STUDIES

Jakub Borowski[1)][2)]

1 Introduction

As the process of Poland's accession to the European Union is nearing completion, the issue of Poland's future membership in Economic and Monetary Union (EMU) is quickly gaining in importance. Even though in view of the formal arrangements, the introduction of the euro in Poland at some time can be deemed a foregone conclusion,[3)] accession to EMU should be preceded by a thorough debate on the economic implications of this process. The wide approach to the theory of optimum currency areas (OCA theory), searching for balance between the costs and benefits of monetary integration, is a useful framework for this debate (Grubel, 1970).

The costs of monetary integration are essentially linked with the loss of an independent monetary policy which may be employed to smooth out the cyclical fluctuations of output and employment. Hence, there is a risk that output variability in Poland will increase once the euro is adopted. This, in turn, would reduce the welfare of the economic agents who prefer their income to be stable through time.

There is an abundant empirical literature pertaining to the potential costs arising from the adoption of the euro in Poland. Part of the related research is devoted to the efficiency of standard adjustment mechanisms (labor mobility and wage flexibility) that mitigate idiosyncratic shocks and that are postulated by the OCA theory (Borowski, 2000, 2002). Other contributions attempt to assess the asymmetric shock exposure of the Polish economy (Boone and Maurel, 1999; Borowski, 2001; Fidrmuc and Korhonen, 2003). They are accompanied by the studies showing that the OCA criteria are endogenous with respect to the process of monetary integration (Artis and Zhang, 1995; Fidrmuc, 2001; Frankel and Rose, 1997). Further, some studies focus on the effectiveness of the exchange rate mechanism in correcting for the effects of asymmetric shocks (Canzoneri et al., 1997). The general conclusion that can be drawn from this debate is that the Polish economy will not be exposed to severe asymmetric shocks after joining the euro area.[4)] In other words, despite the existing labor market rigidities, there is little risk of rising output volatility in Poland after its EMU accession.

1 *Macroeconomic and Structural Analysis Department, Narodowy Bank Polski (NBP).*

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3 *Unlike Denmark and the United Kingdom, Poland was not granted a special right to stay outside EMU (a clause to "opt out"). Formally, upon the EU accession Poland will become a member of EMU with a derogation and will be committed to finally adopting the euro. For simplicity, the terms EMU and euro area will be treated synonymously in the remainder of the paper.*

4 *This conclusion rests on the tacit assumption that, once in the euro area, the presently low share of intraindustry trade in the total trade between Poland and the euro area (Borowski, 2001) will sizeably increase as a result of euro-driven trade creation (see section 3 on the trade effects of currency unions). Such increase, consistent with the endogeneity of the OCA criteria, would be needed to reduce the exposure of the Polish economy to idiosyncratic shocks in a sustainable way.*

The plentiful attempts to assess the costs of euro adoption in Poland do not seem to be matched by an equal amount of research aimed at assessing the benefits of this process. This study constitutes a modest attempt to reduce this gap by assessing the magnitude of the three most frequently addressed benefits arising from the creation of a currency union: potential transaction cost savings resulting from elimination of the bilateral exchange rate, elimination of the currency risk premium contained in the interest rates of a client country[1]) and trade expansion arising from the elimination of exchange rate uncertainty.

The common features of the aforementioned gains are that they can be quantified and will have an effect on the growth potential of the economy. The list of potential benefits is, however, much longer. According to Tymoczko (2001), seigniorage revenues are likely to increase as a result of euro adoption in Poland. Further, there are numerous positive and intangible effects of the common currency such as welfare gains from low inflation achieved by importing monetary policy discipline from a country with a more rooted aversion to inflation (Alesina et al., 2002),[2]) higher competition arising from greater price transparency (Calmfors Commission, 1997),[3]) efficiency gains from capital market integration (Baldwin, 1991)[4]) and a greater ability to manage the volatile FDI and portfolio capital flows arising from changes in the risk perceived by foreign investors (Begg et al., 2003).[5]) Indeed, the combined positive effect arising from these gains may be large. However, due to the quantification problem[6]) or to its limited relevance to the long-term growth potential (seigniorage), the assessment of these effects remains beyond the ambit of this study.

It is noteworthy that the existing literature lacks consensus on the relative importance of the three aforementioned channels through which the economic impact of currency unions is exerted. While Pereira (1999) considers the reduction of interest rates a leading conduit affecting the economic performance of an anchor country, Frankel and Rose (2000) argue that gains

1 *Following Alesina et al. (2002), further in the text the term "client country" will be used to describe a country considering a substitution of its domestic currency by a currency of another country or entity ("anchor country"). Though inappropriate for the 11 EMU founding members, these terms adequately reflect the current position of Poland and the other accession countries for which the euro remains a future anchor currency.*

2 *The empirical attempts to quantify the costs of inflation show that they are relatively low once the moderate level of inflation has been achieved (Barro, 1995; Fisher, 1981). Given the level of the ongoing inflation target (2.5% ±1%) adopted by the Monetary Policy Council in February 2003 (Narodowy Bank Polski, 2003) and the long-run trend real appreciation of the zloty (translating into higher inflation in Poland than in the euro area after EMU accession), it is a matter of judgment whether euro adoption will lead to a permanent reduction in the Polish inflation rate.*

3 *As argued by Baldwin and Lyons (1988), exchange rate uncertainty may delay the response of nominal prices to changes of production costs. Euro adoption in Poland may thus promote cross-border competition by reducing the degree to which prices of tradable goods are out of line with production costs.*

4 *Aiyagari and Gertler (1991) suggest that a currency union – by removing differential transaction costs (costs of money changing faced by international portfolio investors) – should affect asset pricing and thereby improve capital allocation.*

5 *This argument is highly relevant for accession countries, which – given the shallowness of their foreign exchange markets and susceptibility to financial contagion (not entirely eliminated upon EU accession) – may view euro adoption as a way to irrevocably eliminate the risk of a currency crisis.*

6 *Apparently, it is the problem of quantifying these benefits that prompted some economists to question the possibility of measuring the gains from the single currency in general. While Wyplosz (1997) considers attempts to quantify benefits of monetary integration as "frustrating and useless," Obstfeld (1997) argues that this measurement is extremely difficult, if at all possible. Feldstein (1997) does not view European monetary integration as beneficial at all, emphasizing the purely political character of this process.*

from monetary integration come through the promotion of trade. In this debate, the transaction costs channel, though it is the most tractable and recognizable of the three effects, is generally considered less important in terms of attendant growth effects and is thus subordinate to the remaining two. Therefore, in this study each of these three effects is considered separately, and their impact on the growth potential of the economy is individually discussed. However, their combined effects on growth, which may be obtained by employing the macroeconometric model of the Polish economy, is beyond the scope of this paper. The magnitude of the three analyzed gains may be used as an input for such simulations.

The paper is structured as follows. Following the introduction, section 2 estimates the potential savings in transaction costs arising from the adoption of the euro in Poland. Section 3 explores by how much interest rates in Poland are likely to be reduced as a result of the changeover to the euro and the concomitant reduction of the currency risk premium. In section 4 the issues of exchange rate uncertainty and its possible impact on the trade between Poland and EMU are discussed. This section also provides a tentative assessment of the bilateral trade expansion between Poland and the euro area that is likely to occur once Poland adopts the euro. Section 5, the summary, presents the chief findings of the paper. All figures and tables used in the study are presented in the annex.

2 Transaction Cost Savings

One of the most widely recognized benefits stemming from the formation of a common currency area is the elimination of the *bilateral* exchange rate and the related costs incurred by the private sector. These costs can be divided into two groups. The first comprises transaction costs in the narrow sense (financial costs) paid by households and enterprises to the financial sector in form of commissions, spreads between buying and selling rates and fees for hedging against exchange rate risk. Once the domestic currency ceases to exist, there is no more need to exchange it against the anchor currency and vice versa, and hedging becomes free and unlimited. The second group (in-house costs) consists of the resources tied up in handling foreign exchange operations, managing exchange rate risk exposure, maintaining additional accounting activities, losses due to poorer remuneration of companies' cash balances dispersed over an extensive number of accounts, and opportunity costs arising due to searching for natural hedging and to lengthier transfers involving different currencies (European Commission, 1992).

