

# **Behavioral Monetary Policy Making and Gender: Theory, Institutions and Empirics**

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# Motivation

- ❑ “ (Monetary Policy) Committees have **strengths** that **policy rules lack**. In particular, Committees are an **efficient means** of aggregating a wide variety of information and **perspectives**”
- ❑ Stanley **Fischer**, “Committee Decisions and Monetary Policy Rules” May 5<sup>th</sup>, 2017



Source: Wikipedia

# Motivation

- ❑ “ Women continue to be **underrepresented** in certain industries and occupation”
- ❑ “Women are still poorly represented among corporate CEOs, as partners in top law firms, and as **executives in finance**”
- ❑ “Increasing the female participation rate would raise our GDP by **5%**”
- ❑ Janet **Yellen**, “So We All Can Succeed: 125 Years of Women’s Participation in the Economy ”  
May 5<sup>th</sup>, 2017



Source: Wikipedia

# Motivation

- ❑ Research Question: Under which conditions **Gender Diversity** can matter in Monetary Policymaking?
- ❑ Answer: **If** we assume that gender diversity is associated with **risk aversion**, more precisely with a **standard** feature – i.e. **conservativeness** – and/or with a **behavioural** feature, i.e. **loss aversion**

# Contributions

- ❑ The aim of this study is to **intertwine** two strands of the literature (**monetary policy** and **corporate governance**), using both **standard** and **behavioural** insights, with a focus: the relationships between **gender diversity** and monetary policymaking.
- ❑ The study offers **three** contributions: i) **theory**; ii) **metrics**, i.e. the construction of the first index of gender diversity in monetary policymaking (GMP Index) for an extensive sample of 112 countries; iii) **empirics**: the index is used in cross-section analyses aimed at investigating the drivers and the effects of the presence of women in monetary policy committees.

# Contributions (continued)

- ❑ **Background** Articles:
  - ❑ Doves, Hawks and Pigeons: Behavioural Monetary Policy and Interest Rate Inertia, *Journal of Financial Stability*, December 2016, (with F.Favaretto)
  - ❑ *Gender and Monetary Policymaking: Trends, Drivers and Effects*, Baffi Carefin Centre WP Series, 2017 (with. P. Profeta and D. Romelli)

# Presentation Setup

- ❑ State of the Art
- ❑ 1) **Theory**: Explaining **Monetary Inertia**
- ❑ Basic Model with **Conservativeness**
- ❑ Monetary Inertia Driver: **Frictions** in the Economy
- ❑ Basic Model with **Governance**
- ❑ Monetary Inertia Driver: **Consensus** Regime (Super- Majority Rule)
- ❑ Basic Model with **Loss Aversion**
- ❑ Monetary Inertia Driver: Loss Aversion
- ❑ **Gender Diversity**, Conservativeness and Loss Aversion
- ❑ 2) **Metrics**: How to **Measure** Gender Diversity
- ❑ 3) **Empirics**: Gender Diversity – **Drivers** and **Effects**

# The State of the Start

- ❑ Women are increasingly represented in central banks. As of January 2015, **16** central banks were headed by women, either on an interim or full-time basis, the most known being Janet Yellen in the US and Elvira Nabiulina in Russia.
- ❑ The literature on monetary policy (MP) acknowledges that monetary policy is conducted by **committees**.
- ❑ It has also been claimed that committees can make more efficient monetary decisions via heterogeneity and **diversity**.
- ❑ At the same time, members' diversity can trigger **regularities** in the monetary action.
- ❑ **Gender** diversity, a specific type of heterogeneity, is a potential relevant trait in the monetary policymaking.
- ❑ In parallel, a general conclusion of the literature on gender and **corporate** governance is that the presence of women is associated with higher **risk aversion**.



# 1) THEORY

- ❑ In the model we explore the consequences in assuming well-defined risk aversion features – i.e. **conservativeness** and **loss aversion** – in influencing the monetary policy decisions.
- ❑ In such as situations a status quo equilibrium – i.e. **monetary policy inertia** - is more likely to occur.

# The Basic MP Framework

- ❑ We start from the **basic** monetary policy framework with nominal price rigidities (Clarida et al. 1999)
- ❑ In this model the aggregate equations evolve from optimization by households and firms, which in turn depends on expectations, and monetary policy can affect the real economy

# The Economy

- Letting  $y_t$  and  $z_t$  be respectively the logs of the stochastic component and the natural level of output, the output gap  $x_t$  will be  $x_t \equiv y_t - z_t$  while  $\pi_t$  is the period inflation rate and  $i_t$  the nominal interest rate.
- We have an aggregate supply curve that relates positively inflation and output gap which is coupled with an aggregate demand curve, where the output gap is inversely associated with the real interest rate:

- $$\pi_t = \lambda x_t + \beta [E_t \pi_{t+1}] + u_t \quad (1)$$

- $$x_t = E_t x_{t+1} - \phi [i_t - E_t \pi_{t+1}] + g_t \quad (2)$$

- Where  $u_t$  and  $g_t$  are standard disturbance terms that behave as follows:

$$u_t = \rho u_{t-1} + \hat{u}_t \quad g_t = \mu g_{t-1} + \hat{g}_t$$

- Where  $0 \leq \rho, \mu \leq 1$  and  $\hat{u}_t, \hat{g}_t$  are random variables with zero means and finite variances.

# The Central Bank

- The central bank goal function targets the macroeconomic key variables and having as **standard bliss goals** the natural level of output and zero inflation –without any loss of generality - and therefore assuming its basic form:

$$U_{cb} = \max - \frac{1}{2} E_t \left[ \sum_{i=1}^{\infty} \beta^i (\delta \alpha x_{t+i}^2 + \pi_{t+i}^2) \right]$$

- Where the parameter  $\alpha$  is the relative weight of the two macroeconomic goals. At the same time the parameter  $0 < \delta \leq 1$  captures in the simplest way the explicit role of the **central bank independence**, following the approach introduced in Eijffinger and Hoeberichts (1998)
- Being interested in zooming on the drivers of the monetary policy action different from the institutional setting, we will assume that  $\delta = 1$ , i.e. the degree of central bank independence is the maximum one.

# The Optimal Monetary Policy Target

- Assuming now **discretion** in the monetary policy action and **rational expectations**, in each period the solution of the optimization problem produces the following **optimality** condition in terms of **inflation**:

$$\pi_t = -\frac{\alpha}{\lambda} x_t$$

- When inflation is above the target, the central bank have to implement a restrictive policy monetary; the opposite is true when inflation is below the target.
- The toughness of the central bank reaction depends on the **sacrifice ratio**  $\lambda$  between gains in inflation control versus costs in term of output losses, as well as on the degree of the central bank **dovishness**  $\alpha$ , i.e. how important is output stabilization respect to inflation stabilization.
- Dovishness is the opposite of **conservativeness** (**hawkishness**), that we indicate using the parameter **t**, where.

$$t = \frac{1}{\alpha}$$

# The Optimal Monetary Policy Tool

- Finally, assuming that the monetary policy **tool** is the **interest rate** the formulation of the optimal policy will be equal to:

$$i_t^* = \gamma_\pi \rho \pi_t + \frac{1}{\varphi} g_t$$

- Where:

$$\gamma_\pi = 1 + \frac{(1-\rho)\lambda}{\rho\varphi\alpha} > 1$$

# The Equilibrium

- ❑ In **equilibrium** with rational expectations a relationship between **inflation** and **conservativeness** emerges
- ❑ The optimal rate of inflation is equal to:
- ❑ 
$$\pi_t = \frac{\alpha u_t}{\lambda^2 + \alpha(1 - \beta\rho)}$$
- ❑ The equation shows the well-known result that in the basic macro setting the optimal policy incorporates **inflation targeting**, as well the relevance of the **central bank conservativeness**.
- ❑ Given the macroeconomic features of the economy – i.e. the values of  $\lambda, \rho, \mu$  - uncertainty and the time discount, the crucial driver will be the degree of conservativeness, i.e. less concern for output losses implies a more rapid convergence of inflation to its target over time, and vice versa.

