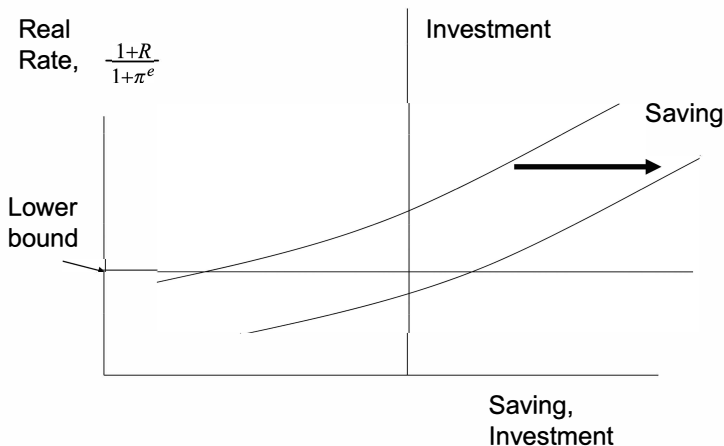
Some Emerging Markets



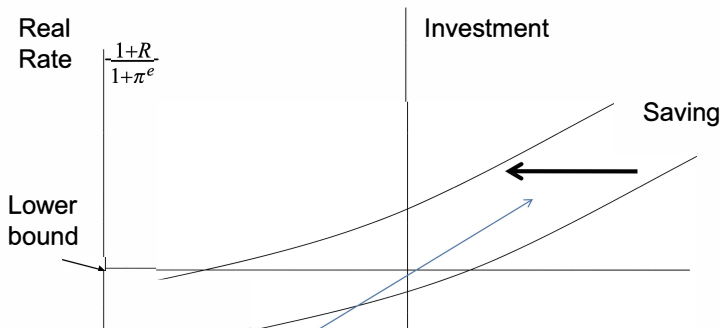
Problem for Monetary Policy

- The nominal interest rate cannot go far below zero.
 - If $R = -5\%$, borrow 1\$ today and only pay 95 cents back later, 5 cents pure profit for borrowers.
 - Infinite demand for loans and zero supply.
 - Interest rates could be a little negative if there were storage/security costs.
- Monetary Policy Pretty Much Helpless.
 - If there were a negative shock to aggregate demand, might get large, inefficient drop in output.
 - Normally a drop in the interest rate (facilitated by central bank) could prevent the drop.
 - This scenario is easy to see in the simple New Keynesian model Eichenbaum discussed.
 - Even simpler to see in an even simpler diagram
 - The diagram motivates why models are needed.

Problem for Monetary Policy in Model Without Capital



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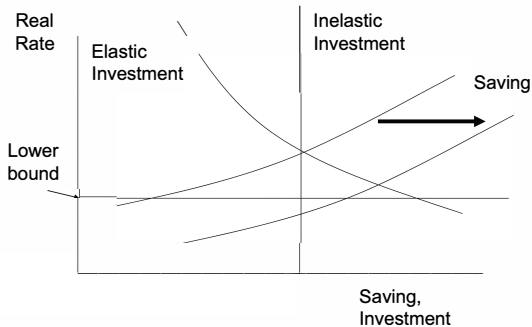


- Push back in saving could be accomplished
 - indirectly, by (possibly big) fall in output
 - directly, by rise in G

Problem for Monetary Policy

- The zero lower bound scenario illustrates the need to build models.
- Likelihood that the lower bound is an issue depends on elasticity of investment to (real) interest rates.