The overall amount of transaction costs is positively related to the amount of bilateral trade between an anchor and a client country and the volatility of the bilateral exchange rate (as it induces companies to use more extensively hedging transactions, which at the same time become more expensive). On the other hand, foreign exchange-related costs are lower the more intense the competition in the financial sector is (suppressing the fees charged on the relevant transactions) and the greater the extent is to which the currency of a client country is used in international payments (i.e. the degree to which foreign exchange risk exposure can be mitigated by invoicing in the domestic currency). Therefore, it may be expected that

Poland, as a small, open economy whose currency is not used as an international means of payment and has shown relatively high and rising volatility in recent years, should benefit relatively much in terms of potential savings on transaction costs as a result of euro adoption.

The macroeconomic impact of EMU exerted via the transaction cost channel can be presented within the framework of the neoclassical growth model (Solow, 1956). Assuming that the entire resources released in the financial sector due to the euro changeover will find an alternative and productive use, savings on transaction costs represent a one-time rise in the productivity of labor and capital (Baldwin, 1991) rather than merely a shift of resources between the financial and nonfinancial sectors.

The increase in total factor productivity may be illustrated as a one-off upward shift of the production function $F(K/L)$ to a new, higher position $F(K/L)'$ at any given capital labor ratio (chart 1). The interpretation of this shift is quite straightforward: the elimination of transaction costs boosts the overall efficiency with which labor and capital inputs in a client country are combined to produce output. Assuming that the initial steady state capital-labor ratio and the corresponding level of output per capita equal K_1/L and Y_1A/L, the single currency leads to a higher level of output (Y_1B/L) produced with the same factor endowment.

The benefits stemming from the elimination of transaction costs are not limited to static efficiency gains. Assuming a constant savings-to-GDP ratio, once the production function shifts upward, the supply of investment increases. As a result, the *SS* curve shifts upward to a new position *(SS')* where the amount of capital invested more than compensates for the investment needed to replace the existing capital stock that depreciates *(DD)*. As a corollary, the initial one-off rise in GDP per capita due to the elimination of transaction costs is followed by induced capital formation. This, in turn, leads to a rise of the capital-labor ratio from K_1/L to a new, higher level (K_2/L) where the capital accumulation eventually levels off. The higher amount of capital stock corresponds to a higher steady state level of output per capita (Y_2/L). It may then be concluded that initial static efficiency gains arising from a one-off productivity shift are accompanied by *dynamic* gains triggered by additional capital formation. This magnifies the total growth effects arising from the elimination of transaction costs.

Ideally, in order to assess the magnitude of financial costs incurred by households and companies due to the existence of the national currency, one should multiply the turnover of the relevant foreign exchange transactions (spot, outright forward, swap, currency futures and options) by the corresponding fees and shares of euro-denominated transactions in total turnover. This approach was applied by the European Commission (1992), which assessed the exchange rate-related financial costs in the 12 EU Member States. A similar approach has recently been adopted by Magyar Nemzeti Bank (2002).

Unfortunately, the domestic financial market statistics for Poland do not contain information on the foreign exchange turnover between financial institutions and nonfinancial customers with a breakdown into relevant instruments, maturities and counterparts. Moreover, the BIS statistics (2002), which offer such a breakdown, capture only a relatively small part of the total foreign

exchange turnover in Poland.[1]) Therefore, this study attempts to assess roughly the magnitude of transaction costs on the basis of balance of payment statistics, i.e. by multiplying gross turnover in each segment of the balance of payments by the relevant euro fees and shares in the currency structure of total turnover. This approach, which is similar to that pursued by Dumke et al. (1997), who reassessed the European Commission's (1992) estimates of transaction costs, has a few important caveats.

First, the risk of double counting, biasing upward the overall assessment, is relatively high as compared with a survey-based approach (Gros and Thygesen, 1998). Second, with respect to some balance of payments components used in the calculation, experts' estimates have to be used,[2]) affecting the precision of the assessment. Third, within some categories general government activity is included, biasing upward the results. Finally, experts' estimates on all the not officially reported data necessary to produce the results are not always available. This leads to an omission of some categories and biases the results downwards. The practical implications of these limitations for the methodology in this study are the following:

– Foreign direct investment was the only financial and capital account component used for the calculations[3]);
– Relying on experts' opinions pointing to the limited role of hedging instruments other than outright forwards, it was assumed that the latter are the only instruments of hedging that exporters and importers use;
– Most of the experts' estimates were obtained from an informal questionnaire circulated among foreign exchange dealers in the nine biggest commercial banks in Poland,[4]) who were asked to provide their assessment of bid/ask spreads charged for spot and forward transactions, the average maturity of the latter and the extent to which foreign trade transactions are hedged against exchange rate risk;
– As delivering rigorous estimates on the magnitude of in-house costs is impossible without execution of a careful internal audit in the companies entering into foreign exchange operations, the European Commission's assessment (1992) based on Ernst and Young (1990) estimates on in-house costs[5]) was taken as a proxy for in-house costs incurred by Polish companies;
– A lower bound, i.e. a conservative estimate of possible transaction costs savings, was generally applied.

1 *Domestic financial institutions have not reported data on PLN/EUR spot, forward and swap transactions contained in the survey to the NBP; they were obtained from other countries' central banks. The NBP provided only the data for interbank foreign exchange activity.*

2 *The coefficient of the import intensity of exports, which is not directly observable, may serve as an example. A higher import intensity tends to lower transaction costs, since companies match their receipts with import payments, thus incurring lower transaction and hedging costs.*

3 *To the author's best knowledge, there are no plausible experts' estimates on the extent to which short- and long-term credits received and extended by Polish companies are hedged and matched with each other. It follows from available survey results that this is common practice (Narodowy Bank Polski, 2002). Such operations reduce the need to enter into foreign exchange spot and hedging transactions and have implications for the overall assessment of financial cost savings.*

4 *The share of these banks in total foreign exchange turnover can be estimated at 60%.*

5 *In the study by Ernst and Young, in-house costs were defined as the exchange rate-related treasury, personnel and equipment costs together with costs related to the dispersion of balances over an extensive number of accounts in various currencies and cross-border payment delays (opportunity costs) as a percentage share of total intra-Community exports.*

Under the aforementioned assumptions, the financial cost savings related to the current account and FDI flows stemming from the changeover to the euro can be reckoned to be around 0.09% of GDP (table 1 summarizes the results and the assumptions made).[1]) To assess the total financial cost savings, i.e. savings arising from both current and financial account transactions, one can apply the ratio of financial cost savings on financial account transactions to financial costs stemming from current account transactions calculated for 12 EU countries by Dumke et al. (1997). Assuming that this ratio (approximately 0.7) properly reflects factual cost relations faced by Polish enterprises and applying it to the current account-related financial costs, the total financial costs can be estimated at around 0.14% of Poland's GDP. This result is broadly in line with potential financial cost savings for the much more open Hungarian economy estimated at 0.11% to 0.22% of GDP (Magyar Nemzeti Bank, 2002).[2]) Supplementing this by the estimated magnitude of in-house costs, total transaction cost savings achieved as a result of EMU accession can roughly be estimated at 0.22%. It should be reiterated that this is the lower bound estimate.

At first sight the potential transaction cost savings arising from euro adoption in Poland do not seem to be high. One should not forget, however, the additional growth bonus which may be achieved once these savings materialize.[3]) Nevertheless, the relative importance of the EMU-driven transaction cost savings cannot be properly gauged without investigating other channels via which the macroeconomic effects of EMU are transmitted, which may eventually dwarf the direct savings in transaction costs.

3 Impact on Long-Term Interest Rates

Substituting a domestic currency with the currency of an anchor country irrevocably eliminates bilateral exchange rate risk and helps to reduce the overall price uncertainty faced by economic agents. This argument, which was put forward by McKinnon (1963), accentuates the role of a stable exchange rate for the stability of the overall price level in small, open economies. Once future prices of goods and services become less variable and thus more certain as a result of a single currency, the related uncertainty about the future level of costs and revenues diminishes. This conclusion has important implications for the investment process. Assuming that investors are risk averse and care about the variability of profits, a single currency renders future investments less risky.[4]) Accordingly, the risk-adjusted rate of return expected by investors eventually rises.