# Conservativeness and Interest Rates: ?

- **Inflation** and central bank **conservativeness** are **inversely associated**, which is immediately evident when the disturbances are completely random, i.e.:

$$\frac{\partial \pi}{\partial t} = -\frac{\lambda^2 u_t}{\lambda^4 t^2 + 2\lambda^2 t + 1} < 0$$

- On top it is interesting to note that also the **sensibility of the interest rate** – i.e. the value of the parameter  $\gamma$  - depends on **conservativeness**:

$$\frac{\partial \gamma}{\partial t} = \frac{\lambda(1-\rho)}{\varphi\rho} > 0$$

- Therefore ...



# Conservativeness and Interest Rates (continued)

- Putting together the two conditions (9) and (10) it is evident that changes in the degree of central bank conservativeness **doesn't** imply any automatic effect in terms of interest rate dynamics:
- A more conservative central banker likes **lower level** of inflation, but at the **same time** she becomes more sensible with respect to **inflation stability**. The two effects push the interest rate in opposite directions and the final outcome has to be defined time to time; in fact:

$$\frac{\partial i}{\partial t} = \left[ \frac{u(\lambda + \beta\lambda\rho^2 - ((1 + \beta\lambda) + \phi\lambda^2))}{\phi\lambda^4 t^2 + (2\phi\lambda^2 - 2\beta\phi\lambda^2)t + \beta^2\phi\rho^2 - 2\beta\phi\rho + \phi} \right]$$

- Therefore the association between the **interest rate policy** and the **conservativeness** is a **genuinely empirical question**.
- **KEY POINT:** We will assume that **gender** and **conservativeness** can be **associated**.

# The Monetary Policy Inertia

- ❑ In the basic monetary policy framework **monetary inertia** can occur, due to the existence of **frictions and delays**: inertia in the policy rule may reflect the inertia **in the economy itself**.
- ❑ Changes in the macroeconomic conditions trigger changes in the interest rate, but these changes occur via a series of small and lagged adjustments, rather than an immediate, harsh and once and for all movement.
- ❑ In other words - following Woodford 1999 - the **past** level of nominal interest rate appears to be a crucial driver of the present interest rate level:

$$i_t^* = \xi i_{t-1} + \gamma_\pi \rho \pi_t + \frac{1}{\varphi} g_t$$

- ❑ Where the coefficient  $\xi$ , with  $0 < \xi < 1$  measures the degree of inertia in the central bank reaction function.

# The Central Banker

- Following Alesina and Tabellini 2007, we assume that the society has decided to assign **the monetary policy task** to a **bureaucrat**, i.e. a career concerned player that chooses the policy action entailing personal benefits and costs, being preferable to politicians in technical task such as the monetary policy field.
- Let  $V(t, \pi)$  be the utility function of the **central banker**:
- $V(t, \pi) = B(t, \pi) - C(t, \pi)$
- Where  $B(t, \pi)$  and  $C(t, \pi)$  are respectively the **benefits** and **costs**.
- First of all we know from (3) that, from an institutional point of view, inflation can be a beneficial tool for macro stabilization. On top of that it is worth noting that, being the central banker a bureaucrat, inflation can be considered a financial source for her organization – see Reis 2015.

# The Central Banker (continued)

- Therefore at least for two different and consistent reasons we can assume that the **benefits** are increasing and concave in the inflation rate:

$$\frac{\partial B(t, \pi)}{\partial \pi} > 0 \quad \frac{\partial^2 B(t, \pi)}{\partial \pi^2} < 0$$

- At the same time again from (3) we know that inflation is costly for the central bank as an institution, so we can assume that the **costs** are increasing and convex:  $\frac{\partial C(t, \pi)}{\partial \pi} > 0 \quad \frac{\partial^2 C(t, \pi)}{\partial \pi^2} \geq 0$

- Finally we assume that the central bankers are **heterogeneous** with respect to their degree of **conservativeness**; the central bankers can be indexed such that more conservative central bankers bear higher marginal costs and/or enjoy lower marginal benefits from the policy:  $\frac{\partial B(t, \pi)}{\partial \pi} \leq 0 \quad \frac{\partial C(t, \pi)}{\partial \pi} \geq 0$

# The Central Banker Optimal Policy

- Therefore **in equilibrium** the central banker optimal inflation rate is such that the **marginal benefits match the marginal costs**:

$$\frac{\partial B(t, \pi_{cb})}{\partial \pi} = \frac{\partial C(t, \pi_{cb})}{\partial \pi}$$

- And that **inflation** and **conservativeness** are inversely associated

$$\frac{\partial \pi_{cb}}{\partial t} < 0$$

- Which is **exactly** the condition that holds in equilibrium in **our economy** with nominal stickiness and rational expectations.

# Central Bank Governance and the Median Central Banker

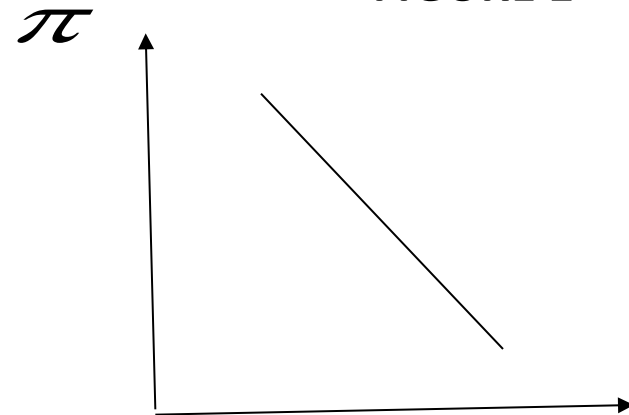
- Finally we assume that a **Monetary Policy Committee** (MPC) with  $n$  members formulates the monetary policy decisions.
- The central bankers, which are the  $N$  members of the Committee, are individuals (voters), heterogeneous in the parameter  $\alpha$ . We assume that:
  - **Each** MPC member maximizes her **own goal function**;
  - **Each** MPC member chooses the preferred inflation rate  $\pi$  and consistently the optimal **interest rate**  $\bar{i}$ , without any inertia;
- The MPC members vote using a **majority rule**: therefore the monetary policy outcome is the **median** type's optimal inflation rate  $\pi_m$  and optimal interest rate  $i_m$ .

# Optimal MP and the Median Central Banker

- The **optimal inflation rate** will be inversely associated with the conservativeness of the **median central banker**:

$$\frac{\partial \pi}{\partial t_m} = -\frac{\lambda^2 u_t}{\lambda^4 t_m^2 + 2\lambda^2 t_m + 1} < 0$$

FIGURE 1



- It is worth noting that:
  - i) Any **macroeconomic changes** will modify the optimal<sub>t</sub> inflation rate, given the central bank conservativeness;
  - ii) the median type's policies is not necessarily coincident with the **social** optimal ones.
  - ii) We assume **constant voting rules**, in order to shed light on monetary inertia independently from how the MPC governance is designed.

