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Dissertation Abstract

Many academic economists and central bank practitioners seem to agree nowadays that transparent and predictable behavior not only promotes the credibility and democratic accountability of an independent central bank but also creates a stable environment to manage the private sector expectations, reduces the uncertainty in financial markets, and, eventually, enhances the transmission and effectiveness of monetary policy itself and leads to social benefits. To study the econometric identification and predictability of monetary policy, this thesis develops the methodology (well suited for many central banks), combining the use of regression techniques for a discrete ordered dependent variable, decision-making meetings of monetary authority as a unit of observation, voting records of interest-rate-setting meetings, and real-time data.

The proposed methodological framework carefully mimics the actual policy-action-generating process since: (i) most major central banks alter interest rates by discrete-valued adjustments, typically multiples of 25 basis points; (ii) policy decisions are naturally made using information available in the real-time setting; (iii) they are typically made 6-12 times per year at special policymaking meetings; (iv) the vast majority of central banks entrust the conduct of monetary policy to a committee, composed by the heterogeneous and quite often dissenting members; and (v) no-change decisions commonly constitute an absolute majority and can be potentially generated by different decision-making processes.

However, the empirical studies routinely estimate the monetary policy rules by (i) applying the regression methods for a continuous dependent variable; (ii) using currently available series of economic data; (iii) analyzing the systematic responses of policy rate's averages to economic data averages for a given month or quarter; (iv) modeling the policy decisions made by a committee and disregarding the disagreement among the policymakers; and (v) treating all the observations as coming from the same data-generating process and applying a single-equation model.

Obviously, such practice leads to misspecification of the actual data-generating process and distorts the inference because: (i) the regression methods for a continuous dependent variable are shown to be inadequate when the dependent variable is discrete, (ii) the latest versions of statistical data may differ from the real-time ones due to the revisions, (iii) the time aggregation of data misaligns the timing of policy decisions and availability of statistical data as well as raises the problem of simultaneity; (iv) the failure to address the heterogeneity of policy preferences can lead to an inefficiency (and even bias, if the model is non-linear); besides, the dissent among the policymakers at the last meeting may carry a strong hint about where policy rates might move in the future; and (v) the assumption of homogeneous population, when the data are actually generated by different processes, causes bias in estimates.

A separate contribution of the thesis is a new methodology for modeling the ordinal variables, which is likely to be fruitfully applied to the ordered data (such as the attitudes, opinions, or discrete changes to the ranking) that are characterized by the abundant observations in the middle neutral or zero category.

Another separate contribution is the compilation of novel Polish real-time data set incorporating the original time series, available to policymakers at each policy-setting meeting during the 1998-2009 period.

The first chapter assesses separately the statistical effects of using the linear regression model instead of ordered probit (OP) one and the latest revised monthly-averaged data instead of real-time one with the policy-making meetings as a unit of observation. The formal comparison shows that the discreteness and real-time data do matter in the empirical identification of Polish monetary policy.

The study detects structural breaks in policy, which switched its focus from current to expected inflation and from exchange rate to real activity. The response to inflationary expectation is shown to be highly asymmetrical depending on whether the expectation is above or below the inflation target. The policy rate appears to be driven by key economic indicators without evidence for intentional interest-rate smoothing by the central bank. The estimated rules correctly explain 95 percent of observed policy actions and surpass the market anticipation made one day prior to a policy meeting, both in and out of sample.

The second chapter provides empirical evidence on whether the voting records of the last policymaking meeting could improve the predictability and private sector

anticipation of the next policy rate decision in Poland. The case of Poland, where the voting records become available only after the subsequent policy meeting, provides an interesting opportunity to investigate whether the disclosure of votes could create news for the private sector as late as one day before a policy meeting, when information on the state of economy available to the public is as close as possible to that available to the policymakers at their meeting the next morning. If the voting records add information, they can improve the public's understanding of the systematic policy responses and decision-making process of the central bank.

This work not only extends the scarce empirical literature, but also makes a contribution in the following directions. First, do voting records (in addition to relevant economic data) help forecast the next policy rate decision? Second, could dissenting votes, if they were available, add information to the market expectations of upcoming policy decision? Third, do voting records enhance the policy predictability beyond the private sector anticipation? And fourth, can the direction of dissents and dispersion of votes explain the direction of bias and uncertainty of private sector forecasts? The answer to all the questions is "yes".

All of the findings are based on the voting patterns only, without the knowledge of the policymakers' names attached to each vote. Therefore, they might be of interest to the central banks that currently do not publish the voting records because of the reluctance to disclose the individual members' votes (e.g., the European Central Bank).

The second chapter provides clear policy messages. First, the National Bank of Poland can further improve the predictability and public understanding of its monetary policy by publishing the voting records as soon as possible, preferably in its press releases immediately after a policy meeting. Second, the voting records should include the proposed policy choice of each dissenting member.

The ordinal outcomes, such as the attitudes, opinions, discrete changes to the ranking or policy interest rate, are often characterized by the abundant observations in the middle neutral or zero category (e.g., the indifferent attitude to survey question, or no change to the ranking or rate). Such excessive zeros can be generated by different groups of population or separate decision-making processes. Besides, the positive and negative outcomes can be driven by distinct sources. In such situation, it would be a misspecification to treat all the observations as coming from the same process and apply a standard ordered-response model based on a single latent equation. The third

chapter develops a more flexible cross-nested model for such type of the ordinal variables, combining three OP latent equations with possibly different sets of covariates.

The proposed middle-category-inflated ordered probit model (MIOP) allows the separate mechanisms to determine what I call the inclination decision ($\Delta y \leq 0$ versus $\Delta y = 0$ versus $\Delta y \geq 0$, interpreted as a loose, neutral or tight policy stance) and two amount decisions (the magnitude of Δy when it is nonpositive or nonnegative), conditional on the loose or tight policy stance. The inclination decision is driven by reaction to the changes in the macroeconomic environment, whereas the amount decisions let policy stance be offset by the institutional features of monetary policymaking. The probability of no-change outcome is inflated, since there are the following three types of zeros: the "always" or "neutral" zeros, generated directly by the neutral policy reaction to the economic developments, and two kinds of "not-always" or "offset" zeros, the "loose" and "tight" zeros, generated by the loose or tight policy inclinations offset by the institutional factors. The model also allows for the possible correlation among three latent decisions.

The Monte Carlo results suggest good performance of the MIOP model in the finite samples and demonstrate its superiority with respect to the conventional and nested OP models.

The MIOP model is then applied to explain policy rate decisions of the National Bank of Poland, using the panel of the individual votes of policymakers and real-time macroeconomic data available at the policy meetings. The two-stage three-regime approach attempts to address the worldwide stylized facts of interest rate setting such as the discreteness, preponderance of no-change decisions and inertia. The voting preferences appeared to be well-modeled by such an approach. Not only does it fit the data much better, but also it has some important advantages over the single- and two-equation models, such as the standard OP, multinomial probit and zero-inflated OP models. The empirical application demonstrates the advantages of the MIOP model in separating different decision-making paths for three types of zeros and estimating the proportion of zeros generated by each regime.