1 *This figure seems to be biased slightly upwards due to the exceptionally high short-term interest disparity prevailing over 2001, inflating the forward exchange rates and related hedging costs. However, halving the interest rate disparity observed in 2001 did not affect the results significantly.*

2 *Apart from the source of the data, the difference between the Hungarian approach and the methodology applied in this study is that the former did not include foreign exchange turnover between households and commercial banks and the latter did not capture the turnover between domestic and foreign banks. A different methodology, however, given a quite substantial difference in the relevant bid/ask spreads (spreads on foreign exchange rate transactions between households and banks are generally several times higher than those for interbank transactions), should not substantially distort the comparison of these results.*

3 *Baldwin (1991) estimated the long-run growth bonus for 12 EU countries to be roughly twice as high as the static efficiency gain arising from the elimination of transaction costs.*

4 *As argued by Baldwin (1991), exchange rate uncertainty is expected to hinder especially those investments which have large irreversible components (sunk costs). The higher the price uncertainty is, the more attractive an alternative wait-and-see investment strategy is and the higher the expected return required on irreversible investment is.*

As in the case of transaction cost savings, it can be argued by means of the neoclassical growth model that the suppression of the price uncertainty arising from a single currency might trigger additional capital accumulation and related growth effects (chart 2). On the assumption that the savings ratio can vary over time, thus facilitating intertemporal optimization, the equilibrium level of capital and output per capita is achieved when the marginal productivity of capital equals a discount rate which reflects the cost of postponing consumption. Graphically it can be illustrated by a point *A* at which line *r,* whose slope is equal to a discount rate, is tangent to the production function (De Grauwe, 1997). Once bilateral exchange rate risk is eliminated and the risk-adjusted rate of return increases (or, equivalently, the risk-adjusted discount rate falls), additional capital accumulation is triggered and the economy moves to a new steady state represented by point *B.* This is a point of tangency between the production function and the r_{EMU} line, whose smaller slope reflects a lower risk-adjusted discount rate. At point *B,* the process of capital formation eventually peters out and the growth rate of output per capita is determined solely by the exogenous rate of technological change.[1])

Whether EMU accession boosts investment significantly depends on the magnitude of the risk premium risk-averse investors require as compensation for exchange rate-related uncertainty. One of the possible ways to assess how large this premium may be in the case of Poland is to investigate the size of the currency risk premium, i.e. a component of interest rates that compensates for unexpected changes of the exchange rate that lead to a fall of actual returns below their expected value. The magnitude of the currency risk premium required by foreign investors investing in zloty-denominated assets can be derived from the uncovered interest parity (UIP) equation, augmented by currency, liquidity and default risk premia (Hawkesby et al., 2000):

$CRP_t = i_t - i_t^* - \Delta s_t^e - l\&d\,premia$, where CRP is the currency risk premium required by investors at time t, i_t is the domestic nominal interest rate, i_t^* is the foreign nominal interest rate, Δs_t^e is the expectation on the percentage change in the PLN/EUR exchange rate, $l\&d\,premia$ are the liquidity and default premia.[2])

Before assessing a currency risk premium, three issues have to be addressed.

First, the choice of a horizon (maturity) of the assets used for assessment has to be made. In this study the yields on one-year bills and ten-year bonds issued by the Polish government have been used to extract the currency risk premium. Using yields on longer-term instruments makes it possible to limit the impact of the current monetary policy stance on the interest rate disparity and, sub-

1 *It should be noted that – unlike the "free" growth bonus arising from savings on transaction costs – dynamic growth effects arising from the elimination of bilateral exchange rate uncertainty can only materialize if either additional domestic or foreign savings are mobilized. However, the single currency offers an opportunity to meet this requirement more easily. First, once a country is in EMU, the current account can be financed by domestic currency. Second, the single currency eliminates the risk of a currency crisis. Hence, a widening disparity between domestic savings and investments, which leads to a deterioration of the current account balance, ceases to be a growth constraint in a monetary union.*

2 *Hence, the augmented UIP theory assumes that there are no factors which contribute to the persistence of interest rate differentials other than expected exchange rate fluctuations and currency, liquidity and default risk premia. It neglects the role of such potentially important issues as home bias explained, inter alia, by information costs or regulatory reasons (Hawkesby et al., 2000).*

sequently, on the estimated size of the currency risk premium.[1]) On the other hand, exchange rate expectations are more tractable for shorter maturities, whereas in case of the longer-term horizon, rigorous assumptions on expected exchange rate movements have to be made.

Second, the focus of this study is on the magnitude of the currency risk premium estimated on the assumption that in the longer run Poland will stay outside EMU. Under such a scenario, the possibility of speculative attacks on the zloty and the outbreak of an exchange rate crisis in Poland cannot be entirely excluded. To compensate for this risk, investors would be expected to require a premium whose eventual elimination resulting from the euro changeover would constitute a tangible gain for the economy. However, once portfolio flows are driven by expectations that EMU accession will take place within a ten-year horizon, the currency risk premium derived from the long-term interest rate differential is likely to be biased downwards.[2])

Finally, it is evident that the magnitude of the estimated currency risk premium critically depends on the way in which expected currency movements are measured. Since there is no unanimity about which measure of exchange rate expectations reflects expected currency movements best, an array of methods may be applied.

One of the ways to extract the expected size of currency fluctuations is to use surveyed expectations of future exchange rate changes. These can be calculated using a monthly Reuters questionnaire circulated among 15 to 20 commercial bank analysts on a monthly basis. The analysts are asked to specify their expectations of PLN/EUR exchange rate developments over a one-year horizon, and the measure applied is an arithmetic average of those expectations. One should bear in mind, however, that this measure of expectations does not necessarily reflect the expectations of economic agents who actually take the exchange rate risk.

An alternative approach is to assume that exchange rate expectations are rational, so that the actual exchange rate movements mirror originally expected exchange rate changes. The plausibility of such assessments can easily be challenged if market players make systematic forecast errors in their exchange rate forecasts.

The third measure rests on the constant exchange rate assumption (random walk), which reflects the view that exchange rate movements are generally unpredictable, so that market players tend to act as if the current exchange rate remained unchanged. Even though this reasoning may have some explanatory power with respect to short-term exchange rate fluctuations, it is apparently in clear contradiction to the popular market view that over the longer run,

1 *According to the yield curve theory based on expectations, interest rates further along the yield curve are shaped by expectations on the future level of short-term interest rates. Since short-term interest rate fluctuations can be expected to average out over the longer run, long-term interest rates tend to be more anchored and thus more suitable for the extraction of exchange rate risk premia. For more on various yield curve theories, see Sławiński (1996).*

2 *Once participation in monetary union comes nearer, with monetary and fiscal policies likely to be more disciplined, the long-term interest rate differential against the euro area is likely to overstate the actual risk of currency depreciation. This triggers capital flows into higher-yielding currencies, which are expected to stay on the convergence track, leading to a fall in the interest rate differential. This phenomenon, which is known as "convergence play," was also observed in countries with a less rooted credibility track record prior to the adoption of the euro (Abreu, 2001).*

the currencies of accession countries are "sentenced for appreciation." These expectations are rooted in the *real* exchange rate appreciation trend explained by the well-known Balassa-Samuelson effect (Balassa, 1964; Samuelson, 1964) and witnessed by most of the accession countries (Halpern and Wyplosz, 2001). What matters for the currency risk premium, however, are the expectations on *nominal* exchange rate fluctuations. Whether and to which extent the Balassa-Samuelson effect manifests itself in the form of a nominal appreciation of the domestic currency depends solely on the monetary policy stance. Should keeping domestic inflation at the level observed in the euro area be a preferred option for the monetary authorities, the nominal exchange rate is expected to appreciate in the long run, with the magnitude of this appreciation corresponding to the size of the Balassa-Samuelson effect.[1]) Given the existent rigidities, however, it seems to be very unlikely that – once inflation is eventually brought to a low level – the monetary authorities in Poland would resort to the option of some constant nominal appreciation unless it was necessitated by compliance with the Maastricht convergence criterion on inflation.[2]) Bearing this in mind, for the extraction of the ten-year currency risk premium the constant exchange rate assumption was made.[3])

The premia required by investors for default and liquidity risk are not directly observable and hardly separable. One way to extract them is by comparing the yields on euro-denominated bonds of comparable maturity issued by the Polish government and governments of the EMU countries (chart 3). Such interest rate differential is free from the impact of the two remaining factors, i.e. expected currency movements and the currency risk premium. During the first year after market placement the difference between the yields on ten-year Polish government eurobonds and ten-year eurobonds issued by EMU countries varied between 49 and 100 basis points, with the average difference standing at 65 basis points.[4]) Therefore, adhering to the principle of conservative (lower bound) assessment, i.e. an estimate which would not lead to an overstatement of the currency risk premium, the liquidity and default premia required by investors buying Polish government securities can be estimated at 70 basis points.[5])