# Central Bank Governance and Monetary Inertia

- ❑ From Riboni and Ruge-Murcia (2010) we know that with the median central banker model, **regardless of the initial status quo**, the MPC will adopt the interest rate preferred by the **median voter**.
- ❑ The median central banker governance is frictionless in the sense that the status quo doesn't matter in determining the actual interest rate  $i_m$
- ❑ In order to have monetary policy inertia, we have to assume a **well defined governance setting**
- ❑ A sufficient condition is to assume a **consensus model**, i.e. the interest rate setting require a **super-majority** to pass.



# Central Bank Governance and Monetary Inertia

- If  $N$  is the number of the MPC members, let  $\frac{(N+1)}{2} + k$  be the size of the smallest super-majority required to set the equilibrium interest rate  $i_{SM}$
- where
 
$$i_{SM} = i_m \text{ iff } k = 0$$
- Therefore **monetary policy inertia** – i.e. a significant autocorrelation coefficient  $\xi > 0$  in the interest rate path – is more likely to occur in a **super majority** model the greater will the consensus required to change the interest rate, i.e.

$$k \rightarrow \frac{(N-1)}{2}$$

$$i_{m,t}^* = \xi i_{m,t-1} + \gamma_{\pi} \rho \pi_t + \frac{1}{\phi} g_t$$

# Loss Aversion in Monetary Policymaking

- ❑ Following Alesina and Passarelli 2015 we can introduce the **loss aversion** in the policymaker goal function.
- ❑ We assume that with loss aversion, and for every monetary policy choice, **losses loom larger than gains**, and both are evaluated with respect to the *status quo*.
- ❑ The loss adverse central bankers **overweight** the inflation distortions.
- ❑ **KEY POINT:** We will assume that **gender** and **loss aversion** can be associated.

# The MP Committee and the Status Quo

- ❑ Now, respect to the standard situation we are assuming that:
- ❑ i) each central banker will evaluate any policy in terms of **changes** from a monetary policy **status quo**;
- ❑ ii) any **negative** effect of a change with respect to the monetary policy status quo are thought to **loom larger** that positive effect of equivalent magnitude.
- ❑ In other words, with inflation is going up the increasing costs are over evaluated, while when inflation in going down the same is true for the decreasing benefits (**loss/gain asymmetry**).
- ❑ The two assumptions are a simply application of the **loss aversion** principle (Kahneman and Tversky 1979, Tversky and Kahneman 1991).

# The Loss Adverse Central Banker

- Formally: Let  $z$ , with  $z > 0$  be the parameter which captures **loss aversion** and let  $\pi^s$  the **status quo inflation**.
- Increasing inflation -  $\pi > \pi^s$  - entails more benefits and costs, but higher inflation costs yield a psychological experience of losses, which amounts to:

$$z(C(t_i, \pi) - C(t_i, \pi^s))$$

- Vice versa reducing the inflation rate -  $\pi < \pi^s$  - entails less benefits and costs, but lower inflation benefits yield a psychological losses which amount to:

$$z(B(t_i, \pi) - B(t_i, \pi^s))$$

# The Loss Adverse Central Banker (continued)

- Therefore the **central banker goal function with loss aversion**  $V(t_i, \pi / \pi^s)$  is given by the standard utility  $V(t_i, \pi)$  minus the psychological losses due to the departures from the status quo, i.e. ....

$$V(t_i, \pi / \pi^s) = V(t_i, \pi) - z(C(t_i, \pi) - C(t_i, \pi^s)) \text{ if } \pi > \pi^s$$

$$V(t_i, \pi / \pi^s) = V(t_i, \pi) - z(B(t_i, \pi) - B(t_i, \pi^s)) \text{ if } \pi < \pi^s$$

- The optimal conditions are as follows:

$$B(t_i, \pi) = (1 + z)C(t_i, \pi^s) \text{ if } \pi > \pi^s$$

$$(1 + z)B(t_i, \pi) = C(t_i, \pi^s) \text{ if } \pi < \pi^s$$

# The MPC Committee: Doves, Hawks and Pigeons

- Now for **each** central banker will true and **she likes the status quo, or dislike it**, preferring and higher and lower inflation rates
- Therefore every MPC can be splitted in **three** different groups: doves, ha

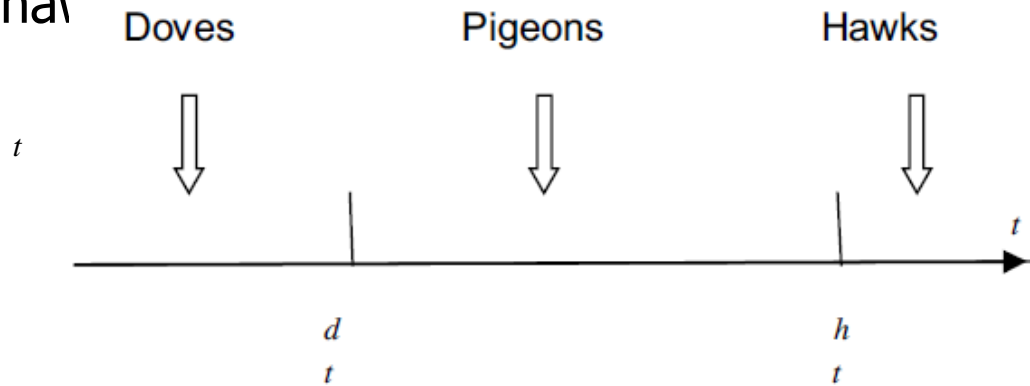


Fig. 3. Central banker types: doves, pigeons and hawks.

- And each MPC member will express well defined **inflation and interest rate preferences**

# Doves, Hawks and Pigeons (continued)

- Formally: given the status quo  $\pi^s$ , the dove central banker will be characterized by a level of conservativeness  $t^d$ , such that:

$$B(t_i, \pi^s) = (1 + z)C(t_i, \pi^s) \quad t^d$$

- While the hawk central banker will be characterized by a level of conservativeness  $t^h$ , such that:

$$(1 + z)B(t_i, \pi^s) = C(t_i, \pi^s)$$

- Where  $t^d < t^h$

- In general for each central banker it will be true that, given her level of conservativeness  $t_i$ , she will set her preferred inflation  $\pi_i$  target according to the following rule:

$$B(t_i, \pi) = (1 + z)C(t_i, \pi^s) \text{ if } t_i < t^d$$

$$(1 + z)B(t_i, \pi) = C(t_i, \pi^s) \text{ if } t_i > t^h$$

$$\pi = \pi^s \text{ if } t^d < t_i < t^h$$

# When the (Median) Pigeon Central Banker Wins

- We already know that the MPC chooses the monetary policy strategy using a **majority rule** and that the consequent outcome is the **median type's optimal inflation rate**  $\pi_m$  and optimal interest rate  $i_m$
- Therefore the optimal inflation rate will depend on the **median conservativeness**  $t_m$ , having three possibilities: dove, pigeon and hawk.
- More precisely **three** different equilibria can arise (see the next **Figure**) ....



