New Working Papers from Norges Bank

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Steinar Holden: "Monetary regime and the co-ordination of wage setting". Arbeidsnotat 2000/1. 38 pp. ISSN 0801-2504. ISBN 82-7553-157-8.
International comparisons show that countries with co-ordinated wage setting generally have lower unemployment than countries with less co-ordinated wage setting. This paper argues that the monetary regime may affect whether co-ordination among many wage setters is feasible. A strict monetary regime, like a countryspecific inflation target, to some extent disciplines wage setters, so that the consequences of uncoordinated wage setting are less detrimental than under a more passive monetary regime (eg a monetary union). Thus, the gains from co-ordination are larger under a passive regime. Under some circumstances a passive regime may induce co-operation in wage setting, and thus lower unemployment, when a stricter regime would not.
JEL classification: E24, J5, E52.
Keywords: wage setting, co-ordination, equilibrium unemployment, monetary regime, monetary union.

Kai Leitemo: "Open-economy inflation forecast targeting". *Arbeidsnotat* 2000/2. 36 pp. ISSN 0801-2504. ISBN 82-7553-158-6.
The paper shows that the procedure of inflation forecast targeting arguably implemented by Sveriges Riksbank and the Bank of England may lead to high nominal and real variability; the latter being manifested most notably in the traded sector. A long inflation forecast targeting horizon results in extensive smoothing of interest rate movements. This implies only weak nominal interest rate responses to disequilibrium conditions, causing the real interest rate and hence the real exchange rate to fluctuate persistently. The paper offers an explanation for the recent large variability of Swedish inflation and UK manufacturing sector output.
JEL classification: E52, E47, E43.
Keywords: inflation targeting, forecast targeting, monetary policy, small open economy.

Gunnar Bårdsen and Ragnar Nymoen: "Testing steady-state implications for the NAIRU". *Arbeidsnotat* 2000/3. 22 pp. ISSN 0801-2504. ISBN 82-7553-159-4.
Estimates of the NAIRU are usually derived either from a Phillips curve or from a real wage curve in an incomplete competition model. This paper investigates the correspondence between the operational NAIRU concepts and the steady state of a dynamic wage-price model. We derive the parameter restrictions that secure that correspondence. The full set of restrictions can be tested by econometric analysis of the wage-price system, and this method is demonstrated for Norwegian data. A set of necessary conditions can be tested from estimated "wage-curves" alone. Existing international evidence from empirical wage equations are re-interpreted in light of these conditions.
Keywords: Phillips curve, steady state, natural rate, NAIRU, dynamic modelling, correspondence principle.

Kai Leitemo and Øistein Røisland: "The choice of monetary policy regime for small open economies"*Arbeidsnotat* 2000/5. 37 pp. ISSN 0801-2504. ISBN 82-7553-162-4.
The paper analyses alternative monetary policy regimes within a simple, estimated macroeconomic model with a traded and a non-traded sector. Two general classes of regimes are considered, inflation targeting and exchange rate targeting, where the latter also includes monetary union. By analysing monetary policy rules within a disaggregated model, the paper adds new insights to the literature on optimal monetary policy rules for open economies. The results suggest that flexible inflation targeting gives lower nominal and real variability than exchange rate targeting or monetary union. The main reason for this is that targeting the nominal exchange rate gives rise to persistent oscillations in the real interest rate and the real exchange rate due to the "Walter's effect". Contrary to conventional wisdom, the results suggest that the traded sector is more stable under flexible inflation targeting than under exchange rate targeting.
JEL classification: E42, E61, E32.
Keywords: inflation targeting, exchange rate targeting, monetary policy, small open economy.

Gunnar Bårdsen, Eilev S. Jansen and Ragnar Nymoen: "Model specification and inflation forecast uncertainty". *Arbeidsnotat* 2000/6. 26 pp. ISSN 0801-2504. ISBN 82-7553-163-2.
Inflation forecasting properties for the dynamic incomplete competition model (ICM) and the expectations augmented Phillips curve model are compared. The ICM both forecasts annual inflation better and has a significantly smaller forecast error than the Phillips curve model. The results show that different specifications can be tested. There is a role for econometric model specification and evaluation in order to reduce the amount of model uncertainty. If one nevertheless insists on using the inferior econometric model, our findings implies that the excess (and artificial) uncertainty is significant.
JEL classification: C32, C51, C52, C53, E31, E52.

Keywords: monetary policy, inflation targeting, wages and prices, model specification, encompassing, model uncertainty, forecasting.