1 *This argumentation disregards the existing price rigidities, limiting the pass-through from the exchange rate to domestic tradables prices. Hence, the pace of nominal appreciation necessary to keep the inflation rate at the level observed in the euro area may in fact turn out to be much higher in the short run than what would be predicted by the Balassa-Samuelson effect (Borowski et al., 2002).*

2 *A compelling reason for refraining from such an option may also be to avoid a destabilizing speculation driven by the expected appreciation of the domestic currency, leading to its subsequent overvaluation.*

3 *Another way to extract the expected exchange rate movements in the long run is to employ the relative purchasing power parity concept, which postulates a relationship between nominal exchange rates and relative price levels (Hawkesby et al., 2000). Since the catching-up process translates into the overall price level via nontradables inflation, using this concept to model long-run exchange rate expectations requires an assessment of the tradables price effects of this process exerted via the rising prices of nontradable inputs. Under the law of one price, however, it can be expected that these effects are mitigated by rising productivity rather than soaring prices, thus leaving the nominal exchange rate unchanged.*

4 *The most recent issue of Polish government eurobonds placed on January 27, 2003, was traded at a premium of 62 basis points over the German benchmark bonds.*

5 *Further in the text, it is implicitly assumed that the probability of the Polish government defaulting on zloty-denominated obligations is equal to that of defaulting on euro-denominated debt; liquidity premia on euro- and zloty-denominated government securities are also comparable.*

The empirical estimates of the currency risk premium for Poland vary considerably depending on the proxies for exchange rate expectations, maturities and periods chosen (charts 4 and 5). The average values for the three analyzed measures range from 60 to 840 basis points, thus rendering even a tentative assessment of the possible reduction of interest rates arising from the introduction of the euro extremely difficult (table 2).[1]) This is where the problem of selecting the most appropriate reference period as a basis for a plausible assessment of the currency risk premium comes into play.

In the course of 1999 and 2000, the Polish economy witnessed growing macroeconomic imbalances, which took the form of a widening current account gap and rising inflation.[2]) The monetary authorities counteracted these developments, which constituted a considerable risk of triggering a currency crisis, financial instability and the collapse of the disinflation process. These developments had important implications for the empirically estimated size of the currency risk premium in Poland.

First, the short-term interest rate disparity against the euro area rose considerably (chart 4). It also affected long-term interest rate spreads, as markets did not expect the monetary authorities to narrow the short-term interest rate gap within a short horizon.

Second, the widening external imbalance entailed a higher risk of currency depreciation. This was mirrored by the rising implied PLN/USD exchange rate volatility derived from currency option prices (chart 5).[3]) Relatively high, though descending, short-term interest spreads and an implied exchange rate volatility prevailed over 2001. In 2002 the implied exchange rate volatility stabilized at the level observed at the beginning of 1999, whereas the cycle of monetary easing gradually petered out.

The conclusion that can be drawn from these developments is that 2002 seems to be the most appropriate reference period for gauging the magnitude of the currency risk premium in Poland. It must be noted, however, that the reference period should be as free as possible from the impact of market speculations on the date of Poland's prospective EMU accession. As already mentioned, these speculations tend to be most visible at the long end of the yield curve and bias down long-term yields as compared with a scenario of staying outside EMU for a longer time. Since the intention of the Polish government and Narodowy Bank Polski (NBP) to join EMU relatively fast became clear in October 2002,[4]) the end of September 2002 can serve as the end of the time span used for the assessment of the currency risk premium.

1 *The estimates of the currency risk premium made under the assumption of rational exchange rate expectations (calculated as ex post exchange rate changes) ranged from –3.7% to 38.2% and were rejected as implausible in the further analysis.*

2 *The current account-to-GDP ratio peaked in the first quarter of 2000, standing at 8.3%. At the same time inflation continuously rose, reaching 11.6% in July 2000, after which it eventually started to fall.*

3 *For more on the concept of implied exchange rate volatility and the methodology used to derive it, see Malz (1995) and Sławiński (1997). Cincibuch and Bouc (2001) and Morales (2000) discuss the predictive power of option prices with respect to future exchange rate volatility.*

4 *In the joint statement published on October 7, 2002, the government and Narodowy Bank Polski declared an intention to carry out a macroeconomic policy that will ensure that Poland meets the nominal convergence criteria stipulated in the Maastricht Treaty in 2005 (NBP, 2002). Even though the exact targeted date of EMU accession was not specified, this statement considerably strengthened market expectations that Poland preferred not to stay outside EMU over the longer run. The yield curve effects of this statement were subsequently strengthened by the final ratification of the Nice Treaty in Ireland, which contributed to the suppression of the long-term interest differential against the euro area.*

Between January and September 2002 the average one-year currency risk premium obtained under the assumption of constant exchange rate expectations stood at 430 basis points,[1]) whereas the average ten-year currency risk premium amounted to 190 basis points. While the former showed a pronounced tendency to fall amid a systematic narrowing of the short-term interest rate disparity, the latter turned out to be less affected by transitory monetary policy and, consequently, much more stable over the whole reference period. Therefore, it is the ten-year currency risk premium that can be taken as a first approximation of the currency risk premium in Poland. This figure, however, may still suffer from an upward as well as a downward bias arising from the short-term interest rate differential in the case of the former and market expectations of a relatively early euro changeover in the case of the latter.

Extracting the currency risk premium from implied one-year forward interest rates may be a good way to address the aforementioned measurement biases (chart 6). It allows at the same time to capture the possible credibility gains for monetary policy that may arise from EU accession. According to this approach, under the assumption of constant exchange rate expectations, the one-year currency risk premium derived from the one-year forward interest rate differential (the difference between the one-year forward interest rate in Poland and the one-year forward interest rate in the euro area, corrected for the liquidity and default premium standing at 70 basis points) calculated for the period starting in February 2004 can be estimated at 170 basis points. The premium for the next one-year period starting in February 2005 can be reckoned to be around 120 basis points. These two periods are likely not to overlap with January 1, 2007, which can be considered the first possible date for Poland's EMU accession. Consequently, the figures obtained can be regarded as fairly good estimates of the currency risk premium in Poland under the scenario of staying outside EMU but reaping some credibility gains arising from EU accession. Combining these results with the assessment of the long-term currency risk premium and assuming an additional fall of the liquidity and default risk premia by 30 basis points due to the credibility gain resulting from EU membership,[2]) the currency risk premium in Poland can be conservatively estimated at 150 to 200 basis points. This is the premium that would be expected to persist if Poland deliberately chose to stay outside EMU for a long time, thus hindering capital accumulation and the attendant catching-up process.

The assessment of the currency risk premium in Poland is consistent with the estimates obtained for other countries once the credibility track record of their monetary policies is taken into account. The most recent assessment for Hungary ranges from 150 to 300 basis points (Magyar Nemzeti Bank, 2002), whereas Barbosa et al. (1998) estimated the currency risk premium for Portugal remaining outside the euro area at 100 to 300 basis points. In the first quarter of 2000, i.e. prior to the decision on the adoption of the euro finally taken in June 2000,

1 *Once surveyed exchange rate expectations are used, the average one-year currency risk premium in the reference period equals –150 basis points, and the figure obtained renders it useless for further analysis.*

2 *In 2002 the average ten-year interest rate differential between Greece and Germany stood at 34 basis points, and this magnitude can be used as a reference in the assessment of the credibility-related fall of the currency risk premium in Poland upon EU accession.*

the one-year interest rate differential to Germany stood at around 250 basis points in Greece (Garganas and Tavlas, 2001). After adjustment for liquidity and default premia, this would yield an order of magnitude that is in line with the estimated magnitude of Poland's currency risk premium.

4 Effects on Foreign Trade

Foreign trade is another possible channel via which the impact of a single currency on the macroeconomic performance of countries making up a monetary union is likely to be exerted. Once the bilateral exchange rate ceases to exist, an important source of uncertainty regarding the profits of firms participating in foreign exchange transactions is eliminated. This uncertainty arises from possible exchange rate movements that may eventuate between the conclusion and the settlement of a trade contract and may lead to a divergence between expected and realized profits. It can be shown that higher profit uncertainty can, in turn, have a deleterious influence on foreign trade. Assuming that economic agents are risk averse, the utility function of a firm (entrepreneur) can be written as (Hooper and Kohlhagen, 1978):

$$U = E(\pi) - \gamma \cdot \sigma_{\pi}$$

where $E(\pi)$ is the firm's expected profit, γ is the coefficient of risk aversion and σ_{π} is the standard deviation of the firm's profit.