# Inflation and the Median Central Banker

□ **Three** different equilibria can arise ....

$$\pi > \pi^s \text{ if } t_m < t^d$$

$$\pi = \pi^s \text{ if } t^d < t_m < t^h$$

$$\pi < \pi^s \text{ if } t_m > t^h$$

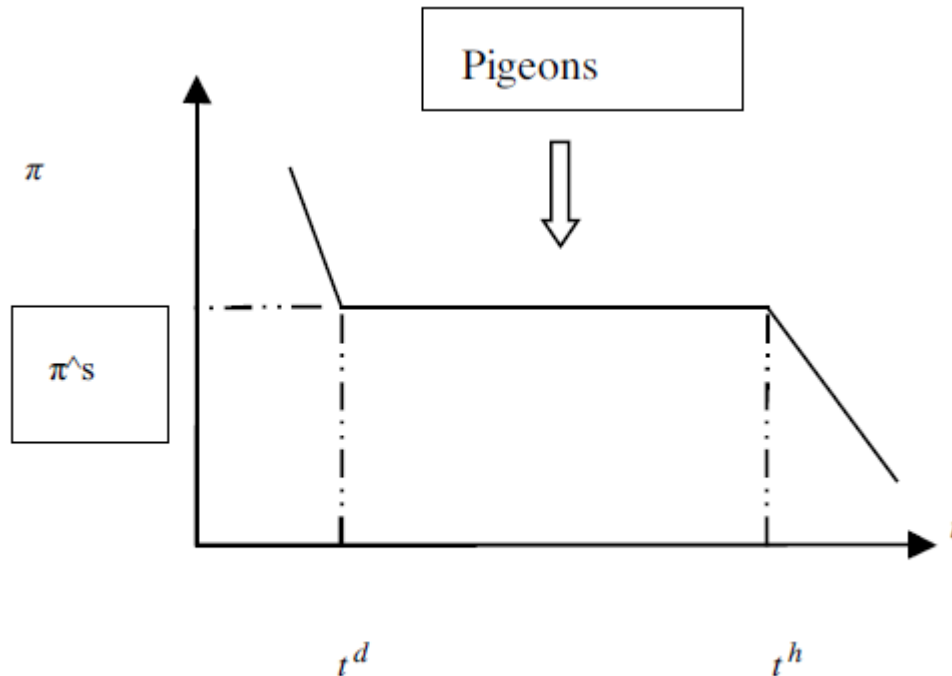


Fig. 4. Central banker types and inflation.

□ The policy outcome will be the **status quo inflation** if the median voter is a **pigeon**

# Monetary Inertia: 1) Moderation Effect

- ❑ The existence of **loss aversion** influences the monetary decisions under **three** different points of view:
- ❑ *Moderation Effect*: given that the **distance** between  $t^d$  and  $t^h$  is **increasing in  $z > 0$** , **the more the loss aversion is increasing the more likely a pigeon will be the median voter**: a status quo bias in the monetary strategy – i.e. monetary inertia - will emerge.
- ❑ As the central bankers become **more loss averse** the number of **pigeons increases** and the inertia in the interest rate setting is likely to increase
- ❑ In other words being the equilibrium interest rate and the median (pigeon) interest rate we have that **increasing loss aversion triggers interest rate inertia**, i.e. :

$$i^* = i_m = i^s \text{ if } z > 0 \rightarrow$$

## Monetary Inertia: 2) Hysteresis Effect

- ❑ The **status quo** will influence the monetary strategy also if the median voter is either a **dove** or a **hawk**.
- ❑ It is easy to show that, assuming that the status quo inflation is **too low** for the median central banker, **she will overweight the increase in inflation costs**, and the optimal inflation rate – as well as the optimal interest rate policy - follows to be relatively low respect to the standard case.
- ❑ In a specular way, also the opposite is true: suppose that the status quo inflation is **too high** for the median central banker: in this case **she will overweight the reduction in inflation benefits**, and the optimal inflation rate follows to be relatively high respect to the standard case (see the next **Figure**).
- ❑ In other words the status quo produces an **hysteresis effect** in the monetary policy decisions.

## 2) Hysteresis Effect

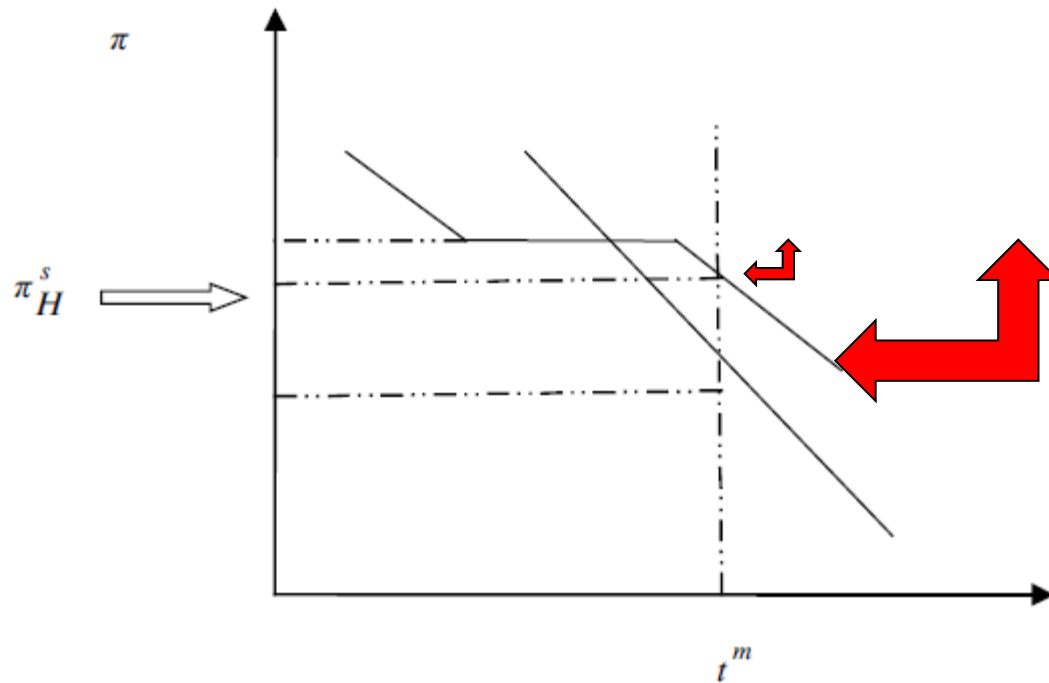


Fig. 6. Hysteresis effect with high inflation.

## Monetary Inertia: 3) Smoothing Effect

- ❑ On top of that, if there a **shock** in the conservativeness, only **big** shocks can trigger a change in the monetary policy stance.
- ❑ Let us assume to be in the status quo equilibrium and that the median central banker is a **pigeon** (see the next **Figure**).
- ❑ Suppose now that a shock hits the degree of conservativeness of the central bankers; for example the **dovishness increases**.
- ❑ Two cases can occur. If the shock is relative **low**, the median central banker is likely to remain a **pigeon**.
- ❑ In other words:  $i^* = i_m = i^s$  if  $\delta\tau \rightarrow 0$
- ❑ **Only** if the shock is relatively **big** the status quo inflation becomes too low for the median central banker.