Problem for Monetary Policy in Model With Capital

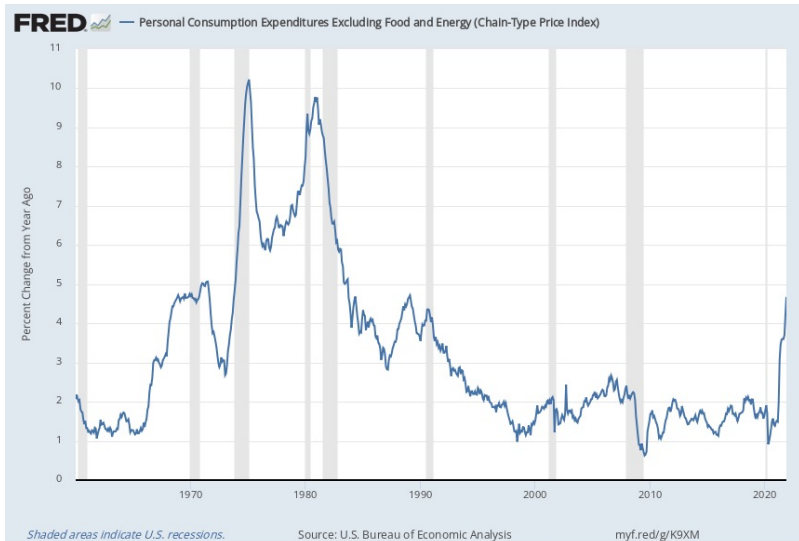


Note: see Christiano-Eichenbaum-Rebelo, 'When is the Government Spending Multiplier Large?', [JPE 2011](#).

Zero Lower Bound and the Need for Models

- Multiplier on government spending higher in the zero lower bound.
 - How much higher? That depends on the government spending multiplier when the interest rate is stuck.
 - That depends on duration of ZLB, government spending, and so on...
 - Two bills in 2020 worth \$3 trillion.
 - American Rescue Plan, for \$1.9 trillion in 2021.
- If the increase in government spending is too large, could lead to higher prices which in turn could trigger 1970s-style wage-price inflation cycle.
 - Huge literature modeling this in the 1980s and 1990s.
 - Recent rise in inflation has made people nervous...

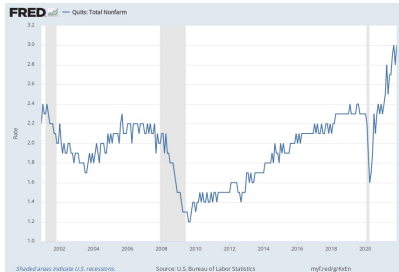
Recent Worrying Rise in Inflation



The Role of Models

- The recent rise in inflation:
 - Is it simply the US economy's tires squealing as it takes off? (Paraphrased from Krugman).
 - Does it have to do with temporary supply chain bottlenecks?
 - Is it a negative shock to labor supply ('the Great Resignation')?
 - Quit rates are historically high.
 - Need labor economics and family economics.
- All these considerations are too much to contemplate simultaneously via intuition alone.
 - Specialists in supply chains are teaming up with labor market specialists, etc., and building models.
 - One example, Christiano, Eichenbaum and Trabandt, *Understanding the Great Recession*.

The Great Resignation



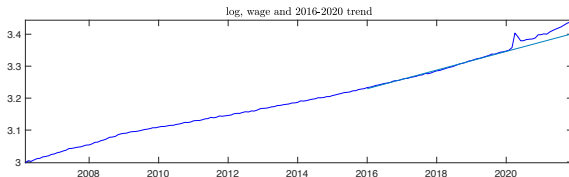
(a) Quit Rate



(b) Openings, rate

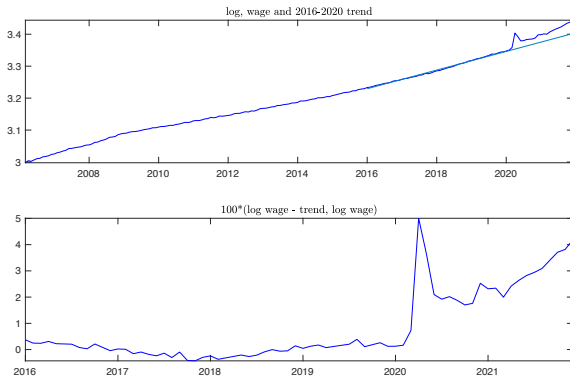
Note: JOLTS data. “Quits” ~ voluntary separations initiated by the employee during a month; “Job Openings” ~ all positions that are open on the last business day of the month; “Rate” ~ number of quits/job openings as a percent of that month’s total relevant employment. See [this](#).