The utility of a firm is thus an increasing function of the expected profit and a decreasing function of the risk aversion and volatility of the firm's profit around the expected value. Assuming that firms maximize this utility function and costs and that the revenues denominated in foreign currency are not fully hedged against exchange rate risk, it can be demonstrated that a rise in exchange rate uncertainty (rise in exchange rate risk)[1]) reduces import demand and export supply at a given price. Alternatively, the rise in exchange rate uncertainty positively (negatively) affects prices if the exporter (importer) bears the exchange rate risk.[2])

Apart from three standard "proximate" sources of growth, e.g. physical and human capital accumulation and spending on research and development, foreign trade is widely recognized as another important growth engine (Temple, 1999). Should the domestic currency and attendant exchange rate uncertainty indeed be an obstacle to trade expansion, as postulated above, the adoption of the euro in Poland is likely to boost bilateral trade between Poland and the euro area and to deliver related growth effects. According to the new trade theory, the growth effects of trade expansion, however, may extend far beyond traditional gains

1 *Perée and Steinherr (1989) distinguish short-term exchange rate risk from long-term exchange rate uncertainty. In the short term, nominal exchange rate volatility is subject to quantification and forecasting, and using the term "risk" is justified. However, in the long run the ability of economic agents to forecast exchange rates is considerably limited. This would warrant the use of the term "uncertainty" with reference to the long-term evolution of exchange rates. For simplicity, both terms will be used interchangeably in this study.*

2 *The propensity to engage in foreign trade is also reduced by the adjustment costs firms incur as a result of exchange rate deviations from the values expected at the moment investment decisions that are necessary to implement a trade contract in the future are taken (IMF, 1984). These costs arise from the expansion (reduction) of production capacity in times of a favorable (unfavorable) exchange rate. Uncertainty about the size of these costs may cause tradable sector firms to move the available resources to the nontradable sector, which is less affected by exchange rate uncertainty.*

arising from specialization driven by comparative advantage and the exploitation of economies of scale. As argued by Edwards (1997) and Grossman and Helpman (1991a, 1991b), who used models with endogenous technological change, knowledge spillovers help countries with an initially lower stock of knowledge to absorb technological progress achieved by leading economies and to reap the related growth effects. Foreign trade is likely to be an important carrier for such spillovers, and more open economies should experience higher growth rates of total factor productivity than those maintaining a higher level of trade protection. Moreover, the potential benefits arising from greater openness are likely to be higher the lower the initial knowledge gap between leading and catching-up countries is (Grossman and Helpman, 1990). These theoretical findings are supported by the results of empirical studies, which show the positive impact of various measures of economic openness on productivity and growth in the cross-section of countries (Edwards, 1997; Frankel and Romer, 1999; Frankel and Rose, 2000).

A two-step approach will be employed to assess the potential trade effects arising from euro adoption in Poland. In the first part of this section the empirical evidence on the deleterious impact of exchange rate uncertainty on foreign trade will be reviewed. This will be followed by an attempt to gauge roughly the potential expansion of trade between Poland and the euro area arising from the EMU-related elimination of exchange rate risk. In the second part, the results of fairly new studies focusing on the trade effects of currency unions rather than of exchange rate risk, will be presented. They will be accompanied by tentative conclusions regarding the possible impact of euro adoption in Poland on its bilateral trade with the euro area.

4.1 Exchange Rate Risk and Foreign Trade: Is there any Relationship?

Prompted by the collapse of the Bretton Woods system, the link between exchange rate uncertainty and trade was discussed in many empirical studies. One such attempt was that of Hooper and Kohlhagen (1978), who regressed the bilateral trade flows between six industrial countries on, inter alia, the quarterly average difference between the spot and forward exchange rate observed three months before (used as a measure of exchange rate risk). Only in one case was a statistically significant and negative impact of exchange rate uncertainty on the level of trade found. Similar conclusions were arrived at in a comprehensive study conducted by the International Monetary Fund (1984), which used the weighted average variance of the quarterly real effective exchange rate (REER) with various lags as a measure of exchange rate risk. These findings were questioned by Kenen and Rodrik (1986). They found a negative impact of the 12- and 24-month standard deviation of the monthly percentage change of REER on the import volume in several industrial countries. A strong impact of exchange rate uncertainty on foreign trade was also found by De Grauwe (1987), who estimated the impact of the variance of yearly changes in the bilateral real exchange rate parameters on the growth rates of bilateral exports of ten OECD countries.

Perée and Steinherr (1989) used various measures of medium-term exchange rate uncertainty defined as the cumulated deviations of the nominal exchange rate from the long-term equilibrium calculated on the basis of pur-

chasing power parity or Williamson's (1985) approach for several industrial countries. In most cases the adopted measures of exchange rate uncertainty had a statistically significant and negative impact on the export volume. This effect was also found by Bini-Smaghi (1990) who regressed the exports of manufactured products between the countries participating in the European Monetary System on the quarterly standard deviation of the weekly change in the effective exchange rate. Another measure of exchange rate volatility which proved to have a negative effect on trade flows was tested by Rose (2000). It was defined as the standard deviation of monthly changes of the bilateral nominal exchange rate over the five years preceding the year of estimation and used as a regressor in the gravity model of trade estimated for 186 countries.

The following conclusions can be drawn from the aforementioned empirical findings. First, the evidence of the adverse impact of exchange rate uncertainty on foreign trade is ambiguous and very much dependent on the specification of estimated models, structures of lags, samples of countries, time series and measures of exchange rate uncertainty applied.[1]) Second, no consensus has been achieved so far as to which measures of exchange rate uncertainty (real exchange rate misalignment versus short-term nominal exchange rate volatility, ex post observed volatility of the nominal and real exchange rate versus ex ante risk measures, e.g. deviation of the forward exchange rate from the relevant spot rate) properly reflects the actual exchange rate risk companies face on a day-to-day basis. Third, the literature lacks a consensus as to the scale of hedging against exchange rate risk. Since the choice between the nominal and real exchange rate as an explanatory variable should partly follow from the extent to which hedging instruments are applied (providing mostly a hedge against short-term exchange rate risk), finding the most adequate measure of exchange rate uncertainty will not be possible as long as this extent cannot be precisely assessed. Finally, a variety of equilibrium exchange rate concepts (Osbat and Schatz, 2003) considerably hinders the consensus as to the most adequate measure of longer-term exchange rate misalignments.

Despite the ambiguity of empirical findings, at this juncture an attempt can be made to gauge the possible impact of the elimination of bilateral exchange rate uncertainty arising from euro adoption on the bilateral trade flows between Poland and the euro area. The empirical assessment can be done by applying the aforementioned measure of exchange rate risk originally used by Rose (2000) (PLN/EUR in this case). Apart from its tractability, an unquestionable merit of this measure is that its impact on trade was estimated on the basis of a large

1 *Nevertheless, there is compelling evidence that the adverse impact of exchange rate uncertainty on foreign trade was implicitly recognized in economic policymaking. For instance, the stimulation of trade and growth by constraining the volatility of bilateral exchange rates was the main reason behind setting up the European Monetary System in 1979 (De Grauwe, 1987). Calvo and Reinhart (2000a) argue that one of the reasons for "softening" the floating exchange rate regime in emerging economies by discretional interest rate and foreign exchange interventions was to limit trade-inhibiting currency fluctuations. The latter cannot be mitigated without exchange rate smoothing if foreign trade is denominated in foreign currency (as is mostly the case in emerging economies) and financial markets (providing hedging instruments at a relatively low cost) are not fully developed. In another study, Calvo and Reinhart (2000b) present the results of six studies focusing on the adverse impact of exchange rate uncertainty (measured mostly as real exchange rate variability) on foreign trade only in emerging economies. Five of them point to a negative and statistically significant impact of exchange rate uncertainty on foreign trade.*

country sample with a high number of observations (22,948) rather than borrowed from one of the aforementioned single-country models.[1]) The data (chart 7) demonstrate that in the period from September 1998[2]) until August 2002, the five-year rolling standard deviation of monthly changes of the PLN/EUR exchange rate rose by one percentage point to 2.7% from 1.7%. This period has been associated with the gradual but steady relaxation of the exchange rate regime in Poland.[3]) Since entering a currency union delivers the elimination of exchange rate volatility in perpetuity, i.e. a sustainable reduction of standard deviation of monthly exchange rate changes to zero, the long-run impact of the euro on bilateral trade flows between Poland and the euro area can be reckoned to be around 4.7%.[4])

The figures obtained merits three comments.