### 3) Smoothing Effect

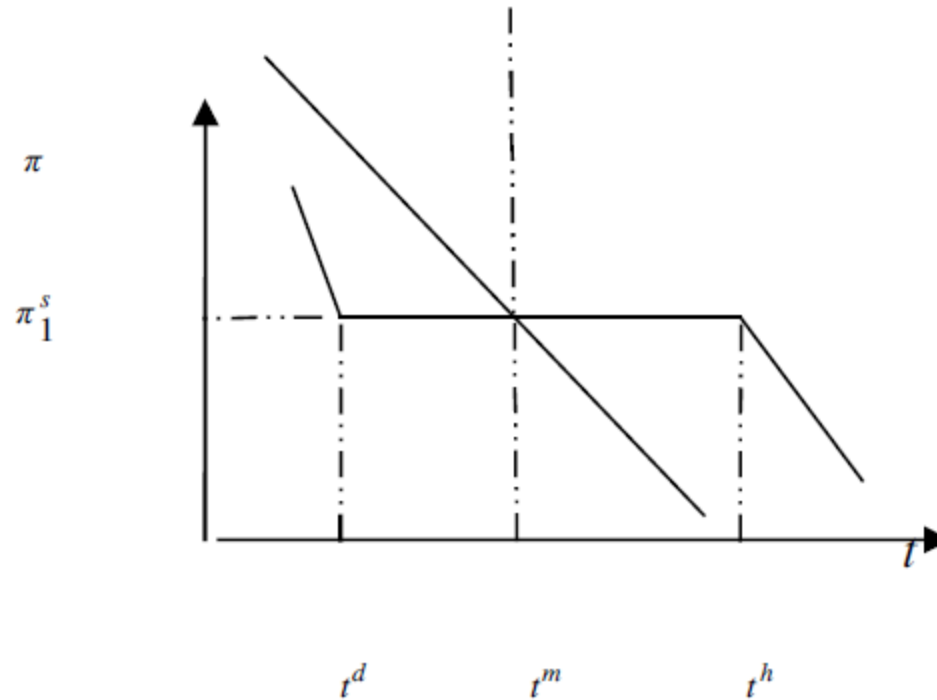


Fig. 7. Smoothing effect: starting point.

### 3) Smoothing Effect

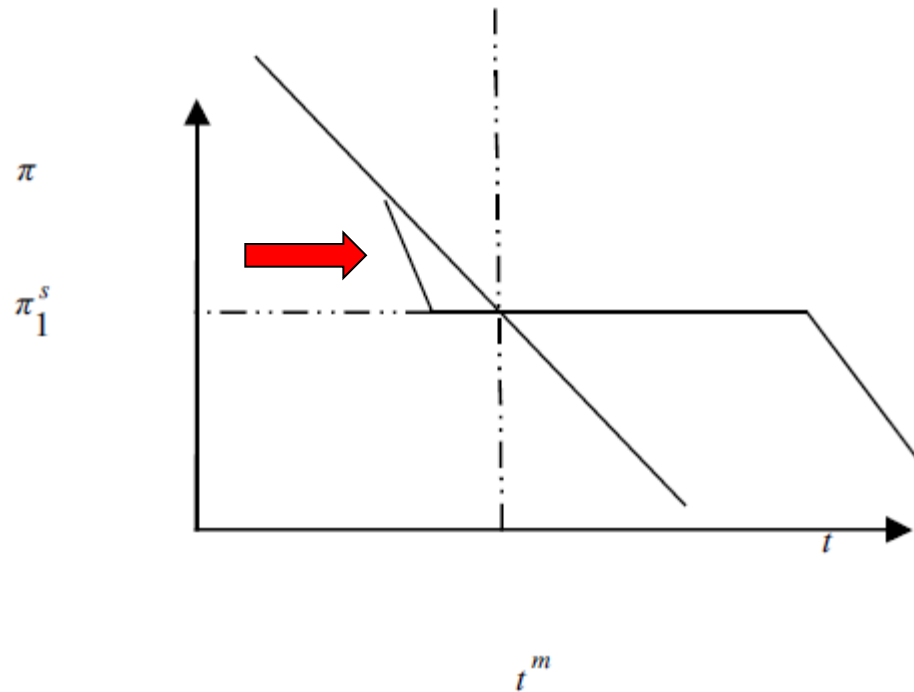


Fig. 8. Smoothing effect: low shock in conservativeness.

### 3) Smoothing Effect

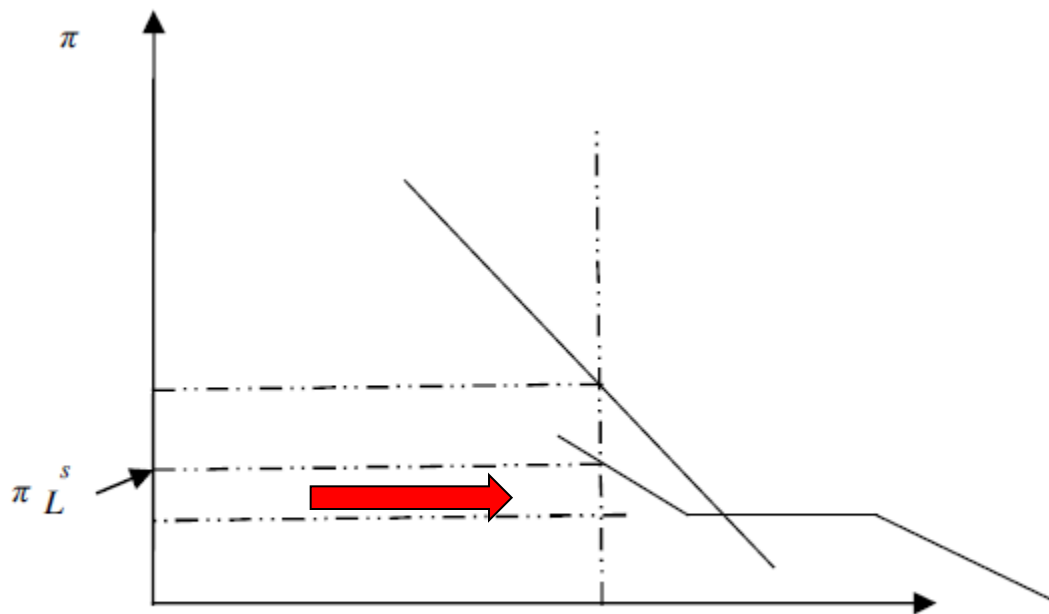


Fig. 9. Smoothing effect: high shock in conservativeness.



# Loss Aversion and MP Inertia

- ❑ Conclusion: as central bankers become **more loss averse** monetary policy **inertia increases**.
- ❑ The MP inertia is **independent** from both the existence of **frictions**, the central bank **governance** features and the **central banker standard preferences**.
- ❑ With behavioural biases in the MPC members monetary policy inertia – i.e. as usual a significant autocorrelation coefficient  $\xi > 0$  in the interest rate path – is more likely to occur if loss aversion is a significant phenomenon, i.e.  $z > 0$  :

$$i_{m,t}^* = \xi i_{m,t-1} + \gamma_{\pi} \rho \pi_t + \frac{1}{\phi} g_t$$

# Gender, Risk Preferences and MP

- ❑ **Gender** diversity can be associated with **risk aversion**,
- ❑ more precisely with a standard feature – i.e. **conservativeness** –
- ❑ and/or with a behavioural feature, i.e. **loss aversion**
- ❑ Now: The more the two assumptions are true
- ❑ The more likely is that gender diversity is associated with the **monetary policy** performances.
- ❑ But: How to **measure** gender diversity? We need a **metrics** ...

