Do financial frictions shift the Beveridge curve?
## Theory and evidence

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Abstract

I propose the deterioration of credit availability as a novel explanation for the outwards shift of the Beveridge curve in the US following the Great Recession. The model implements a twist in Wasmer and Weil (2004): instead looking for a loan to finance their vacancy costs, firms borrow to cover a fixed cost of hiring required to convert a match into a hire. This timing allows labor market efficiency to drop following a productivity shock. I build a monthly index of loan approval and conduct an empirical exercise that confirms the relevance of the credit channel.

Background

- The Beveridge curve is a well-established negative relation between the unemployment rate and the vacancy rate.

- Shifts of the Beveridge curve are sometimes observed in the data as well. For example, from December 2009 to May 2017, the US Beveridge curve shifted outwards noticeably. Compared to the pre-recession period, the labor market displayed a significantly higher vacancy rate for any unemployment rate.
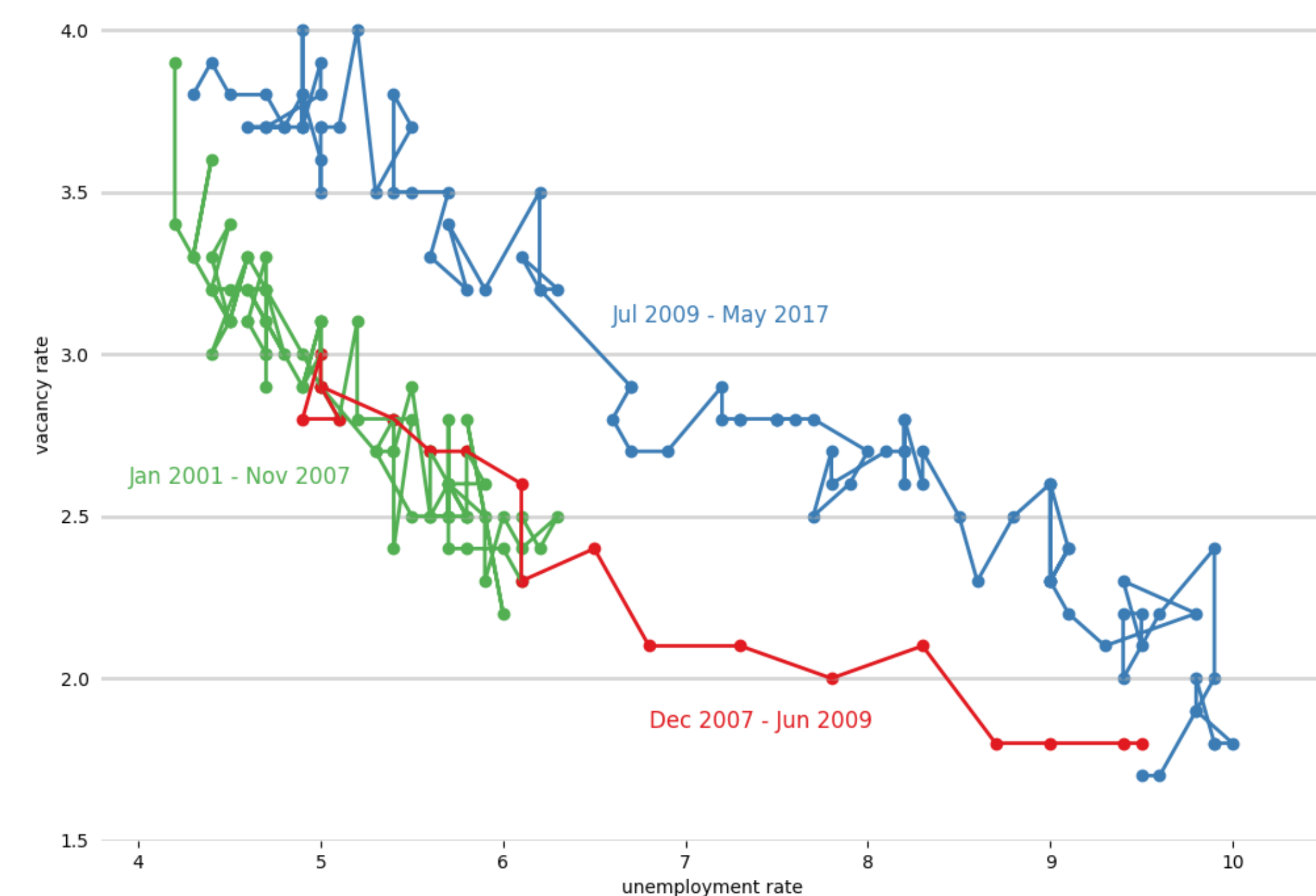
▲ Beveridge curve in the US, January 2001 to May 2017, CPS and JOLTS data.