First, there is no automatism between the *bilateral* trade expansion arising from the elimination of exchange rate uncertainty and total trade expansion (it is the latter that really matters once the growth effects of trade expansion are considered). The magnitude of the latter will depend on the extent to which the elimination of bilateral exchange rate risk translates into rising uncertainty as to the exchange rate of the common currency against third currencies, which is likely to inhibit trade with countries outside the monetary union (Calmfors Commission, 1997; Obstfeld, 1997).

Second, given the specification of the model, a five-year span is needed for these trade effects to materialize. Therefore, once expressed in year-on-year terms, these effects cannot be viewed as negligible.

Third, recent empirical findings, prompted by those delivered by Rose (2000), indicate that apparently small bilateral trade effects arising from the *elimination of exchange rate uncertainty* are likely to be eclipsed by the potential boost to trade which may result from the *introduction of the single currency*. The latter is a step which is substantially different from merely eliminating currency fluctuations.

4.2 Currency Unions and Foreign Trade: The Power of a Dummy

Despite the ambiguity of empirical research addressing the influence of exchange rate uncertainty on foreign trade, there are two intuitive reasons for believing that bilateral trade effects of euro adoption in Poland may not be negligible.

1 *Given the aforementioned evidence on a relatively wide exposure of Polish enterprises to exchange rate risk, this measure of short-term exchange rate volatility should be viewed as appropriate for estimating the impact of exchange rate uncertainty on the bilateral trade between Poland and the euro area.*

2 *This was the first value which was not distorted by the one-off steep devaluation of the zloty in August 1993.*

3 *Since September 1998 the evolution of the exchange rate regime in Poland has been marked by a steady reduction of the preannounced rate of crawl together with a gradual widening of the fluctuation band. This paved the way to the introduction of the floating exchange rate regime in April 2000. At the same time, the NBP consistently refrained from interventions in the foreign exchange market. Both factors contributed to the substantial rise of nominal exchange rate volatility, which may be viewed as the price paid for ensuring the autonomy of monetary policy.*

4 *The coefficient on exchange rate volatility estimated by Rose is –0.017. Assuming that the level of exchange rate volatility observed in 2002 will be sustained once Poland decides to stay outside EMU, adopting the euro in Poland can hypothetically result in bringing the standard deviation of monthly bilateral exchange rate changes from 2.7% to zero. This would increase the log of bilateral trade (a dependent variable in the panel regression) between Poland and the euro area by (–0.017) (–2.7) = 0.046 or by 4.7% (since* $e^{0.046}$ *is around 1.047).*

First, it is likely that none of the previously used measures of exchange rate uncertainty captures the *entire* impact of exchange rate fluctuations on bilateral trade flows. The diverse degree of hedging against exchange rate risk and the variety of measures of exchange rate volatility (nominal versus real exchange rate fluctuations) due to varying contract lags render the specification of one uniform measure of exchange rate uncertainty impossible. In other words, it seems that a "correct" measure of exchange rate uncertainty simply does not exist.

Second, it is reasonable to expect that the reduction (elimination) of exchange rate volatility to zero is a step which is qualitatively different from the introduction of a single currency. While the former can always be reversed, the latter is likely to be irrevocable and thus much more credible. Therefore, it may be expected that the way to trade expansion induced by monetary integration leads through the introduction of a single currency rather than a mere elimination of exchange rate uncertainty achieved by suppressing exchange rate volatility.

The intuitiveness of the foregoing argument goes back to McCallum (1995), who analyzed the impact of the Canada-U.S. border on regional trade patterns. He showed that the existence of the national border exerted a sizeable and deleterious impact on regional trade flows: holding constant for distance and size, trade between two provinces was more than *twenty times* larger than trade between a province and a U.S. state. This order of magnitude could not be plausibly explained by the existence of trade costs such as linguistic barriers or trade-inhibiting measures. Therefore, the lack of a single currency rather than simple exchange rate volatility became a natural though still not generally accepted explanation for this phenomenon.

A seminal attempt to measure the trade effects of currency unions directly was made by Rose (2000). Apart from the aforementioned measure of exchange rate volatility and standard gravity model regressors (GDP and distance), he used a number of dummies to control for additional factors that are likely to foster bilateral trade, such as a common language, colonial status and a common currency. The coefficient on the currency union dummy showed that countries sharing the same currency trade more than *three times* (!) as much as countries with different currencies. Glick and Rose (2001) performed a time series analysis to estimate the trade effects of 146 switches into and out of currency union. Their chief finding was that each regime shift into a common currency is expected to yield a doubling in bilateral trade. The same order of magnitude was found by Rose (2002), who used a meta-analysis to combine the point estimates of the trade effects of currency unions presented in 19 studies addressing this issue.

Persson (2001) challenged the results achieved by Rose (2000), accentuating the possibility of nonlinearity between trade and some of its determinants distorting the final estimates. He also pointed to a considerable risk of mismeasuring the impact of the single currency on trade if countries are systematically different from those which share a common currency ("treatment effect").[1]) Depending on the estimation technique and accounting for the treatment effect,

1 *Indeed, the countries constituting a currency union used for estimation were generally relatively poor, small, geographically close and frequently shared a common language, borders and a colonial relationship. Further, the pairings of countries forming a currency union constituted a tiny part of the whole sample (around 1%), and countries participating in EMU were excluded from the sample.*

Persson's preferred estimates of trade effects arising from currency unions ranged from *13%* to *66%,* and only the latter figure reached borderline statistical significance. A similar order of magnitude was found by Rose and van Wincoop (2001), who used the theoretical gravity model originally developed by Anderson (1979) and adapted by Anderson and van Wincoop (2001). According to the model, after controlling for size, bilateral trade between two countries decreases in the ratio of their bilateral trade barrier (a domestic currency may be viewed as a nontariff barrier to trade) relative to the average barrier of these countries to trade with all their trading partners. They found that the introduction of the euro is likely to yield an increase of *59%* in trade between the 12 EMU countries.

Bun and Klaassen (2002) contributed to the debate on the trade effects of currency unions by estimating a dynamic panel model for annual bilateral exports between the 15 EU countries and the non-European G-7 countries from 1965 through 2001. They used the dummies for EMU membership and applied a dynamic specification which allowed for capturing both the long-run effects of EMU and transitional dynamics. The long-run impact of EMU on intra-EMU trade was estimated at *38%* (a static model produced a trade increase of *35%*). Interestingly enough, half of this increase is likely to be achieved within an eight-year period.

Though still far from over, the debate on the trade effects of currency unions makes room for some tentative conclusions regarding the potential trade expansion arising from Poland's EMU accession.

First, studies that point to trade effects that are appreciably smaller than the estimates originally provided by Rose (2000) and others with this order of magnitude should be used as a benchmark for the assessment of trade effects arising from euro adoption in Poland. One of these studies (Persson, 2001) constituted an original attempt to overcome a bias arising from the specificity of the country sample. Two others (Rose and van Wincoop, 2001; Bun and Klaassen, 2002) focused directly on euro-driven trade effects for EMU countries. These two studies are highly relevant for Poland, since the level of trade integration between Poland and the euro area is already comparable with that for EMU countries before the introduction of the euro (Fidrmuc and Schardax, 2000). Further, as a result of full implementation of the internal market and the likely fall of zloty volatility due to participation in the European Exchange Rate Mechanism II (ERM II), nonmonetary and monetary barriers to trade between Poland and the euro area on the eve of EMU accession are expected to be similar to those observed in the EU countries before the introduction of the euro. Therefore, it may be expected that the switch to the euro will yield an increase of around *40%* to *60%* of trade between Poland and the euro area in the long run. Though this assessment is very tentative and should serve as a guesstimate rather than a precise forecast, it suggests that the trade expansion resulting from euro adoption may be substantial.[1])

1 *The trade effects arising from euro adoption may be amplified by the reduction of the gap between actual and potential Poland-EU trade derived from the standard gravity models. According to Jakab et al. (2000), in 1997 potential imports from the EU were 92% to 103% higher than actual imports, whereas potential exports to the EU outstripped the actual figures by 106% to 114%. Once augmented by the FDI variables, gravity models reveal gaps which are appreciably smaller but continue to persist.*

Second, it is an open question whether trade creation between countries participating in a currency union is accompanied by a reduction of trade between members and nonmembers of the union. While Rose (2000) tested directly and rejected the hypothesis of trade diversion, the theoretical gravity model adapted by Anderson and van Wincoop (2001) assumes that trade diversion is concomitant to the trade-creating effects arising from the reduction of (monetary) trade barriers. Since it is overall trade rather than just bilateral trade intensity that matters for trade-related growth effects, the issue of trade diversion deserves attention in the further research.