Demand for Labor High, Supply Low: Wages Rising



Note: Average Hourly Earnings of All Employees, Total Private. Source: FRED

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The ZLB Likely to Put Many Countries in a Quandary in Near Future

- When the interest rate is low and you want to stimulate the economy, monetary policy not very effective.
- Fiscal policy is potentially very effective, but most countries have exhausted their 'fiscal space'.
- This raises an age-old question in monetary policy:
 - Does the monetary authority have another tool available when the interest rate is stuck at the ZLB?
- Some are arguing that the answer is 'yes':
 - Resuscitating old (pre-1970s) idea that one can (somewhat) independently control R (domestic interest rate) and S (domestic price of a unit of foreign currency).
 - International Monetary Fund's 'Integrated Policy Framework' is cautiously studying it.
 - This is currently an intense area of research at the IMF, in academia and central banks around the world (see [this](#) for references).

The Conventional Idea that the Central Bank Has Only One Tool

- This idea is wrapped up with the hypothesis of Uncovered Interest Parity (UIP).
- Idea that Central Bank has two tools is (cautiously) entertained as a consequence of the empirical failure of UIP.

The Conventional Idea that the Central Bank Has Only One Tool

- UIP derived under assumption of free capital mobility and (approximately risk neutral) international currency traders.
 - Domestic, R_t , and foreign, R_t^* , net nominal rates of interest.
 - Approximately,

$$R_t = \overbrace{R_t^* + E_t \log S_{t+1} - \log S_t}^{\text{return on foreign asset, expressed in domestic currency units}}. \text{(UIP)}$$

- For a small open economy, R_t^* is exogenous.
- Assuming UIP holds means that government cannot independently move $\{R_t\}$ and $\{S_t\}$.
 - A change in R_t automatically translates into a change in S_t by the operation of international financial markets.
 - In conventional view, the only way a central bank can affect S_t is by what it does with R_t .
 - UIP is like a set of handcuffs on government policy.

But, the UIP Fails Miserably

- According to UIP (plus rational expectations),

$$\log S_{t+1} - \log S_t = \alpha + \beta (R_t - R_t^*) + \varepsilon_t, \text{ where } \varepsilon_t \perp (R_t - R_t^*).$$

- UIP implies OLS estimates of α, β should be $\alpha = 0, \beta = 1$.
 - But, in quarterly or monthly data get $\hat{\beta} \cong -0.8$.
- Through eyes of UIP the empirical results are hugely puzzling...recall:

return on foreign asset, expressed in domestic currency units

$$R_t = \overbrace{R_t^* + E_t \log S_{t+1} - \log S_t} \quad .(\text{UIP})$$

- So, regressions suggest that if central bank raises R_t then $E_t \log S_{t+1} - \log S_t$ *falls*, wildly violating UIP.
 - Something terribly wrong with UIP hypothesis.

Interpretation of Failure of UIP

- Empirical results suggest that

$$R_t = R_t^* + E_t \log S_{t+1} - \log S_t + \Lambda_t, (\text{MUIP})$$

- where Λ_t is some unobserved variable, called the *foreign exchange risk premium*.
- Maybe Λ_t is something that has to do with private sector perceptions of risk (when central bank increases R_t then it risks creating a recession and traders require a premium to hold domestic assets, $\Lambda_t \uparrow$).
 - But, problem is that $\hat{\beta} < 0$ even when R_t and R_t^* are returns on risk free government debt.
- Alternative interpretation is that there is a *portfolio balance effect*:
 - Λ_t is a variable that the central bank can control, for example:
$$\Lambda_t = f(\text{domestic government debt in hands of public}), f' > 0$$
 - When public holds a lot of government debt, require R_t high compared to (exchange rate adjusted) foreign rate.

