

# WHY DOES THE ZERO LOWER BOUND CAUSE HIGH UNEMPLOYMENT? A HARDER QUESTION THAN YOU THINK

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SED Zero Lower Bound Session  
7 January 2012

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# THE TOPIC

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unless it is extended

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# DMP MODEL OF UNEMPLOYMENT

$$u = U(A)$$

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# EQUILIBRIUM REAL RATE

$$U(A) = 1 - \frac{D(r^*)}{A\bar{n}}$$

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# THE CLASH AT THE ZERO LOWER BOUND

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If  $-\pi > r^*$ , the zero lower bound binds—the real rate exceeds its equilibrium value.

The unemployment rate derived from the DMP model differs from the unemployment rate on the right side, derived from the product market.

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# THE CENTRAL BANK'S INFLUENCE OVER INFLATION

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The zero lower bound binds when the central bank loses control of the rate of inflation.

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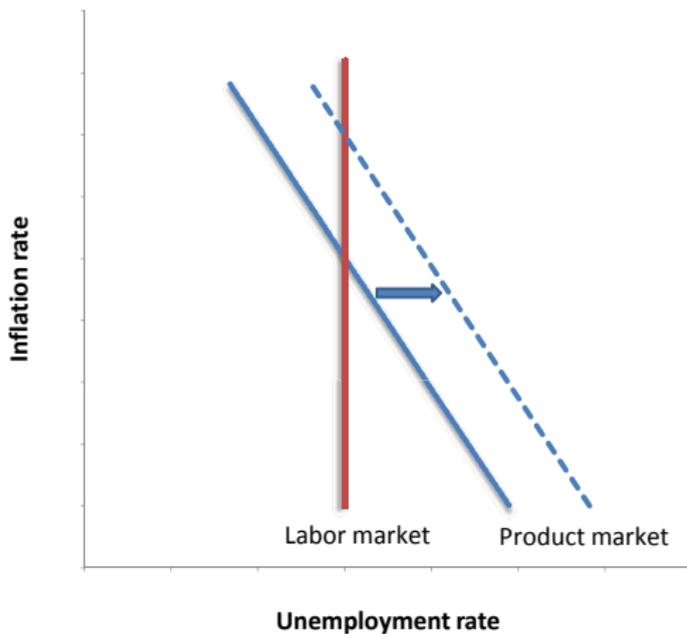
# WHY THE EQUILIBRIUM REAL RATE IS LOW

$$\frac{u'(c_t)}{\beta u'(c_{t+1})} = 1 + r$$

- (1) High value of the discount ratio  $\beta$ .
- (2) Consumption shrinkage, so marginal utility is higher next period.

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# RESPONSE TO SHOCK WITH STANDARD DMP LABOR MARKET



# EXTENDED DMP MODEL

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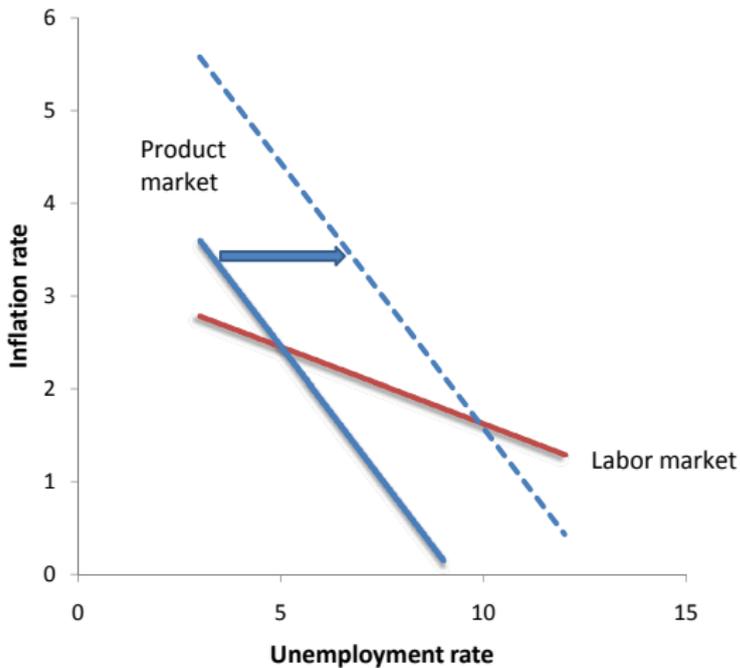
The dependence is negative.

Higher inflation raises employers' incentives to recruit new workers.

Much of the rest of the talk is about the mechanism underlying the negative dependence.

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# EQUILIBRATION WITH A NEGATIVE DEPENDENCE OF DMP UNEMPLOYMENT ON INFLATION



## BASIC CONCLUSION

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Evidence is reasonably conclusive that a drop in product demand *lowers* inflation.

*Thus, to resolve the clash between theories of unemployment by introducing a dependence of DMP unemployment on the inflation rate, the DMP labor-market curve must be flatter than the product-market curve.*

# THE DMP MODEL OF UNEMPLOYMENT

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The unemployment rate  $u$  measures the tightness of the labor market.

The increasing function  $h(u)$  is the recruiting success rate, the per-period probability of filling a vacancy.

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## DMP, CONTINUED

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The zero-profit condition is  $h(u)J = \gamma$ .

Result is a stable decreasing relationship,  $J_Z(u)$ , between unemployment and the job value.

