Reports from the Economic Research Centre*

Long-run links among money, prices and output: world-wide evidence

Discussion paper 14/01
by Helmut Herwartz and
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Many theoretical macroeconomic models are underpinned by the belief that, in the long run, inflation is a monetary phenomenon. Empirical tests of this thesis are overwhelmingly based on studies of national money-demand functions, supplemented by cross-sectional analyses in which the average growth rates of monetary aggregates and prices, as well as those of real output and monetary aggregates, are investigated for a raft of countries. A comparison of the growth rates supports the initial hypothesis. In terms of their methodologies, though, such studies have obvious shortcomings.

This research paper uses a P-star model to analyse the relationship between monetary aggregates, prices and output. This theoretical approach is based on the modern version of the quantity theory and regards the current inflation rate as being dependent on a "price gap" which describes the relationship between the current price level and an equilibrium price level. The equilibrium price level is the price level attained given normal capacity utilisation and the current supply of money. A number of theoretical restrictions may be derived from this theory, which are investigated

* In this section selected discussion papers are presented and summarised. All recent discussion papers are downloadable from the Bundesbank's web site (http://www.bundesbank.de)

using a panel cointegration approach. This new approach combines a non-stationarity method for macroeconomic time series, which has become standard practice over the past few years, with cross-sectional approaches. In this paper, the error-correction approach for non-stationary time series is applied to pooled data to yield more meaningful results. The chosen approach makes it possible to test for cointegration and parameter restrictions in the cointegration vector using a simulation approach (the "wild bootstrap approach").

It becomes apparent that, at the national level, a cointegration relationship between money, output and prices is not found in all cases. Cointegration between these variables, however, can be confirmed for the pooled country analyses. Furthermore, the parameter restrictions for the cointegration vector implied by the P-star model are tested consecutively. These individual restrictions must be rejected if all countries are studied simultaneously, regardless of whether the monetary aggregate under investigation is broadly or narrowly defined.

By contrast, if the restrictions implied by the model are entered into the model wholesale, thus causing the inflation equation of the P-star model to be estimated as an error-correction model, it emerges that the coefficients of the price gaps in the pool are, on the whole, significantly different from zero. In order to refute the objection that the evidence is supported only by the parallel movement of monetary growth and inflation rates in some high-inflation countries, the countries in the pool are arranged according to their average inflation rates. The greater the number of higher-inflation countries entering the pool, the stronger the rejection of the null hypothesis will be, and the greater will be the impact of the price gap on inflation.

On the whole, this study confirms the hypothesis that monetary growth is a crucial element in the long-term future development of prices. These findings thus support the view that a forward-looking stability-oriented monetary policy has to take monetary developments very seriously.

Currency portfolios and currency exchange in a search economy

Discussion paper 15/01
by Ben Craig and Christopher J. Waller

In many developing and transitional economies, "safe" foreign currencies such as the US dollar or the D-Mark (and probably also the euro in future) circulate as a medium of exchange alongside the "risky" domestic currency, which is subject to unexpected losses of purchasing power. This phenomenon is often called "dollarisation". Furthermore, there is active domestic currency exchange. At first glance, the existence of these two trading patterns may not appear to be unusual, but it actually creates a puzzle: if both currencies are accepted as media of exchange, why are currencies exchanged? Evidently, agents are heterogeneous in some dimension such that trading currencies improves the welfare of each individual agent. As a case in point, agents holding large

amounts of risky domestic currency may be willing to give up multiple units of that currency for a single unit of the safe foreign currency.

In order to investigate more closely the exchange of currency, this discussion paper presents a model of decentralised exchange with two currencies circulating as media of exchange. In addition, new aspects not examined in previous studies have also been taken into account, such as portfolio diversification, the endogenous determination of nominal exchange rates and the role of risk aversion in portfolio choice. In the model, dollarisation is the natural outcome of optimising agents in the face of risky domestic currencies.

Using this model, it is possible to study how fundamental changes in the currency risk impact on the real exchange rate, the mean nominal exchange rate, the cross-sectional variance of the nominal exchange rate distribution, the extent to which the dollar is used in goods exchange (dollarisation) and the volume of currency trading. However, due to the complexity of the model, the authors resort to numerical methods to study the equilibrium behaviour of the economy and to address other issues.

If the domestic currency is subject to currency risk, the value of the domestic currency as a medium of exchange falls. In other words, the risk is a kind of "tax" on the domestic currency. Furthermore, agents now have an incentive to diversify their portfolios by trading multiple units of the risky currency for a unit of the safe currency if the opportunity arises. At an appropriate exchange rate, sellers of the safe currency are compensated for accepting the risky currency. The nominal exchange rate observed in different matches depends on the relative portfolio positions of the currency traders who are paired together. Not surprisingly, therefore, increasing the riskiness of the domestic currency leads to a depreciation of the domestic currency relative to the foreign currency (the mean of the distribution shifts). More surprising is that the increase in currency risk can increase or decrease the variance of the nominal exchange rate distribution. Furthermore, by shutting down currency exchange, the authors were able to demonstrate how the existence of a currency market affects welfare in the economy.

Rent indices for housing in West Germany, 1985–1998

Discussion paper 01/02
by Johannes Hoffmann and Claudia Kurz

To a central bank, the correct measurement of inflation is of major importance. This is especially the case if, like the Deutsche Bundesbank in the past and the European Central Bank in the present, the central bank is committed to maintaining price stability. The correct measurement is not a trivial task. In a number of countries, studies have shown that measurement errors can occur. An earlier study also confirmed this for Germany.[1] That study analysed the consumer price index but

1 J. Hoffmann: Problems of inflation measurement in Germany, Discussion paper 1/98, Economic Research Group of the Deutsche Bundesbank.

did not consider expenditure on housing. The new discussion paper studies the development of housing rents for potential distortions.

German price statistics record rents for three types of apartments in the privately financed segment and for three types of apartments in the subsidised segment of the market. The apartments in question have three or four rooms. Smaller apartments and bigger dwellings, such as single-family houses, are not taken into account. This raises the question of whether the official figures for rent increases are representative of the entire universe of dwellings.

To begin with, "hedonic functions", which explain rents in terms of the dwellings' characteristics, are estimated on the basis of the Socio-Economic Panel (SOEP) – a regular survey of a representative panel of households about their living conditions. The results of these cross-section regressions are then used to calculate quality-adjusted rent indices, which are subsequently compared with the official index of the Federal Statistical Office.

During the observation period of 1985 to 1998, the rent index derived from the SOEP shows an annual average rise which is around 1 percentage point faster than the official index. This indicates that the official consumer price index is likely to have understated rather than overstated rental price inflation, unlike in the case of some industrial goods which were examined in the earlier study.

The deviations from the official rental price index are concentrated on the 1991–1994 period. In the years before and after that, the multi-year average of rental price inflation, according to hedonic estimates, matches that measured by the official index.

The reason for that finding is not the relatively narrow definition of dwellings in the official index; rather, calculating an index in accordance with the official definition using the SOEP largely confirms the revealed differences. There are no clear indications that the differences are due to differing quality adjustment methods, either.