Accession of the Czech Republic into euro area and Maastricht convergence criteria from the perspective of theory of „impossible trinity"

Vstup ČR do eurozóny a maastrichtská konvergenční kritéria z hlediska teorie „nedosažitelné trojice" [1]

MOJMÍR HELÍSEK

1   Introduction

The decision of the Czech Government, i.e. not to strive - for now, at least - for accession into the European Exchange Rate Mechanism II (ERM II), issued in October 2006, has postponed the accession of the Czech Republic into the euro area indefinitely. In spite of this, the Czech Republic has been referred to as a good example of timely preparation for accession into the euro area by the European Commission, even if the accession date has not been fixed yet. The Fifth EC Report on the practical preparation for future enlargement of the euro area (July 2007) appreciates, particularly, adoption of the National Plan for euro introduction in the Czech Republic (issued in April 2007). [2]

The accession of the Czech Republic into the euro area is conditioned by various circumstance, particularly, compliance with the Maastricht convergence criteria. Two of the three criteria (inflation and exchange rates), along with the obligation of each EU member to guarantee free capital flow, are contained in the theory of "impossible trinity", i.e. impossibility of meeting all three criteria at the same time. This survey should check the applicability of this theory in the conditions of Czech economic system.

In the first section of this survey, the main features of the "impossible trinity" theory will be explained, at first in general terms, and then in the context of economic policies of the countries accessing into the euro area. In the second section, the evaluation of achieving these goals in selected countries that already have accessed into the area will be dealt with. The third section covers the issues associated with meeting these criteria in the Czech Republic. The final, fourth, section summarizes the experience in meeting the criteria of „impossible trinity" and the perspectives in the period of time where the Czech crown will be included in ERM II.

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1   This paper has been made with the assistance of the Internal Grant Agency of the Institute of Finance and Administration, o. p. s. (project no. 7701).

2   EC, 2007, s. 10. The accession before 2012 is unacceptable, not only because of necessary consolidation of the public finances and flexibilization of the labour market, but also with regard to insufficient synchronization of economic cycles in the Czech Republic and the euro area (see Kaňková, 2007 for details).

2   „Impossible trinity" and the accession into the euro area

The hypothesis of the „impossible trinity" is based on trinity of options in the macroeco-nomic policy in an open economy, of which only two can be achieved at the same time.[3] These economic and political objectives are:
● independent (anti-inflation) currency policy,
● stable exchange rate,
● free international capital flow.

As shown in Fig. 1, the achievement of two of these objectives (vertices of the triangle) is conditioned by abandonment of the third objective indicated on the side between two achieved objectives.

Fig. 1: „Impossible trinity" of economic policy in an open economy
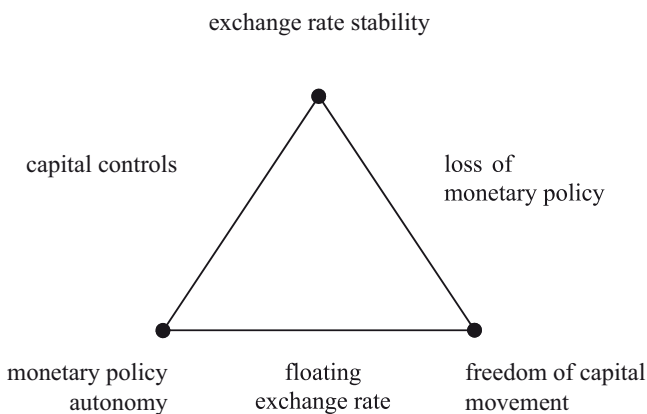
Remark: In the original, loss of the currency policy is indicated as "currency board".
Source: Krugman, Obstfeld (2006), p. 630. The authors have implemented this analysis in the context of searching for reform of the worldwide "financial architecture", in response to Asian currency crisis. According to the authors, a stable exchange rate is more important for developing countries rather than for developed ones, since it allows to control the inflation more easily.

