On the Limits to Monetary Policy

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Monetary Policy in the United States

- The Federal Open Market Committee (FOMC) formulates monetary policy.

- It seeks to fulfill a dual mandate from Congress.
  - promote price stability
  - promote maximum employment

- The FOMC views the two objectives as generally complementary.
Dual Mandate Performance Since 2007

- The Great Recession began in the fourth quarter of 2007.

- Over the intervening four years, average inflation is close to the Fed’s target of 2%.

- But employment is much lower now than four years ago.
• The Fed is clearly doing well on the price stability mandate.

• Why does its performance appear to be so much worse on the other?

• I suggest an answer to this question in the context of a model.
Disclaimer and Acknowledgements

• I am not speaking for others in the Federal Reserve System.

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Demand Shocks Since 2007

- Starting point for analysis: two distinct kinds of demand shocks.


- Usual models/analyses emphasize one force or the other - I include both.
Falls in Employment

- Labor demand shock generates a fall in employment.

- This fall in employment is magnified if the real wage adjusts slowly to the shock.

- The product demand shock generates an additional fall in employment.
Main Model Implications

In this model:

1. Monetary policy can offset the jobs impact of a *product* demand shock.

2. Monetary policy cannot offset the jobs impact of a *labor* demand shock and any associated slow real wage adjustment.

3. Non-monetary policy can offset the jobs impact of a *labor* demand shock - but only with the support of monetary policy.
Dual Mandate Implications of the Model

• The dual mandate is: promote price stability and maximum employment.

• The model implies that, acting alone, the Fed cannot offset the impact of adverse labor demand shocks.

• Hence: adverse labor demand shocks reduce the maximum employment achievable by the Fed.
Connections

- Long line of disequilibrium models that nest "classical" and "Keynesian" unemployment.
  - See, for example, Malinvaud (1977), Coen and Hickman (1988).

- These concepts have rough analogs in my model.
  - "Classical" unemployment = employment shortfall due to slow real wage adjustment.
  - "Keynesian" unemployment = employment shortfall due to high real interest rates.
More Recent Connections

• Recent academic work studies how increased uncertainty about financial conditions reduces labor demand.
  – See Quadrini and Perri (2011), among others.

• Shimer (2010) - models impact of real wage rigidities.

• Hall (2011) - models labor market impact of high real interest rates.
  – Like Hall, I use a disequilibrium model (not New Keynesian or search).
Outline

1. Labor Demand Shock
2. Product Demand Shock
3. Limits to Monetary Policy
4. Other Policy Responses
5. Conclusions
6. Appendix: Model Math
Before I Get Started ....

• "Real" wages are actual wages, divided by the price index.
  – Real wage growth is wage growth, adjusted for inflation.

• "Real" interest rate is the actual interest rate net of inflation.
  – I assume that the Fed controls current and future real interest rates.

• (Minor) assumption: no income effects on labor supply.
1. LABOR DEMAND SHOCK
Fall in Labor Demand

• For a given real wage:

• Firms want to hire fewer workers/hours in 2012 than in 2007.

• Why?
Multiple Sources of Fall in Labor Demand

- Harder to start up new firms (because households have less net worth).
  - Young firms are important source of employment growth.

- High firm profits suggest that product market competition has declined.
  - Recession eliminated many firms.
  - Less startup activity means less competition from potential entrants.
Uncertainties

- Firms now see adverse financial shocks as being more likely than they did in 2007.
  - They learned in 2008 that such shocks can trigger large layoffs.
  - This possibility makes them less willing to hire new workers.

- Firms remain concerned about possible increases in taxes and regulations.
Adverse Labor Demand Shock

\[ W \]

\[ L^s \]

\[ L^d_{07} \]

\[ L^d_{12} \]

\[ W_{07} \]

\[ L_{07} \]
Slow Real Wage Adjustment

- Real wages should fall to clear markets.

- But firms may face internal and external impediments to cutting real wages for new hires.

- This gives rise to even lower employment.
Slow Real Wage Adjustment

\[ W \]

\[ L^s \]

\[ L^d \]

\[ w_{FLOOR} \]

\[ L_{FEDMAX} \]

\[ L_{FE} \]
2. PRODUCT DEMAND SHOCK
• When real interest rate is high: people buy less and save more.