- While the Mortensen-Pissarides (MP) model of unemployment provides a well-accepted theory of the downwards-sloping shape of the curve, there exists no general consensus regarding what shifts the curve.

- Several explanations have been explored in the wake of the Great Recession, e.g:
 - Increase in mismatch between jobseekers and vacancies
  - Increase in long-duration jobseekers
  - Decrease in search intensity due to more favorable unemployment benefits

None of them can account for more than 30% of the shift. Even all together, a significant share of the shift remains unaccounted for.

- We know that financial and credit markets were particularly hit by the 2008-09 recession. As displayed by the figure on the right, access to credit deteriorated sharply during the crisis, and did not ease much in the following years.

- **Hypothesis:** The decrease in loan-availability hindered firms' ability to hire, independently of their willingness to do so. This in turn reduced aggregate matching efficiency in the labor market, which contributed to the outwards shift of the Beveridge curve.

Lending standards for small firms, Quarter 1 2001 to Quarter 2 2017. Plotted is the percentage of each response to "Over the past three months, how have your bank's credit standards for approving applications for C&I loans to small firms changed?", FRB Senior Loan Officer opinion survey. ▶
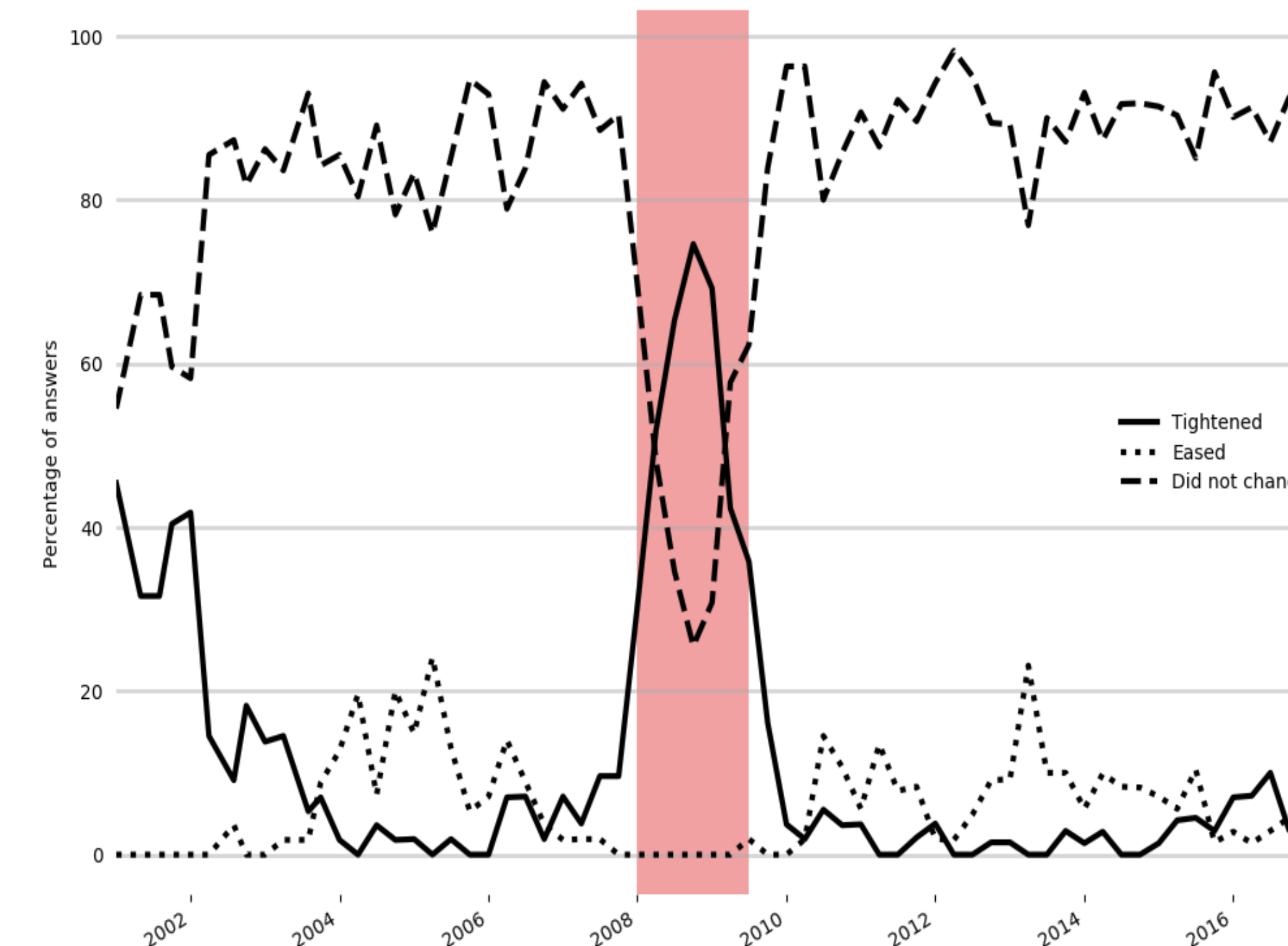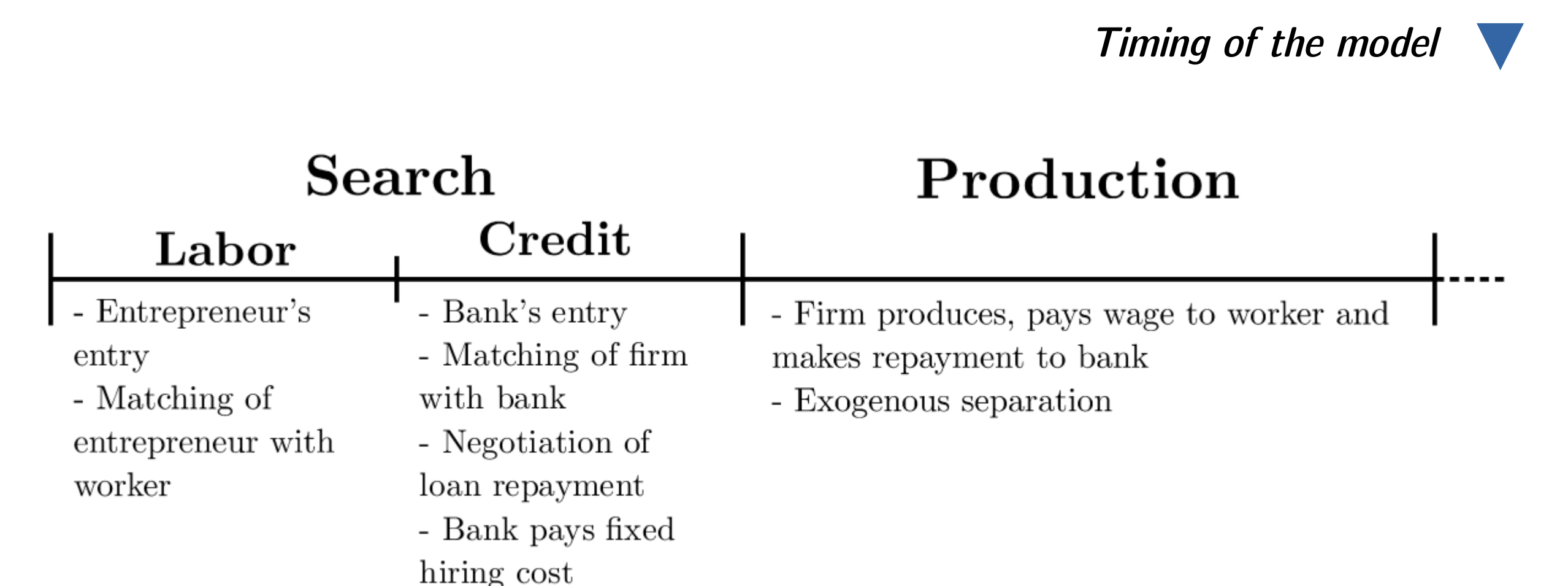