Impossibility of achievement of all three objectives at the same time is documented by the following combinations:
1)   Having low inflation and, at the same time, stable exchange rate, capital control will have to be implemented, since low inflation with a restrictive currency policy and high interest rates attracts foreign capital. On the one hand, this will promote ex-change rate appreciation, on the other hand, increase home stock of money and put under risk the inflation goal. The solution would be capital control, as already said.

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3   The hypothesis is based on the model of monetary and fiscal policy under conditions of fixed exchange rates, as defined by Robert Mundell in 1962.

2) Combination of low inflation (with high interest rates) and free capital flow will put under pressure the exchange rate (its appreciation with unfavourable impacts on competitive advantage compared with foreign countries). This pressure could be encountered by introduction of floating exchange rate. Abandonment of the stable exchange rate could result in currency crisis, i.e. dramatic exchange rate devaluation - if the investors would lose their confidence – with following strong drain of capital from the country.

3) Maintaining stable exchange rate, along with free capital flow, will lead to fluctuation of central bank´s foreign exchange reserves (resulting from exchange rate interventions), with impact on home stock of money. This process will bring about instability of inflation rate. Hence, the currency policy is not efficient in an economy with stable exchange rate.

For any country wishing to access into a monetary union, **low inflation rate** is the first of the four Maastricht convergention criteria stipulated in the Treaty on European Union. The Treaty has set forth the obligation of achieving sustainable price stability in long-term perspective and in the course of one year prior to assessment of compliance with these criteria, in particular, the reference inflation rate (i.e. average of three EU countries with the best results in terms of price stability, which is considered achievement of the lowest inflation rate) should not be exceeded by more than 1.5 percentage points.

Stable exchange rate is another criterion (on original sequence, the third one)[4] . The exchange rate of the assessed country must be within - so called - normal fluctuation band applicable in the European Monetary System (Exchange Rate Mechanism II – ERM II since 1999) for the time of minimum two years before the assessment of compliance. More exactly, the exchange rate must be within the "standard fluctuation band" and must not be subject to "severe tension", without central parity devaluation.

The prevailing representation of the standard fluctuation band is asymmetric: 15 % above and 2.25 % below the central parity set to euro. The asymmetry of the fluctuation band results from ambiguousness of set criteria. The original ERM developed in 1979 [5] utilized a band of 2.25 % below and above, however, it was extended in August 1993, as a result of currency crisis. The interpretation of the exchange rate convergency criterion stems from the position of the European Commission, according to which the original (2.25 %) band above and below should be maintained, whereas exceeding of the appreciation limit of 2.25% should not be considered failure to meet this criterion (however, the extended limit of 15 % must not be exceeded).

Free capital flow has not been mandated in the Maastricht convergence criteria, however, the EU countries are obliged to enable free capital flow as specified in the Maastricht Treaty, not only within EU, but also internationally (with non-member states). This require-

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4   *It should be noted that the second criterion is fiscal one (consisting of two parts) and the fourth criterion are long-time low interest rates. The criteria have been defined in article 121 of the Treaty and set forth in more detail in the following Protocol no. 21.*

5   *The ERM II was implemented in early 1999, by way of transition from central parity between individual currencies to only one central parity, i.e. euro.*

ment has been stipulated in art. 56 of the Treaty: „Within the framework of the provision set one in this chapter [i. e. Capital and Payments], all restrictions on the movement of capital between Member States and between Member States and third countries shall bee prohibited."