## 2) Metrics

- A rich and new dataset with information of members of Monetary Policy Committees in 37 countries for the period 2002-2015
- New index of gender representation in central bank boards for a large sample of countries
- Investigation of the potential drivers of an increased presence of women in central banks
- Implications for the conduct of monetary policy

# Data Sources

- Central Bank Directories
  - ▶ Names of Monetary policy board members which are used to identify gender
  - ▶ Gender staff ratio
- World Bank
  - ▶ Governance indicators
  - ▶ Inflation adversion
  - ▶ Output Gap
- IMF
  - ▶ Inflation
  - ▶ Lending rate
  - ▶ Money growth
- World Economic Forum
  - ▶ Country Gender Equality Index

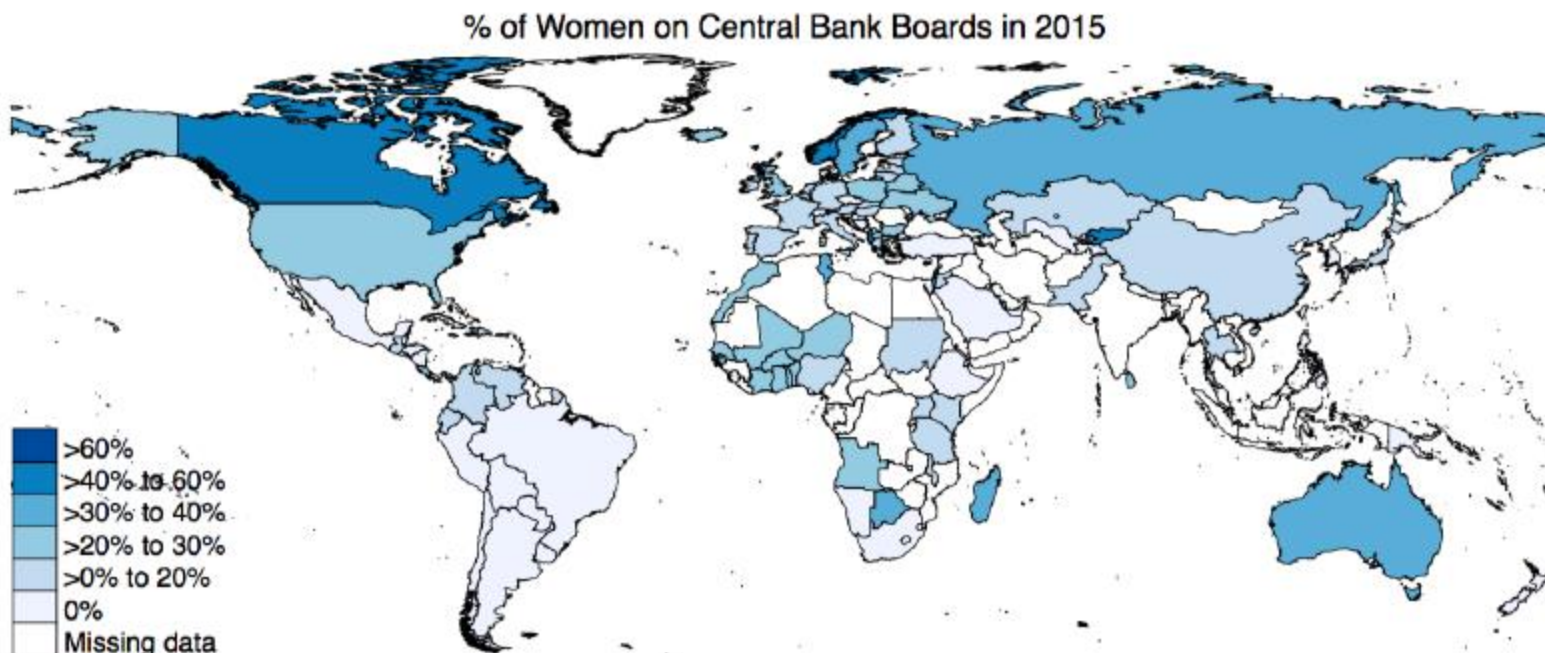
# Data Sources (continued)

- Romelli, D. (2016). The political economy of reforms in central bank design: evidence from a new dataset. Mimeo, Department of Economics, ESSEC Business School
  - ▶ Central Bank Independence
  - ▶ Inflation Targeting Regime
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. W. (1997). Legal determinants of external finance. *Journal of finance*, 1131-1150
  - ▶ Civil law Dummy
- Dimensions - Geert Hofstede
  - ▶ Power Distance Index
- OECD
  - ▶ OECD Membership

# Gender in MP: The GMP Index

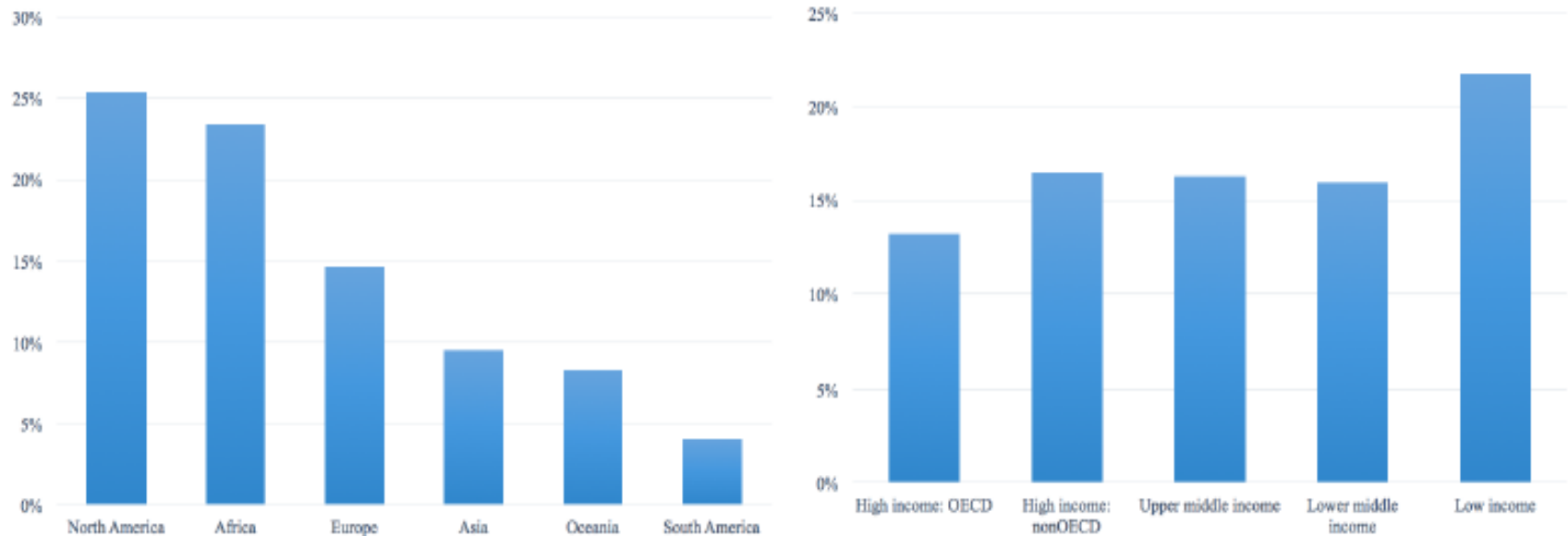
The GMP Index: measures the share of women in MP committees:

- 112 countries as of 2015
- Restricted sample of 37 countries: evolution over 2002-2015
- Sources: Central Bank Directories 2002-2015, Central Bank websites