Theoretical model

Environment

- Wasmer and Weil (2004, WW thereafter) add to the MP model a frictional credit market that functions similarly to the labor market. Entrepreneurs in need of financing and banks search for each other; they meet bilaterally according to a matching function. The model highlights the existence of a financial accelerator that amplifies shocks to the labor market. However, it does not feature any channel for financial frictions to shift the Beveridge curve.

- A simple change in the timing of WW enables such a mechanism. In WW, firms need financing in order to pay for vacancy search costs, and therefore need to find a bank prior to entering the labor market. Instead, I assume that firms need financing only after they have matched with a worker, in order to pay a fixed hiring cost required to convert a match into a hire. This cost could be interpreted as a training cost, a legal cost, the cost of installing a new workstation, etc.

- If the firm fails to secure a loan, it cannot pay the hiring cost, loses the worker, and goes back to having an open vacancy.

Timing of the model ▼

	Search		Production
	Labor	**Credit**	
	- Entrepreneur's entry - Matching of entrepreneur with worker	- Bank's entry - Matching of firm with bank - Negotiation of loan repayment - Bank pays fixed hiring cost	- Firm produces, pays wage to worker and makes repayment to bank - Exogenous separation

- The rest of the model is standard. Importantly, there is free entry for banks in the credit market and for firms in both markets, exogenous job destructions, the loan repayment contract is determined by Nash bargaining, and the wage taken exogenously (it is endogenized in an extension).

Equilibrium

- Market tightnesses in the labor and credit markets, (θ, φ), are jointly determined by the vacancy-supply (VS) and the loan-supply (LS) curves (see figure below).

- Steady-state unemployment rate is determined by the following Beveridge curve:

$$u = \frac{s}{s + \theta q(\theta) p(\phi)}$$

with s the separation rate, $\theta q(\theta)$ the job-finding rate, and $p(\varphi)$ the loan-finding rate.

> **Impact of financial frictions on the Beveridge curve**
> 1. **Direct effect** → the loan-finding rate behaves as a curve shifter
> 2. **Indirect effect** → changes in credit conditions impact firms' entry and labor market tightness, which affects the job-finding rate

Impact of a productivity shock*

1. Standard effect: expected profits drop → VS shifts inwards as firms exit the labor market → θ_1 drops to θ_c, u_1 drops to u_c.

2. Financial accelerator effect: LS shifts to the right as banks' entry margin adjusts → θ decreases further along the VS curve, to θ_2