Formerly, capital controls had been possible (and frequently implemented – see below) before it was officially abandoned in July 1990. However, the Treaty (art. 120) allows for exceptions: „Where a sudden crisis in the balance of payments occurs and a decision within the meaning of article 119 (2)[6] .is not immediately taken, the Member State concerned may as a precaution, take to necessary protective measures" As indicated further in this article, the Commission shall issue its standpoint on these measures, based on which the Council of European Union, consisting of the ministers of economy and finances (ECOFIN Council), after consultation with the Economic and Financial Committee, can decide on amendment, suspension or cancellation of the imposed „protective measures." The nature of these protective measures has not bee specified in the Treaty, however, they have been normally understood as „capital control". [7]

The possibility of implementation of „protective measures" has also been mentioned in art. 59. In this particular case, however, the measures must be triggered by "serious difficulties for the operation of economic and monetary union," i.e. they shall not be initiated by internal problems of any country.

The protective measures should be of temporary and exceptional nature, as can be concluded from the above legislation (incl. possible lifting of these measures by the Council), but also from the economic point of view. In case of frequent implementation of these measures, they could be anticipated by the market – and reflected by higher risk premium in interest rates. [8] However, the most essential argument for exceptionality- or rather disapproval of capital control as a tool to maintain fixed exchange rate in ERM II – is the compliance with the exchange rate convergence criterion, without "severe tension". This term (i.e. "severe tension", with slight differences in understanding of this term by the Commission and ECB) can be characterized, among other things, by the response of the economic policy. [9] Even if only foreign currency interventions and increasing short-terms interest rates have been specifically referred to, it can hardly be anticipated that capital control would be consistent with the condition "without severe tension". Consequently, any infringement of free capital flow appears to be unacceptable as well (equally crucial as the compliance with the inflation and exchange rate criteria).

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6   Art. 119 deals with the situation where " difficulties of the balance of payments" resulting from imbalance or "type of the currency at its disposal" are imminent or already encountered by any member state. The Commission will recommend measures the relevant member state should take. Should these measures prove insufficient, the Commission will recommend the Council to give assistance (a procedure agreed upon with other international organisations, prevention of commerce diversion in case of necessary quantitative restriction in relation to third countries or a loan granted by other member states).

7   For example,. Begg et al., 2002, p. 66, or Schadler et. al., 2005, s. 85.

8   For example, Begg at al., 2002, s. 66, or Buiter, 2002, p. 10.

9   Helísek, 2006.

As already pointed out, the countries striving for accession into the euro area must comply with all three objectives stipulated in the Treaty on European Union at the same time. No wonder this provision raises criticism, for example by W. Buiter, former Chief Economist of European Bank for Reconstruction and Development. His objections are based on impossibility to pursue all three nominal objectives, i.e. inflation, interest rates and currency exchange rate, since this effort could result in "financial accident". According to Buiter, the fiscal criteria are sufficient. Stable exchange rate should not be required and the countries wishing to access into the euro area should be allowed to maintain floating exchange rates. [10]

Also begg et al. point out the risk of a crisis resulting from participation in ERM II combined with high mobility of capital. The following claim has been brought up in association with ERM II: "However, crises, particularly of the contagion type, cannot be ruled out in any scenario that combines full capital mobility with the ERM II".[11] The alternative is capital control. Free capital flow could be allowed only in case of unilateral euroisation (introduction of euro without consent of European Union authorities). Begg et al. have recommended this option for countries that have reached fiscal and price stability and have "sound" banking systems, however, being aware of European Central Bank´s definite disapproval of this option. [12]

Similar objections – arising from concerns about maintaining low inflation rate – can be found in the Czech literature as well: „Can these countries be expected to maintain a low inflation rate after their ERM II accession […] and can setting exchange rate targets be regarded as a tool (or an intermediary milestone) which - at the same time – would allow maintaining stable and low inflation rate?" [13]

Also, the Czech National Bank points out the risk associated with the „impossible trinity" in connection with impossibility to have fixed exchange rate and free capital flow. Maintaining fixed exchange rate too long will be „punished with foreign exchange crisis." The example can be the „currency turbulence" in 1997 in the Czech Republic. The euro area has dealt with the issue of the „impossible trinity" by wide flexibility of euro exchange rate. [14]

