

# Research Proposal: Loan Officer Incentives, Uncertainty and Credit Supply

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# Question

- Loan officers are intermediaries in the home mortgage market, sourcing and processing mortgages for mortgage brokers.
- In the past 20-30 years, loan officers have transitioned from primarily being salaried employees of banks to non-bank independent contractors (Woodward and Hall, 2010).
- How do the incentives induced by their compensation contracts affect how they respond to uncertainty shocks?

# Motivation

- ① Compensation incentives have been shown to play an important role in how firms respond to uncertainty shocks.
  - Managers with greater equity incentives relatively reduce risk (Ion and Yin, 2021) and investment (Glover and Levine, 2015).
- ② Similar agency frictions have been highlighted in the mortgage market:
  - Moral Hazard on the part of originators (Keys et al., 2010) has been highlighted as a cause of the global financial crisis.
  - Experiments on commercial bank loan officers show that compensation based on loan performance leads to better screening and profitability (Cole et al, 2012).
  - Another experiment varying compensation from fixed to volume-based led to 31% higher mortgage origination rates, 15% higher loan amounts and 28% higher default rates (Agarwal & Ben-David, 2014).
- ③ Little evidence to-date on how uncertainty shocks affect the mortgage market.

# Who are loan officers and how are they paid?

- "Loan Officer" (LO) refers to the agent within (or associated to) the originator bank-branch that process the mortgage application.
  - LO's often screen mortgage applications and search for "leads". As effort is unobservable, banks provide performance incentives in the order of "typically 1-2% of the loan amount" (Bhutta et al., 2024).
- LO compensation contracts can consist of:
  - 1 per-loan commissions
  - 2 per-dollar commissions
  - 3 a fixed salary
- As of 2011, LO's legally cannot be paid differently for processing loans with different terms (interest rates, prime/subprime).
- The terms of the contract can vary even between loan officers in the same branch. Bhutta et al. state that some loan officers can trade-off their percentage and fixed salary.

# Conceptual Framework

- Dynamic labor-leisure tradeoff model. Two period game with log utility, effort cost function  $\phi$  is convex.
- Loan Officer's compensation schedule is a exogenous and consists of a percentage of each loan  $\theta_i$  and a fixed salary  $F_i$ .

$$I(D_t; e_t) = \theta_i D_t e_t + F_i \quad (1)$$

- Compensation depends on demand conditions  $D_t \geq 0$ .
  - 1  $D_t e_t$  is the value of loans originated.
  - 2 Period 2 demand conditions  $D_2$  is uncertain in period 1.
  - 3 Income risk is undiversifiable.
  - 4 Effort supply rises with  $\theta$  and falls with  $F$ .
- Idea is a MPS of  $D_2$  will lead to greater effort via a precautionary savings channel.

## Loan Officer's Problem:

$$\max_{e_1, s, c_1} \log(c_1) - \phi(e_1) + \beta E_D[V(s, D_2; \theta_i, F_i)]$$

$$\text{s.t. } c_1 + s = \theta_i e_1 + F_i$$

- $D_1$  is known and set to 1 for simplicity.

**Terminal Problem** ( $D_2$  is observed).

$$V(s, D_2; \theta_i, F_i) = \max_{e_2} \{\log(c_2) - \phi(e_1)\}$$

$$\text{s.t. } c_2 = (1 + r)s + \theta_i D_2 e_2 + F_i$$

$$c_1 \geq 0, c_2 \geq 0, e_1 \geq 0, e_2 \geq 0, S \geq 0$$

- Consider  $D_2 = 1$  vs.  $D_2 = 2$  with  $p = 1/2$  or 0 with  $p = 1/2$ .

# What am I proposing?

- Descriptive questions first:

- ① Do loan officers that receive higher compensation per loan (per dollar) originate more loans (more dollars)?
- ② How volatile is the origination activity for each branch / officer?
- ③ How does loan officer compensation vary across time, branch and loan?
- ④ How does the tightness of the origination market vary with economic conditions and uncertainty? (Measured by the number of "offers" outstanding to the number of originations / mortgage inquiries).

# Causal Questions

- How do uncertainty/volatility shocks affect loan officer (LO) mortgage origination?
  - A staggered DiD spec. ( $G$  = incentive group and  $T$  = time of uncertainty shock). Check effect on processing time/ dollars approved.
  - Compare performance-based vs. fixed-salary LOs (e.g., traditional vs. non-bank lenders).
- Possible Approaches:
  - Use branch-time fixed effects (at least for traditional lenders I can do this), control for prime/subprime loans.
  - Develop a structural model of LO origination (e.g., Glover and Levine) to explain responses.
- Hypothesis:
  - If loan officers can react quickly to an uncertainty shock, they may work harder today. If they can't, they may work less.
  - For "conforming" loans whose default risk is insured by a GSE, LOs may be more sensitive to demand volatility than originators. So changes to interest rate spreads may not balance this effect out.
  - Volatility shocks may enhance LO informational advantage, potentially harming borrowers.



- Loan Officer Compensation data is from Optimal Blue "Pricing Insight" data on mortgage offers to potential buyers (contract design must be inferred from repeated mortgage offers).
- Ideally, Mortgage Call Report (MCR) data from the Federal Reserve can help to cross-check contracts with aggregate compensation data at the originator-level and form a measure of salary.
- Uncertainty shocks can be measured as idiosyncratic uncertainty in mortgage demand, perhaps measured at the local level by a model of the volatility of mortgage applications. Another idea is to use lender-level uncertainty, 30 year fixed rate - 10 year spreads or policy uncertainty.
- In the GSE market, interest rate uncertainty would perhaps lead to little variation in mortgage interest rates today.
- Mortgage inquiries can be taken from equifax.