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# WAGE DETERMINATION

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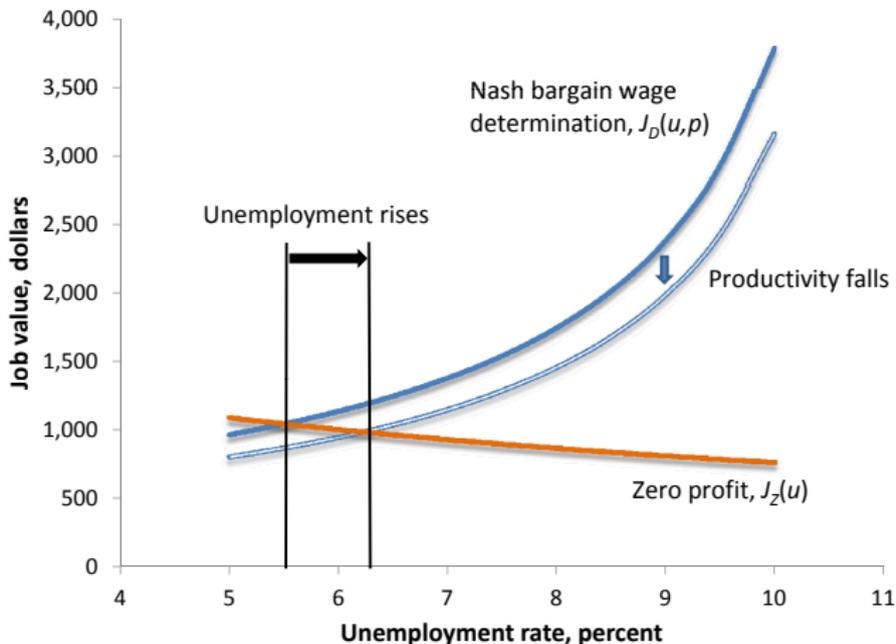
Employer and job candidate bargain over the job value,  $J$ .

$$J = \tilde{J}(u, A, \pi)$$

The only fundamental limitation is that  $J$  lies in the parties' bargaining set:  $0 \leq J \leq$  candidate's reservation value.

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# DMP ACCOUNT OF AN INCREASE IN UNEMPLOYMENT CAUSED BY A DECLINE IN PRODUCTIVITY



## GETTING INFLATION INTO THE WAGE-DETERMINATION FUNCTION

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V. Ramey (2010) questions empirical evidence of countercyclical variations in markups.

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# GERTLER-SALA-TRIGARI (2006) BASED ON GERTLER-TRIGARI (2008)

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No departure from strict rationality.

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## SLOPE OF THE PRICE- AND WAGE-ADJUSTMENT BLOCK IN GST

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At four quarters past the shock, the ratio is 3.3 percentage points of increased unemployment per percentage point of decreased inflation.

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## OTHER MEASURES OF THE LABOR-MARKET SLOPE

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Between October 2008 and October 2009, unemployment rose 3.5 percentage points and inflation fell by 0.5 percentage points, for a slope of 7, on the reasonable assumption of no shift of the labor-market curve.

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# SLOPE OF THE GST PRODUCT-MARKET CURVE

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Slope is

$$\frac{f_{u,\eta}}{f_{r,\eta} - f_{\pi,\eta}}$$

where  $f_{u,\eta}$  is the impulse response function 4 quarters out for the effect of the wage markup shock  $\eta$  on unemployment  $u$ , and similarly for the nominal interest rate  $r$  and the rate of inflation  $\pi$ .

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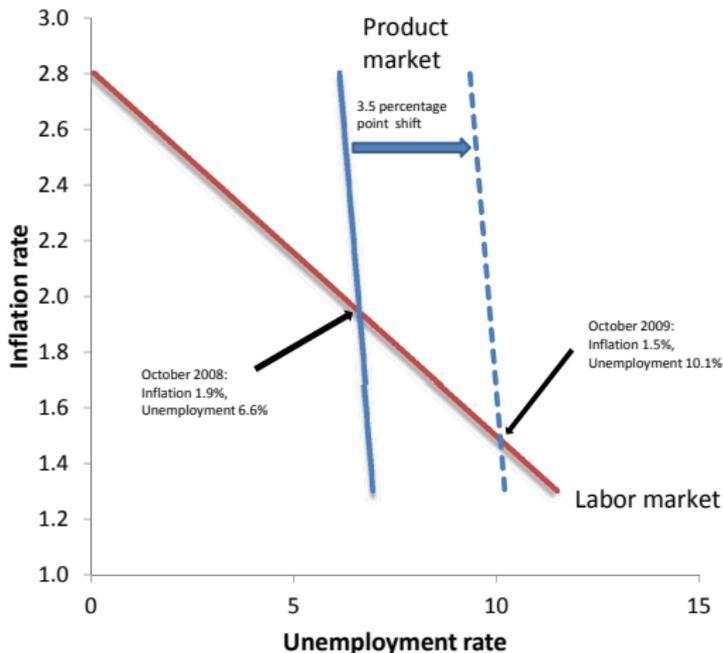
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Thus the GST model easily satisfies the criterion for resolving the clash between the product market and the labor market.

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# THE U.S. ECONOMY IN OCTOBER 2008 AND OCTOBER 2009, WHILE AT THE ZERO LOWER BOUND



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If the rate of inflation had remained constant despite the recession, the unemployment rate would have risen from 6.6 percent to 9.8 percent rather than to 10.1 percent.

The downward slope of the labor-market curve somewhat amplified the effect of the negative shock to product demand, from 3.2 percentage points of unemployment to 3.5 points.

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# EFFECT OF PRODUCT-DEMAND SHOCK ON UNEMPLOYMENT