Qaisar Farooq Akram: "PPP despite real shocks: An empirical analysis of the Norwegian real exchange rate". *Arbeidsnotat* 2000/7. 75 pp. ISSN 0801-2504. ISBN 82-7553-164-0.
Despite the emerging consensus on the validity of purchasing power parity (PPP) between trading countries in the long run, empirical evidence in favour of the PPP theory is scarce in data predominantly exposed to real shocks. This paper tests for PPP between Norway and its trading partners using quarterly observations from the post Bretton Woods period, in which the Norwegian economy has been exposed to numerous real shocks such as frequent revaluations of oil and gas resources through new discoveries and price fluctuations. The paper undertakes an extensive examination of the behaviour of the Norwegian real and nominal exchange rates and shows that it is remarkably consistent with the PPP theory. Moreover, convergence towards the equilibrium level appears relatively fast; our estimate of the half life of a deviation from the equilibrium level is just six quarters. This is partly attributed to the Norwegian government's policies aimed at preserving the competitiveness of the economy and the system of centralised wage bargaining.
JEL classification: C22, C52, C51, E31. E58, F41, J51.
Keywords: PPP, real exchange rate, oil prices, Dutch disease, centralised wage bargaining, exchange rate policy, cointegration analysis.

Qaisar Farooq Akram: "When does the oil price affect the Norwegian exchange rate?" Arbeidsnotat 2000/8. 47 pp. ISSN 0801-2504. ISBN 82-7553-165-9.
Major changes in the Norwegian exchange rate have often coincided with large fluctuations in the price of crude oil. Previous empirical studies have however suggested a weak and ambiguous relation between the oil price and the exchange rate. In contrast to these studies, this paper explores the possibility of a non-linear relation between oil prices and the exchange rate. An examination of daily observations reveals a negative relation between the oil price and the nominal value of the currency. The strength of this relation depends on whether the oil price is below, inside or above the range of 14-20 US dollars a barrel. Moreover, it depends on whether the oil price is displaying a falling or rising trend. The relation is relatively strong when oil prices are below 14 dollars and are falling. These non-linear effects are tested and quantified within equilibrium correcting models of the exchange rate, derived on monthly and quarterly data to control for the influence of other macroeconomic variables. The models with non-linear oil price effects outperform similar models with linear oil price effects. The latter models grossly underestimate the exchange rate response to oil price changes in a state of low oil prices. The paper undertakes an extensive evaluation of the derived models to demonstrate the robustness of the results.
JEL classification: C51, E44, E52, F31.
Keywords: currency crises, exchange rate, oil price, non-linear econometric models.

Kai Leitemo: "Strategic interaction between the fiscal and monetary authorities under inflation targeting". *Arbeidsnotat* 2000/9. 27 pp. ISSN 0801-2504. ISBN 82-7553-166-7.
This paper studies the strategic interaction between the fiscal and monetary authorities when the monetary policymaker pursues an underlying inflation target. Given that monetary policy is transparent and the fiscal policymaker can commit to a particular policy stance, the Stackelberg equilibrium can be implemented. If the conditions for Stackelberg leadership is not present, policies may end up in a Nash equilibrium, resulting in excessive interest and exchange rate volatility. Legislative restrictions on fiscal policy may then be stabilising, whereas they may be counterproductive in the Stackelberg case.
JEL classification: E61, E63, E42, E52.
Keywords: small open economy, inflation targeting, policy coordination, policy interdependencies.

Øyvind Eitrheim, Eilev S. Jansen and Ragnar Nymoen: "Progress from forecast failure – the Norwegian consumption function". *Arbeidsnotat* 2000/10. 30 pp. ISSN 0801-2504. ISBN 82-7553-167-5.
After a forecast failure, a respecification is usually necessary to account for the data ex post, in which case there is a gain in knowledge as a result of the forecast failure. Using Norwegian consumption as an example, we show that the financial deregulation in the mid 1980s led to forecast failure both for consumption functions and Euler equations. Counter to wide-held beliefs, we show analytically and empirically that this constellation of forecast failures is inconsistent with an underlying Euler equation. Instead, respecification led to a new consumption function where wealth plays a central role. That model is updated and is shown to have constant parameters despite huge changes in the income to wealth ratio over nine years of new data.
JEL classification: C51, C52, C53, E21, E27.
Keywords: consumption functions, equilibrium correction models, Euler equations, financial deregulation, forecast failure, progressive research strategies, VAR models.