3. Beveridge curve shifter effect: φ lower for any θ → loan-finding rate lower for any θ → outwards shift of the curve, u goes to u_2.
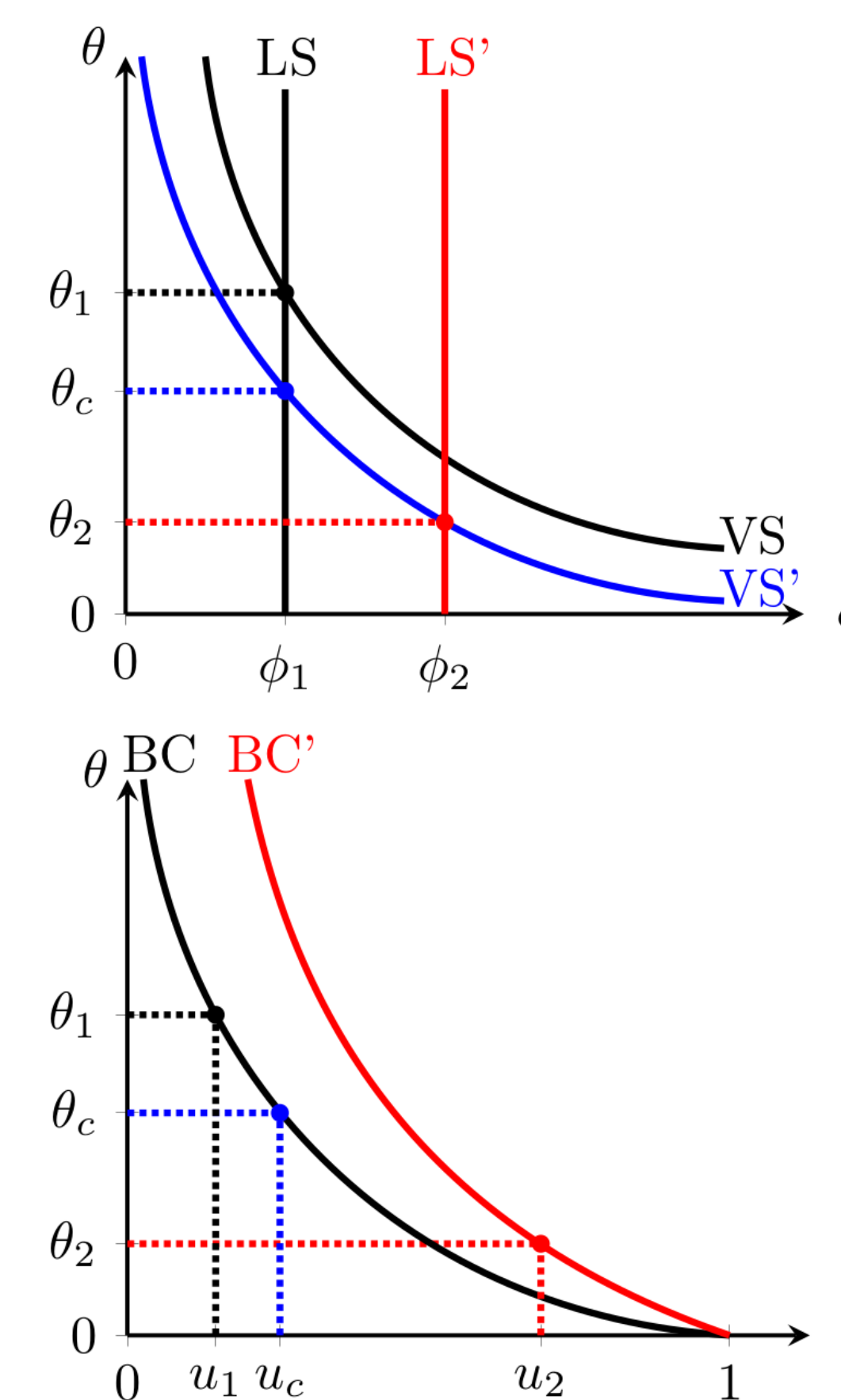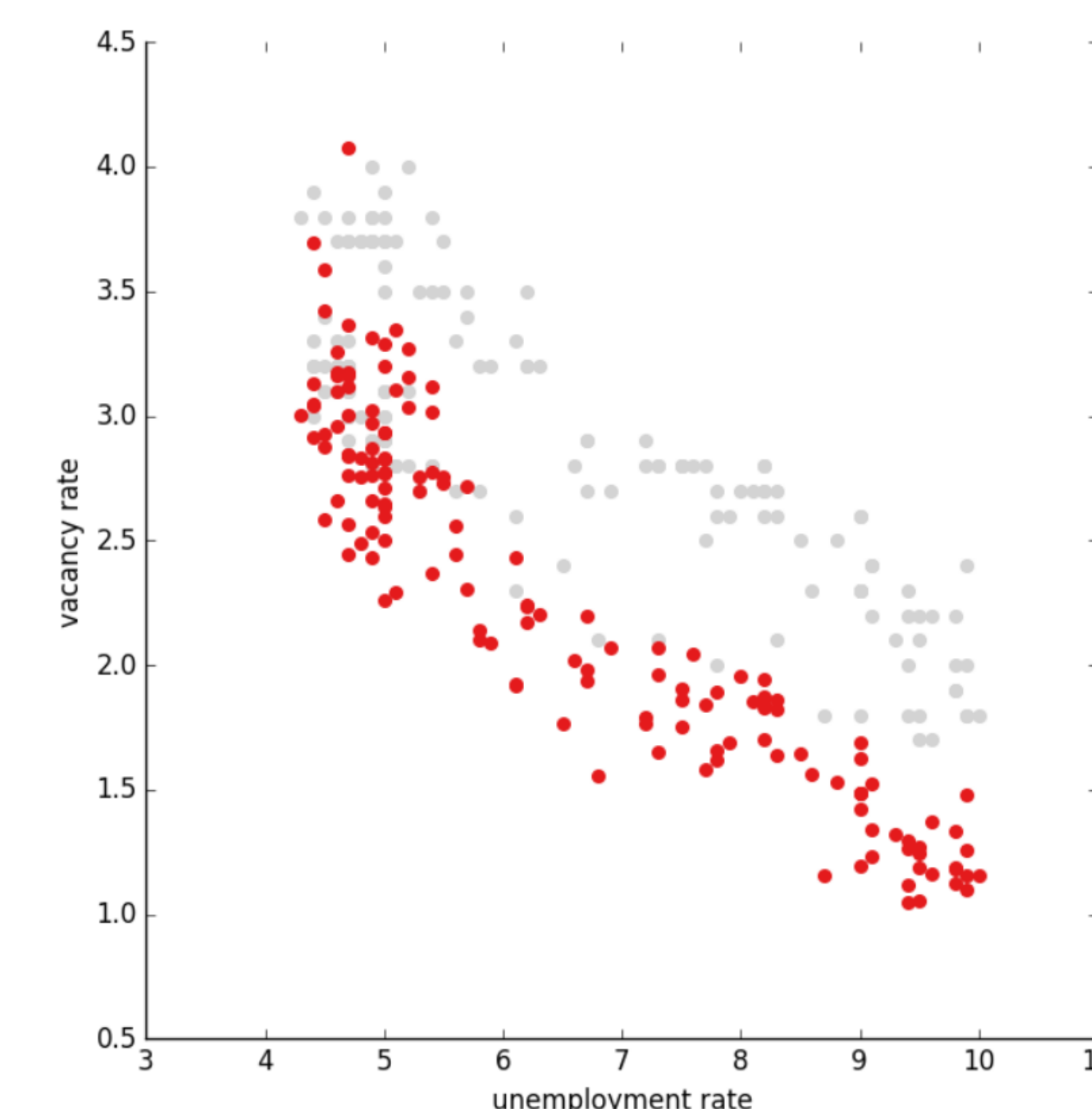