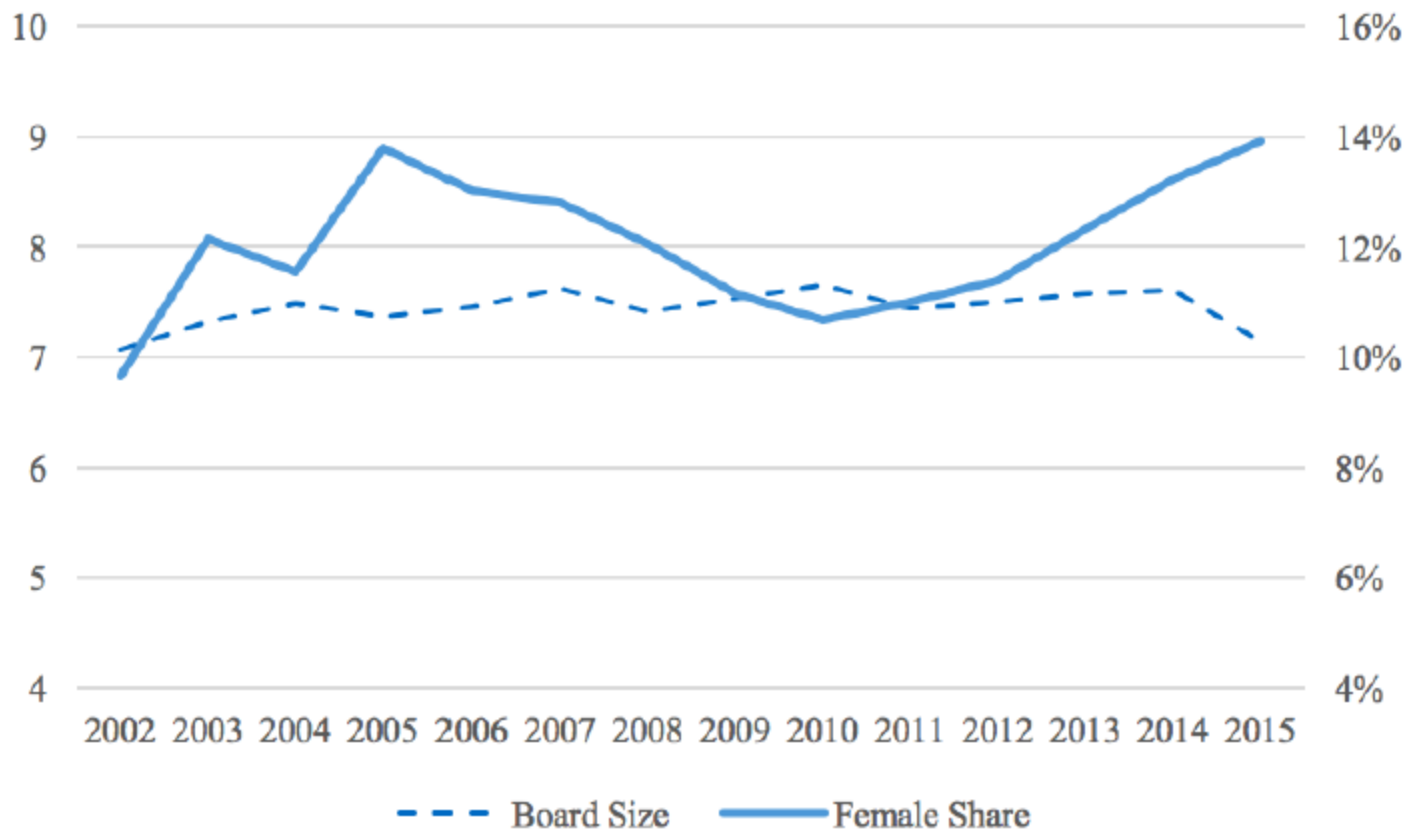
# Descriptives : The GMT index (2015)

Figure: Share of Women on Board by geographical region and income group



# Descriptives : The GMT Dynamics

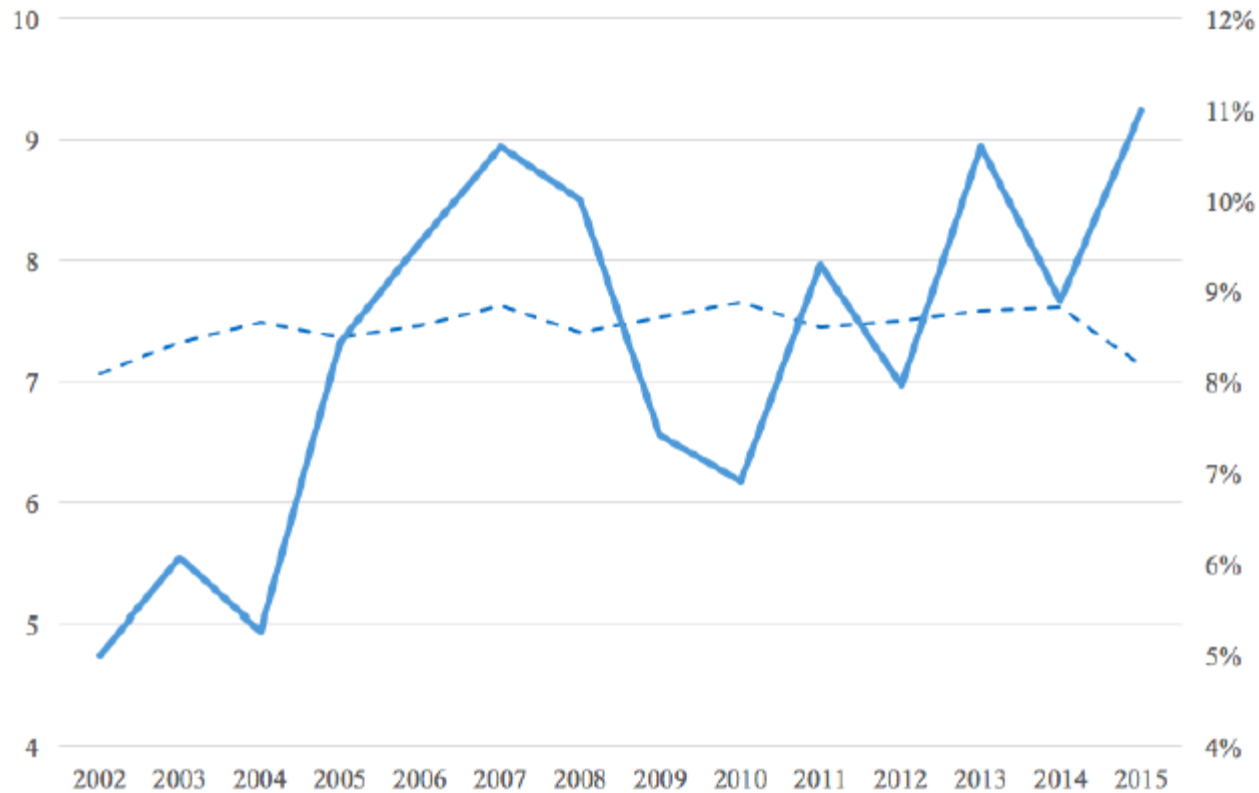
Figure: Evolution of Share of Women on Board vs Board Size