Sterilized Intervention

- Suppose an emerging market economy (EME) does a sterilized purchase of dollar assets:
 - Enters the exchange rate market to buy dollars, presumably depreciating the exchange rate, so that S_t rises.
 - Domestic money in hands of the public, M , greater.
 - CB sterilizes the impact of the operation on M by selling domestic government bonds.
 - Domestic government bonds in hands of public is higher.
 - Liabilities of central bank unaffected, composition of assets had shifted towards dollar assets.
- Effect of sterilized purchase of dollar assets
 - Λ_t rises because there are more domestic bonds in the hands of the public and (maybe) S_t rises (depreciates).

$$R_t = R_t^* + E_t \log S_{t+1} - \log S_t + \Lambda_t, \text{ (MUIP)}$$

- If currency depreciates, that might stimulate the economy, assuming expenditure switching channel is strong enough.

Sterilized Intervention and the ZLB

- Argument suggests central bank can drive out of the ZLB by intervening in the exchange rate market.
- Whether this is true remains controversial:
 - How big do foreign exchange rate interventions have to be to significantly impact Λ_t ?
 - What is the size of the portfolio balance effect?
 - How big is the expenditure switching channel on GDP?
 - Evidence is that export prices are sticky in the foreign currency (dollars) (see [Gopinath, et. al.](#) and for some pushback, see [this](#)).
 - A big import component (priced in dollars) in exports.
 - Above two considerations suggest that exports not much stimulated by a depreciation.
- So, not clear that foreign exchange intervention is a way out of the ZLB.

Sterilized Intervention: A Cautionary Tale

- Here is a semi-realistic example (maybe Mexico, 1994?).
 - Let the domestic economy be a small open economy, dealing with a large economy, say the US.
 - US raises interest rate, R^* , sharply for its own reasons (in 1994 there was panic at the Fed about US inflation pressures).
 - Domestic considerations dictate keeping R unchanged or reducing it (say, there is a presidential election, an outbreak of revolution in the south, plus a shaky banking system).
- The domestic government now confronts an impossible choice under the conventional, one-tool view:
 - raise R and damage economy, but save reputation by maintaining the exchange rate target.
 - keep R constant and depreciate currency, losing reputation.
- The domestic gov't desperately wants to keep *both* R constant and S constant even though R^* had risen.
 - Not possible under conventional one-tool view.

Cautionary Tale, cnt'd

- Sterilized intervention seems like it offers a solution.
- Keep the interest rate, R , constant and defend the exchange rate by doing sterilized sales of dollar reserves.
 - Sterilization ensures the domestic money supply (and, R) does not change.
- Problem: what happens if/when the government runs out of dollar reserves?
 - You could borrow dollars (in effect, Mexico did this when it issued tesobonos).
 - There is a risk that you cannot prevent the depreciation, in which case the servicing cost on the dollar debt becomes sufficiently high that traders think the government will be tempted to default.
 - Traders respond by refusing to roll over the dollar debt.
 - End result: an international bailout, with strings attached, followed by severe recession, high inflation and much suffering.

Sterilized Intervention: Some Final Observations

- Sterilized intervention has recently emerged as an important policy tool.
 - Maybe it is effective over short periods, at stabilizing transitory shocks in the foreign exchange market.
 - Logic similar to Poole, who suggested that interest rate rules for monetary policy are better than money rules if there are a lot of shocks in the money market.
 - Much work building DSGE models to think about this (see references to IMF above and the references [here](#)).
- It should be clear from this presentation, that the intuitive style adopted here leaves too many t's uncrossed and i's not dotted.