• When real interest rate is low: people buy more and save less.

• For a given real interest rate, people demand less consumption in 2012 than in 2007.

• Why?
Sources of Lower Product Demand

- Loss of wealth due to fall in housing values and equity wealth.

- Higher risk of job loss: households need to do more self-insurance.

- Tighter access to household credit.
Real Interest Rate, Output and Employment

- The Fed controls $r$.

- Its choice of $r$ determines the aggregate demand for goods.

- That in turn determines output, and thereby employment.
Relevance of the Real Interest Rate: Product Market
Relevance of the Real Interest Rate: Labor Market

- $w$ vs. $L$
- Labor Market equilibrium
- $w_{FLOOR}$
- $L_{FEDMAX}$
- $L_{FE}$
3. LIMITS TO MONETARY POLICY
Modeling Monetary Policy

- By lowering $r$, monetary policy can increase output.
Impact of Monetary Stimulus in the Product Market

\[ r \]

\[ \bar{r} \]

\[ \bar{r}' \]

\( Y_d \)

\( \bar{Y} \)

\( Y_{FEDMAX} \)

\( Y_{FE} \)

\( Y \)
Impact of Monetary Stimulus in the Labor Market

- **$w^*$** represents the wage.
- **$w_{FLOOR}$** indicates the floor wage.
- **$L^*$** and **$L^{d}$** represent the supply and demand for labor, respectively.
- The graph illustrates the effect of monetary stimulus on the labor market, showing how changes in wage and employment are depicted.
- Key points include $L_{FEDMAX}$ and $L_{FE}$, which likely denote specific levels of employment or economic indicators affected by the stimulus.
Key Model Result

- The Fed cannot remove impediments to real wage adjustment.

- This means that lowering $r$ cannot raise $Y$ above $Y_{FEDMAX}$.

- And: lowering $r$ cannot raise $L$ above $L_{FEDMAX}$.

- Fed’s "maximum employment" is $L_{FEDMAX}$ - which may be less than full employment $L_{FE}$. 
4. OTHER POLICY RESPONSES
Non-Monetary Policies

- Can non-monetary policies raise employment above $L_{FEDMAX}$?

- The model implies that:
  - Product demand stimulus policies cannot.
  - Labor demand stimulus policies can - but only with the help of monetary policy.
Product Demand Stimulus

- Suppose the government stimulates product demand.
  - examples: buying more goods itself or reducing sales taxes

- For a fixed $r$, such a policy can increase $Y$.

- But it cannot raise $Y$ above $Y_{FEDMAX}$ - or $L$ above $L_{FEDMAX}$. 
Labor Demand Stimulus

- Policies that stimulate labor demand can raise $L_{FEDMAX}$.
  - Example: subsidies for hiring by firms.
Impact of Hiring Subsidies in the Labor Market

The graph illustrates the impact of hiring subsidies on the labor market. The supply of labor ($L^s$) and the demand for labor ($L^d$) are shown. The hiring floor ($w_{FLOOR}$) is depicted as a horizontal line, indicating the minimum wage below which hiring subsidies may be effective. The arrows indicate the shift in the demand for labor when hiring subsidies are implemented, from $L^d$ to $L^{d'}$. The new equilibrium point reflects a higher level of employment ($L_{FEDMAX}$) compared to the base case ($L_{FE}$).
Needed: Help from Monetary Policy

- Consider any policy that raises the Fed’s maximum employment $L_{FEDMAX}$.

- This policy only raises employment itself if monetary policy also eases.
Impact of Hiring Subsidies in the Product Market

\[ r \]

\[ Y^d \]

\[ \bar{r} \]

\[ \bar{r}' \]

\[ Y_{FEDMA} \]

\[ Y'_{FEDMA} \]

\[ Y_{FE} \]
5. CONCLUSIONS
Motivating Question

- The FOMC views its two mandates as generally complementary.

- But over the past four years, the Fed has apparently done better on its price stability mandate than on its employment mandate.

- Why?
Model’s Answer to the Motivating Question

- The Fed’s accommodative policy has offset the impact of the product demand shock.