2   Experience in achieving of the "impossible trinity"

In the first wave, 11 countries have accessed into the euro area on 1 Jan. 1999; Greece followed on 1 Jan. 2001. The fixed exchange rate system had the shape of the initial ERM as a part of the European Monetary System (EMS). In March 1979, where the EMS was established, it included 8 countries, another countries have accessed with time. When

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10 „*The history of the pursuit of two or more nominal targets […] is a most unhappy one. The pursuit of an inflation target (itself inappropriately specified) and a-fortiori of an inflation target and a nominal interest rate target subject to a nominal exchange rate constraint is an accident waiting to happen"* (Buiter, 2004, p. 43).

11 *Begg et al., 2002, p. IX, 70.*

12 *ECB, 2003.*

13 *Viktorová, 2005, p. 63.*

14 *Tůma, 2006, p. 4 – 5.*

evaluating the experience of these countries, striving to have the „impossible trinity", several periods must be distinguished.

1) From establishment of the European Monetary System to mid-1980s:
- Getting fixed currency exchange rates in a narrow fluctuation band (see above) has brought about fixed exchange rates but, on the other hand, many changes in central parities, particularly devaluations (see Table 1).
- Considering significant differences in inflation rates, the countries continued to follow independent monetary policy. Hence, no agreement on a single policy was reached: in some countries, currency restriction would result in recession, in other countries, they would lead to decrease of inflation rate etc.
- Many obstacles in free capital flow (i.e. capital controls).

Table 1: Changing central parities within ERM

	3/13/79 – 1/12/87			1/13/87–8/2/93			8/3/93–12/31/98		
Country	R	D	Σ	R	D	Σ	R	D	Σ
Germany	7		7	1		1			
France	3	3	6	1		1			
Netherlands	6		6	1		1			
Belgium	4	1	5	1		1			
Luxembourg	3	1	4	1		1			
Ireland	2	2	4	1	1	2	1		1
Italy		5	5		2	2			
Spain	x	x		1	3	4		1	1
Portugal	x	x		1	2	3		1	1
Total			37			16 *			3

Source: own compilation according to Čech, Komárek, 2002, p. 524.
*Rem: EMS established 3/13/1979; 1/12/1987 four parities were adjusted; 8/2/1993 the fluctuation band was extended. No changes to central parity in Austria and Finland. R = revaluation, D = devaluation, Σ = total. x = the country was not member of the system. * Of these 16 changes to central parity, 7 were devaluations triggered by the currency crisis in 1992 – 1993.*

2) From 1987 to 1992 (before EMS crisis):
- Fixed exchange rates had experienced much less central parity adjustments (particularly, after being purged from the influence of the currency crisis 1992 – 1993).
- The countries abandoned independent monetary policy by linking up their exchange rates to DEM. Thus, Deutsche Bundesbank (DBB), in fact, performed the tasks of the European Central Bank. These measures were aimed at approximation of high inflation rates in some countries to the low inflation rate in Germany.
- The capital controls had been gradually reduced and officially abandoned in July 1990.

3) Currency crisis in September 1992 – August 1993: [15]
The anti-inflation policy in some countries (specifically Italy, Portugal, Spain) was not consequent and the confidence in stability of these currencies gradually fell. Moreover, the restriction of DBB was increased by the need of holding back fiscal expansion resulting from German reunification. This process was accompanied by political problems (failure to adopt the Treaty of Maastricht in Denmark, with expecting the same result in France and other) and led to UK´s and Italy´s withdrawal from EMR and currency devaluation in Italy, Spain (3x), Portugal (2x) and Ireland.