Third, it should be noted that even in the extreme case that Poland's entire trade with EMU nonmembers is crowded out by bilateral Poland-euro area trade, Poland would benefit from joining the euro area. As long as the newly created trade is dominated by the exchange of differentiated products (intraindustry trade), greater bilateral trade openness to the euro area is likely to result in higher business cycle synchronization between Poland and EMU countries (Frankel and Rose, 1996; Fidrmuc, 2001). As a corollary, exposure to asymmetric shocks would be reduced. Further, in view of Polish trade patterns, a reorientation of trade towards EMU countries would de facto mean an increase in openness towards more advanced economies and – as predicted by new trade theories – greater access to accumulated knowledge stock. This, in turn, should foster Poland's economic performance via total factor productivity gains.[1])

Finally, the problem of the time span needed for the trade effects of currency unions to materialize is not explicitly addressed by most of the empirical studies. Further research in this area is definitely needed, and the results produced can be used to track the timing of the growth effects of monetary integration more precisely.

5 Summary

The Polish economy is likely to benefit substantially from the adoption of the euro. First, transaction costs incurred by households and enterprises will be reduced. These savings can be reckoned to be around 0.2% of GDP. Second, the currency risk premium will be eliminated and the related fall of interest rates can be estimated at 150 to 200 basis points. Third, the elimination of bilateral exchange rate uncertainty is expected to boost trade between Poland and the euro area. A tentative assessment made on the basis of available empirical findings suggests that trade between Poland and the euro area is likely to increase by around 40% to 60% in the long run as a result of euro adoption.

The aforementioned effects are expected to enhance the growth potential of the Polish economy. However, the scale of trade diversion, as well as the magnitude of other gains such as greater competition or capital market integration, need to be investigated further. This renders the assessment of the combined growth effects as well as the overall balance of costs and benefits arising from euro adoption in Poland a challenging issue for further research.

1 *Given the present structure of Polish foreign trade (around 60% of trade falls on EMU countries) the scenario of a diversion of Poland's entire trade seems unlikely. Assuming a 50% increase of bilateral trade as a result of EMU accession, Polish trade with EMU nonmembers would practically be reduced to zero, and this scenario is hardly imaginable for contiguous or not remote countries even if relative trade barriers increase substantially.*

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Table 1

Cost Savings in Poland (Percent of GDP) Resulting from EMU Accession

	item	Bid/ask spread in %	Savings in % of GDP
1	Trade in goods[1])	0.50	0.035
2	Trade in services[2])	0.50	0.005
3	Current private transfers[3])	2.00	0.005
4	Unclassified transactions[4])	2.00	0.017
5	Foreign trade-related hedging costs[5])	0.75	0.019
6	Foreign direct investment[6])	0.50	0.006
	CA-[7]) and FDI-related savings (1+2+3+4+5+6)	–	0.086
7	Savings in the financial account[8])	–	0.057
8	Total financial cost savings (1+2+3+4+5+7)	–	0.138
9	In-house costs[9])	–	0.070
	Total transaction cost savings (8+9)	–	0.207

Source: Own calculations on the basis of experts' estimates and NBP balance of payments statistics on a cash basis for 2001.

[1]) Import intensity of exports at the level of 0.4 was applied; import adjusted for FDI import intensity.

[2]) Zero import intensity of exported services has been assumed.

[3]) The share of euro-denominated transfers equals the share of euro-denominated trade flows; it has been assumed that half of the inflows are exchanged against zloty as cash and as such captured by unclassified transactions; inflows corrected for a one-off increase due to the compensation payments for World War II slave workers.

[4]) Commercial banks' purchases and sales of euro (cash) adjusted for one-off increase in purchases due to the euro cash changeover.

[5]) It was assumed that 20% of goods export and import transactions are hedged against exchange rate risk and that the outright forward with average maturity of three months is the only hedging instrument; the forward rate was derived from the three-month WIBOR differential relative to the 3M EURIBOR.

[6]) Nonresidents' FDI inflow plus residents' FDI outflow and withdrawals; share of euro-denominated FDI derived from the currency composition of FDI from January to November 2002; an import intensity of nonresidents' FDI inflows at a level of 0.4 was applied.

[7]) The income segment of current account transactions was omitted due to the negligible amount of transaction costs related to income on residents' direct investment made abroad and salaries paid to residents; other components of the income segment were also omitted due to their negligible amount (other income) or the fact that they are dominated by the financial activities of the NBP, government, commercial banks and foreign portfolio investors (income on portfolio and other investments).

[8]) Derived by multiplying the ratio of savings on financial account transactions to savings on current account transactions (0.7) estimated by Dumke et al. (1997) for EU countries by the estimated size of savings on current account transactions (0.081% of Poland's GDP).

[9]) The European Commission's assessment (1992) based on Ernst and Young (1990) estimates on in-house costs was taken as a proxy for in-house costs incurred by Polish companies.

The implicit transaction cost is half of the applied bid/ask spread. Numbers may not add up due to rounding.

Table 2

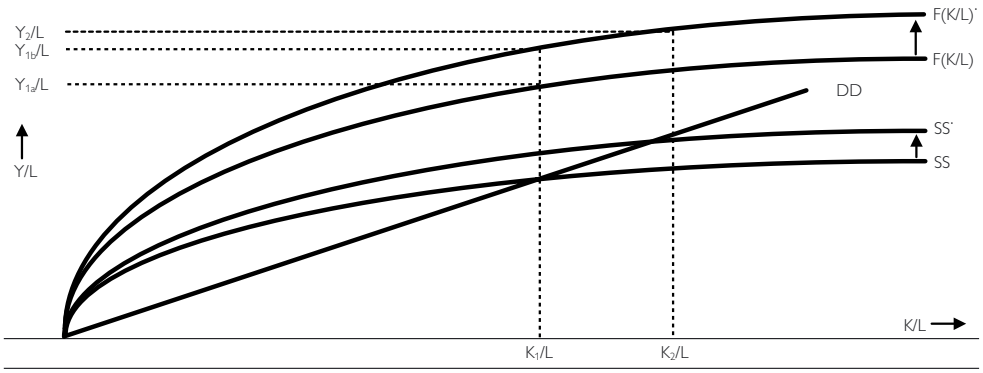
Currency Risk Premia in Poland

	1 year	1 year	10 year
Period	Jan. 1999 to Nov. 2002	Jan. 1999 to Nov. 2002	Aug. 1999 to Nov. 2002
Exchange rate expectations	Constant exchange rate	Reuters survey	Constant exchange rate
Liquidity and default premia (%)	0.7	0.7	0.7
Average (%)	8.4	0.6	3.9
Range (%)	−2.6 to 11.9	−8.2 to 10.6	0.6 to 6.7

Source: Own calculations on the basis of Reuters, Bloomberg and NBP data.

Chart 1

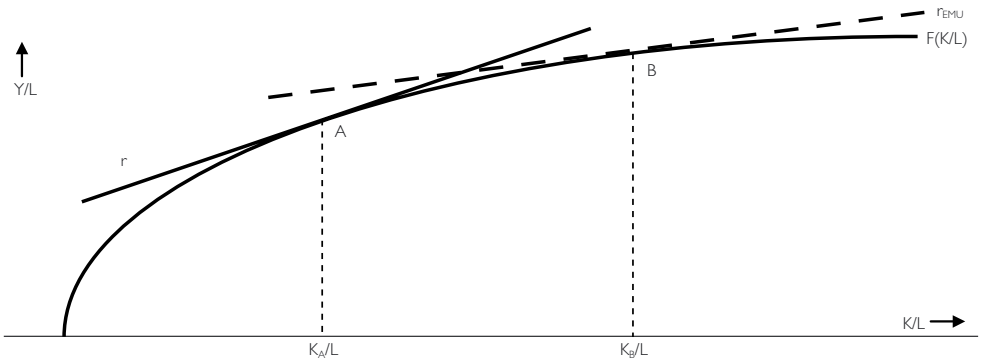
Static and Dynamic Efficiency Gains from Reduced Transaction Costs within the Framework of the Neoclassical Growth Model



Source: Baldwin (1991).