* The analysis would be unchanged for any negative shocks to firms' profits, e.g. increase in wage or in the hiring cost

Empirical exercise

- In the model, the elasticity of the vacancy rate with respect to the loan-approval rate is $-1/(1-\alpha)$, with α the elasticity of the labor market matching function with respect to vacancies.

- I build a loan-approval rate series using data from the NFIB Small Business Survey, which asks: "During the last three months, was your firm able to satisfy its borrowing needs?"

- I can then construct a counterfactual series that shows how the vacancy rate would have evolved, given u, had the loan-approval rate remained constant since 2001.

> Controlling for changes in loan availability, the magnitude of the shift diminishes considerably!

Counterfactual Beveridge curve in red (counterfactual vacancy rate against observed unemployment rate), observed Beveridge curve in grey. ▲

Conclusion

- I add to the growing literature on Beveridge curve shifters by proposing credit frictions as a novel channel.

- By changing the timing of financials frictions in Wasmer and Weil (2004), I show that the effective vacancy yield of a firm can be negatively impacted by productivity shocks when firms are credit-constrained at the time of turning a match into a hire.

- Key mechanism: existence of an event that occurs after a firm and a worker have met, and may prevent the hire.
  → Other stories are worth exploring, e.g, job-specific productivity with stochastic matching (leads to reservation productivities).

Main references

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