Kai Leitemo: "The performance of inflation forecast feedback rules in small open economies". *Arbeidsnotat* 2000/11. 39 pp. ISSN 0801-2504. ISBN 82-7553-168-3.
This paper examines the performance of inflation forecast feedback rules in a two-sector, calibrated model of the UK economy. Under such rules, the

interest rate responds to the deviation of the unchanged-interest-rate forecast of inflation from the inflation target. We find that this procedure may produce a high degree of nominal and real stability, even outperforming the optimal discretionary (flexible) inflation targeting strategy. In order to take adequate account of the exchange rate channel, the feedback horizon will need to be short. A feedback horizon of a year or more creates exchange rate volatility, resulting in higher variability in inflation and traded sector output.
JEL classification: E61, E47, E43.
Keywords: monetary policy, inflation targeting, inflation feedback rules, simple rules, small open economy.

Eilev S. Jansen: "Statistical issues in macroeconomic modelling". *Arbeidsnotat* 2000/12. 32 pp. ISSN 0801-2504. ISBN 82-7553-169-1.
The paper describes the influx of mathematical statistics in economics. It focuses on an approach to macroeconometric modelling which is based on fundamental statistical concepts like the joint distribution function of all observable variables for the whole sample period. The methodology relies on valid conditioning and marginalisation of this function in order to arrive at tractable subsystems, which can be analysed with statistical methods. Two case studies - the modelling of the household sector and the modelling of wages and prices in the Norges Bank RIMINI model - highlight this.
JEL classification: B23, C50, C51, C52, C53, E21, E31, E37.
Keywords: macroeconometric modelling, role of statistics, Norges Bank's RIMINI model, Haavelmo distribution, sequential conditioning and marginalisation, dynamic modelling, aggregate consumption, wages and prices, testing of rival models.

B. Gabriela Mundaca: "Optimal bailout during currency and financial crises: A sequential game analysis". *Arbeidsnotat* 2000/13. 45 pp. ISSN 0801-2504. ISBN 82-7553-170-5.
We present a model that illustrates the close relationship between the possibility of a currency crisis and the amount of private-sector debt within a four-stage sequential game framework. The agents are the government and the private sector in a small economy. In the first stage, the government announces that a fixed exchange rate regime will be pursued, and all agents in the economy receive probabilistic information about a future shock that will occur in the last stage. This shock will affect unemployment and net returns on private sector investment. At this stage, the government can already commit to bailing out part of the private sector liabilities of outstanding stock in the event of a bad shock occurring. We also consider the case where the government waits until the last stage to make decisions about the optimal bailout. The private sector in stage 2 forms expectations about the future exchange rate and engages in risky investments. In stage 3, the government faces costs due to expectations of future devaluation and private-sector debt, anticipating the stochastic shock that will occur in stage 4. In this stage, the government may or may not find it optimal to pre-emptively abandon its fixed exchange rate policy. We find that these decisions to commit or not to commit have very important implications for the government's optimal decision and expectations formation in the private sector. A commitment to bailing out provides a reconciliation of the multiple equilibria that result from self-fulfilling expectations. It is found that commitment to debt bailouts may discourage speculative attacks, in which case it will never be optimal to devalue, even in the case of losses in investment projects. Thus, the government may sometimes avert currency crises by committing to bailing out.
JEL classification: E44, F30, F41.
Keywords: financial and currency crisis, bailouts, sequential games, multiple and unique equilibrium.

David Humphrey, Aris Kaloudis and Grete Øwre: "Forecasting cash use in legal and illegal activities". *Arbeidsnotat* 2000/14. 38 pp. ISSN 0801-2504. ISBN 82-7553-171-3.
A general econometric model is developed and used to estimate the share of cash in consumer point-of-sale transactions in Norway over 1980-99. The share of cash fell from 90% during the 1980s to 50% in 1999, primarily due to debit card growth. Additional data from banks, stores, and elsewhere give an estimate of the total cash use in legal activities. The stock of cash that is unaccounted for is an estimate of cash used in illegal activities. This totals 10% of GDP and has risen by 63% over 5 years. Projections of future cash use are also made.
JEL classifications: E41, H26.
Keywords: cash, money, tax evasion.

Øistein Røisland and Ragnar Torvik: "Fiscal policy under inflation targeting". *Arbeidsnotat* 2000/15. 35 pp. ISSN 0801-2504. ISBN 82-7553-174-8.
The paper discusses the role of fiscal policy as an instrument for macroeconomic stabilisation when monetary policy pursues inflation targeting. Within a theoretical model of an open economy with a traded and non-traded sector, we show that inflation targeting may lead to large sectoral imbalances when fiscal policy is passive. There is a potentially large welfare gain from an active fiscal policy, in particular when sectoral stability is included in the welfare function. However, with reasonable parameter values, a small cost of adjusting fiscal policy reduces the optimal degree of activism considerably. The reason is that a given change in output requires a large change in the fiscal policy stance under inflation targeting, because of the monetary policy reaction function.
JEL classification: E52, E62, F41.
Keywords: inflation targeting, fiscal policy, monetary policy, small open economy.