Chart 2

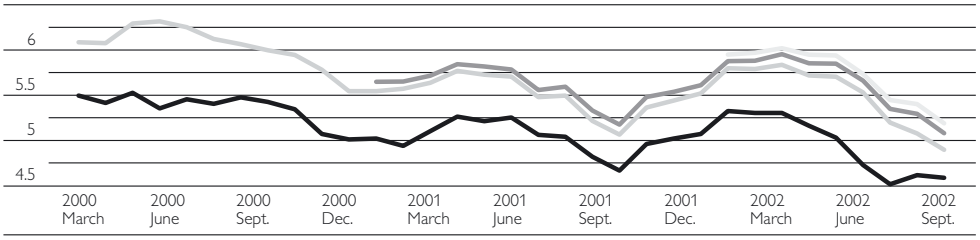
Dynamic Efficiency Gains from Lower Exchange Rate Uncertainty within the Framework of the Neoclassical Growth Model



Source: De Grauwe (1997).

Chart 3

Yields on Polish Ten-Year Eurobonds and Ten-Year Government Bond Yields in the Euro Area

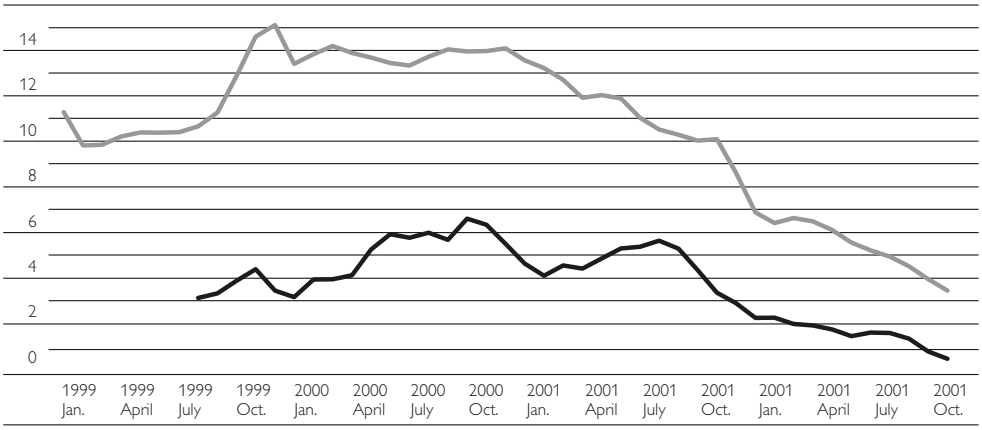


Euro area ten-year treasury bonds (Reuters benchmark)
Ten-year Polish eurobonds, issued January 29, 2001, maturity February 14, 2011
Ten-year Polish eurobonds, issued March 7, 2000, maturity March 22, 2010
Ten-year Polish eurobonds, issued February 26, 2002, maturity: March 12, 2012

Source: Bloomberg and ECB.

Chart 4

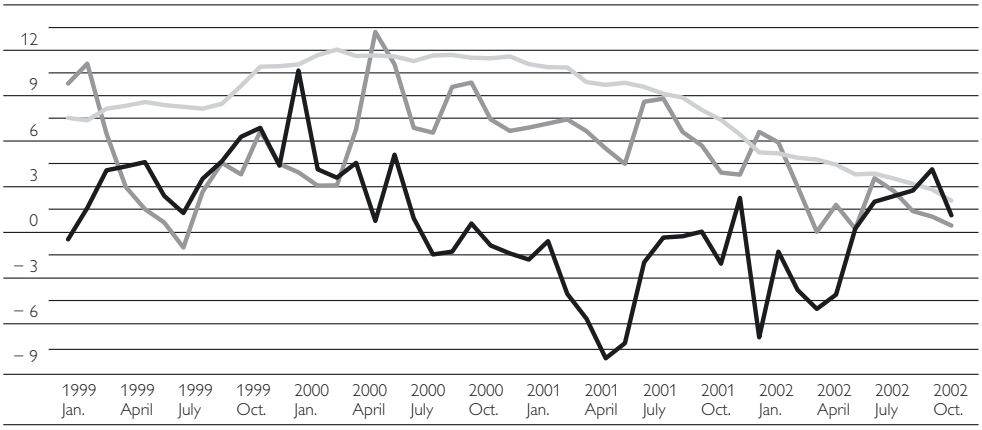
Ten-Year Currency Risk Premium and Short-Term Interest Rate Disparity in Poland



Source: Own estimates on the basis of Bloomberg, ECB and NBP data.

Chart 5

One-Year Currency Risk Premium[1])[2]) and Implied Volatility[3]) of the PLN/USD Exchange Rate



Source: NBP data (implied volatility) and own estimates on the basis of Reuters.

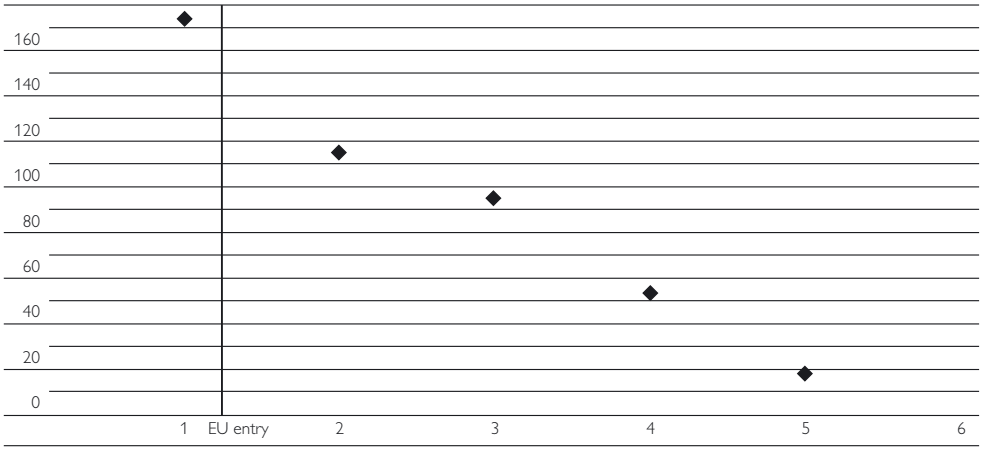
[1]) Expected change of the nominal PLN/EUR exchange rate derived from commercial banks expectations (unweighted average) of the PLN/EUR exchange rate prevailing over the one-year horizon.

[2]) Twelve-month EURIBOR used as a proxy for yields on one-year government treasury securities in the euro area.

[3]) Annualized standard deviation expressed in percent of the expected exchange rate.

Chart 6

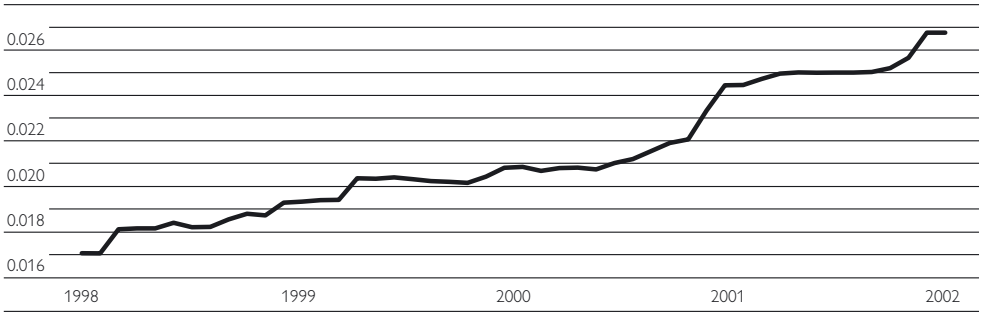
One-Year Currency Risk Premium (Basis Points)[1])[2]) Derived from One-Year Zloty and Euro Implied Forward Interest Rates



Source: Own calculations on the basis of Bloomberg data.
[1]) One-year forward interest rates calculated for periods starting in February every year.
[2]) Assuming 70 basis points liquidity and default premium and constant exchange rate expectations.

Chart 7

Five-Year Moving Standard Deviation of Monthly Change in the Logarithm of the PLN/EUR Rate[1])[2])



Source: Own calculations based on NBP data, in accordance with the formula proposed by Rose (2000).
[1]) NBP fixing rate.
[2]) Deutsche mark until the end of 1998.