- Those actions have successfully kept inflation near target.

- But the Fed can’t offset the large adverse shock to labor demand and slow real wage adjustment.

- This limitation is what keeps employment low.
• In the language of the model, $\overline{L}$ is near $L_{FEDMAX}$ ...

• But $L_{FEDMAX}$ is well below $L_{FE}$
Relevance of the Real Interest Rate: Labor Market

\( L^S \)

\( L^d \)

\( w \)

\( w_{\text{FLOOR}} \)

\( \bar{w} \)

\( \bar{L} \)

\( L_{\text{FEDMAX}} \)

\( L_{\text{FE}} \)
Important Policy Implication from the Model

- Some argue that raising employment requires *product demand stimulus*.
  - easier monetary policy or increased government purchases

- Others argue that raising employment requires *labor demand stimulus*.
  - cutting taxes or increasing subsidies to firms
• This model incorporates both labor demand and product demand shocks.

• Raising employment above $L_{FEDMAX}$ requires dual stimulus:
  – Labor demand stimulus (e.g. hiring subsidies) AND
  – Monetary easing
APPENDIX: MODEL MATH
Four Equilibrium Restrictions (in every date and state)

1. $\bar{Y}_t = F(\bar{L}_t)$

2. $\bar{w}_t = F'(\bar{L}_t)\eta_t$

3. $\bar{Y}_t = Y^d(\bar{\tau}_t; \xi_t)$

4. $\bar{w}_t \geq \max(w^FLOOR_t, v'(\bar{L}_t))$
Assumptions

\[ v'(L_t) \text{ is indep. of } C_t \text{ (no income effects on labor supply)} \]

\[ F' \text{ is strictly decreasing in } L \]

\[ Y^d \text{ is strictly decreasing in } r \]
Understanding the Restrictions

Restriction 2: \( \bar{w}_t = F'(\bar{L}_t)\eta_t \)

- Restriction 2 is implied by the following four assumptions:
  
  - Firms maximize profits.
  
  - Firms can freely adjust prices (unlike New Keynesian models).
  
  - Firms take wages as given.
  
  - Firms face revenue distortions \( \eta_t \) (like taxes or market power).
Restriction 3: \( Y_t = Y^d(r_t; \xi_t) \)

- I assume that the Fed’s changes in the nominal interest rate have little impact on inflation expectations.

- In this way, the Fed is able to control the real interest rate \( r_t \).
Restriction 4: $\bar{w}_t \geq \max(w_t^{FLOOR}, v'(\bar{L}_t))$

• Restriction 4 is implied by the following three assumptions:
  
  – Firms reject any worker’s offer to supply labor at a real wage below $\bar{w}_t$.
  
  – Real wages cannot fall below $w_t^{FLOOR}$.
  
  – Firms cannot force workers to supply labor.
Changes Since 2007

- Fall in labor demand: modeled as fall in $\eta_t$.
  - This change is not due to technology, because $F$ is unchanged.

- Fall in product demand: modeled as fall in $\xi_t$. 
Definitions of Key Concepts

Def’n of full employment $L^\text{FE}_t$

$$\eta_t F'(L^\text{FE}_t) = v'(L^\text{FE}_t)$$

Def’n of Fed’s maximum employment $L^\text{FEDMAX}_t$

$$\eta_t F'(L^\text{FEDMAX}_t) = \max(w^\text{FLOOR}_t, v'(L^\text{FEDMAX}_t))$$
Key Results

• $L \leq L_{t}^{FEDMAX} \leq L_{t}^{FE}$.

• $L_{t}^{FEDMAX}$ is independent of $(r_t, \xi_t)$.

• That is, $L_{t}^{FEDMAX}$ - not $L_{t}^{FE}$ - is maximum employment for Fed (in any date and state).
Hiring Subsidies

• A hiring subsidy increases the value of $\eta_t$.

• Hence, a hiring subsidy raises $L_t^{FedMax}$ (and $L_t^{FE}$).

• But $F(L_t) = Y^d(r_t; \xi_t)$.

• Hence, a hiring subsidy does not raise $L_t$, unless $r_t$ is lower.