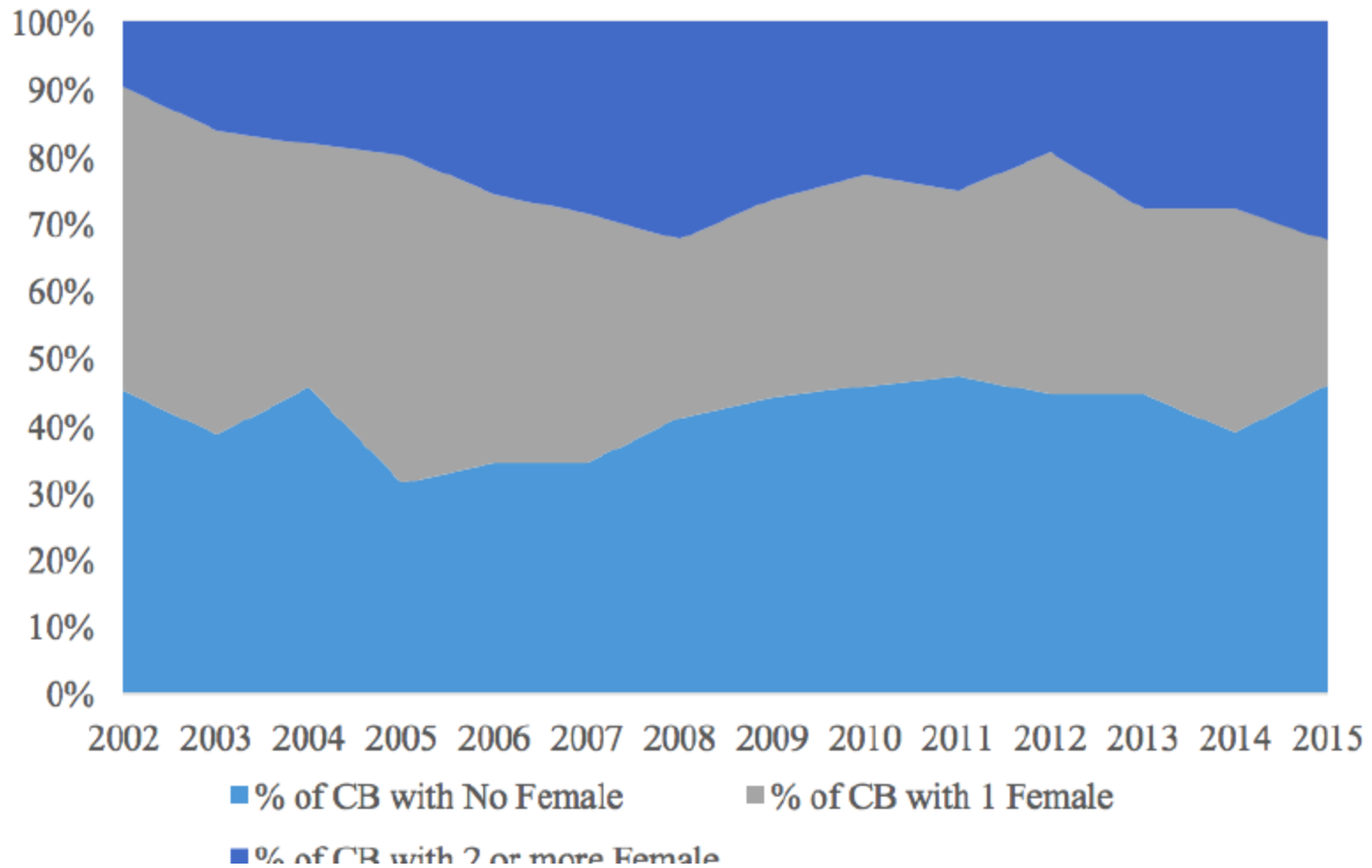
# Descriptives : The GMT Dynamics

Figure: Share of (Deputy) Governors vs Board Size



# Descriptives : The GMT Dynamics

Figure: Presence of Women in Central Bank Boards over time



### 3) EMPIRICS: The GMT Drivers

Dependent Variable: GMP Index (as of 2015)						
	(1)	(2)	(3)	(4)	(5)	(6)
Staff gender ratio	0.006*** (0.002)			0.005* (0.003)	0.004** (0.002)	0.006** (0.002)
Country gender equality		0.673* (0.384)				
Central bank independence			0.154* (0.084)	0.216* (0.125)		
Power Distance					-0.002** (0.001)	
Inflation aversion						0.006 (0.042)
OECD Member	-0.078 (0.060)	-0.002 (0.043)	-0.078 (0.090)	-0.151 (0.112)	-0.068 (0.058)	
Inflation Targeting Regime	0.058 (0.044)	0.016 (0.037)	0.019 (0.058)	0.036 (0.072)	0.124*** (0.043)	0.043 (0.043)
Civil Law Dummy	-0.040 (0.037)	-0.088** (0.035)	-0.159*** (0.048)	-0.218*** (0.067)	-0.093** (0.041)	-0.042 (0.037)
Governance Indicators	0.028 (0.035)	-0.020 (0.032)	0.059 (0.047)	0.119** (0.056)	0.013 (0.037)	-0.004 (0.020)
Observations	77	64	52	34	41	76
R-squared	0.184	0.157	0.187	0.465	0.418	0.170

Constant term included but not reported.

# GMT and Monetary Policy (work in progress)

Taylor Rule:  $r_{it} = \alpha_i + \tau GMP_{it} + \beta \pi_{i,t+1} + \gamma Output\ Gap_t + \rho r_{i,t-1} + \epsilon_{it}$

Dependent Variable:	Lending rate				Inflation rate
	(1)	(2)	(3)	(4)	(5)
GMP		1.293** (0.645)	3.180* (1.740)	1.454** (0.662)	-2.542* (1.338)
Inflation	0.130*** (0.045)	0.133*** (0.045)	0.178** (0.083)	0.133*** (0.049)	
Output gap	-0.774 (0.810)	-0.789 (0.782)	-1.676 (1.271)	-0.807 (0.754)	1.253 (0.984)
Lag Lending rate	0.909*** (0.022)	0.910*** (0.021)	0.667*** (0.048)	0.910*** (0.021)	
Money growth				-0.001 (0.009)	0.117** (0.049)
Central Bank Independence					-0.170 (0.489)
Lagged Inflation					0.520*** (0.091)
OECD Member					-0.707* (0.397)
Observations	378	378	343	364	318
Countries	35	35	34	34	27

Constant term included but not reported.

# GMT and Monetary Policy (work in progress)

$$\text{Inflation Dynamics } \pi_{it} = \alpha_i + \tau \text{GMP}_{it} + \rho \pi_{i,t-1} + \gamma X_{it} + \epsilon_{it}$$

Dependent Variable:	Lending rate				Inflation rate
	(1)	(2)	(3)	(4)	(5)
GMP		1.293** (0.645)	3.180* (1.740)	1.454** (0.662)	-2.542* (1.338)
Inflation	0.130*** (0.045)	0.133*** (0.045)	0.178** (0.083)	0.133*** (0.049)	
Output gap	-0.774 (0.810)	-0.789 (0.782)	-1.676 (1.271)	-0.807 (0.754)	1.253 (0.984)
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OECD Member					-0.707* (0.397)
Observations	378	378	343	364	318
Countries	35	35	34	34	27

Constant term included but not reported.

# Conclusion

- ❑ Gender diversity can be associated with risk aversion, more precisely with a standard feature – i.e. conservativeness – and/or with a behavioural feature, i.e. loss aversion
- ❑ The more the two assumptions are true, the more likely is that gender diversity is associated with the monetary policy performances.
- ❑ In order to measure gender diversity we proposed a metrics ...

## Conclusion (continued)

- We build a new index of gender representation in monetary policy committees
- The share of women in central bank boards is quite low, averaging at around 15% in a sample of 112 countries
- 30% of countries have no female board members and 48% have less than 10%
- Share of women has been increasing over the past one decade, but mainly due to central banks in which representation was already higher
- We show that gender representation on monetary policy boards can be explained by some country or institutional factors
- Female representation can impact monetary policy making, as a higher share of women members is associated with a more hawkish attitude
- Work in progress: include data for 80 countries from 1994 to 2016