4) From 1993 to 1998 (discontinuation of ERM and transition to ERM II):
● Dramatic extension of the fluctuation band. "The post-crisis ERM agreed upon in 1993 differed little from a floating exchange rate regime."[16] Generally, exchange rate fluctuations were not dramatic since the extended fluctuation band discouraged speculative attacks (elimination of the risk associated with the "one way speculation"). Within the two-years´ period evaluated before accession into euro area, only three currencies failed to remain in the allowed depreciation band (Ireland – for 32 days, Italy – for 96 days and Finalnd – for 39 days) – see Table 2.
● The monetary policy was associated, predominantly, with the policy pursued by the German Central Bank. From this perspective, the policy was not "independent", however, it allowed to keep the inflation rate low, ranging from 0.6 % to 2.2 % (see Table 3).
● Capital controls were not allowed.

Table 2: Exchange rate fluctuations in ERM (countries that failed to remain in the depreciation band)

	Ireland	**Italy**	**Finland**
Maximum exchange rate deviation:			
- depreciation band	4.2 (4.8)	7.8 (10.0)	4.2 (9.1)
- appreciation band	10.9 (12.5)	1.8 (2.5)	3.7 (3.6)

Rem: Exchange rate deviations from central parity (in %). The first figure indicates exchange rate of the median currency– daily exchange rates (method implemented by the European Commission), the figure in parenthesis indicates exchange rate of the national currency with the highest deviation – 10-daily-average (a method implemented by the European Monetary Institute). Sources: EMI: Convergence Report 1998, EC: Convergence Report 1998.

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15 *See Helísek, 2004, p. 43 – 47.*

16 *Baldwin, Wyplosz, 2006, p. 339.*

Table 3: Rates of inflations of the first countries of the euro area (HICP, annual average, in %)

	1995	1996	1997	1998
Germany		1.2	1.5	0.6
France	1.8	2.1	1.3	0.7
Netherlands	1.4	1.4	1.9	1.8
Belgium	1.3	1.8	1.5	0.9
Luxembourg		1.2	1.4	1.0
Ireland		2.2	1.3	2.1
Italy	5.4	3.0	1.9	2.0
Spain	4.6	3.6	1.9	1.8
Portugal	3.4	2.9	1.9	2.2
Austria	1.6	1.8	1.2	0.8
Finland	0.4	1.1	1.2	1.4

Source: ECB: https://sdw.ecb.europa.eu [1. 4. 2008]

Achieving the "impossible trinity" within the European Monetary System and the initial ERM is summarized in Table 4.

Table 4: Achieving „impossible trinity" in EMS and ERM

Exchange rate	**Monetary policy**	**Capital flow**
1979 – 1987		
✓✗ Frequent parity changes	✓ Independent MP	✗ Capital flow control
1988 – 1993		
✓ Fixed exchange rates	✗ MP dependent on DBB	✓ Abandonment of capital control
Currency crisis 1992 – 1993 (withdrawal from EMS, devaluation and fluctuation band extension)		
1993 – 1998		
✓✗ Broad fluctuation band	✗ MP dependent on DBB	✓ Free capital flow

Source: own compilation according to Baldwin, Wyplosz, 2006, p. 335 – 339.

Summarizing, the assessment of meeting the "impossible trinity" is rather difficult, for the following reasons:

- ambiguous evaluation of the "fixed exchange rate" with broad fluctuation band; however, the broad fluctuation band was not utilized by most of the countries (generally, this objective seems to have been met),
- lacking independence of monetary policy, however, allowing keeping the inflation rate low (this objective, too, has been met).

Finally, it should be pointed out that all countries under consideration complied with the inflation and exchange rate criteria and introduced euro on 1 Jan. 1999 (at first, only in cashless payments, and at the beginning of 2002 for cash payments as well), naturally, without any international capital flow controls.

Greece (at the beginning of 2001) and Slovenia (at the beginning of 2007) became **new member of euro zone.** Lithuania was subject to assessment along with Slovenia, however, failure to comply with the inflation criterion (or rather sustainability of this criterion) caused the exemption from temporary non-participation in the monetary union has not been withdrawn [17].

Exchange rates of all countries were stable throughout the (approximately) two-years´ period (see Table 5), for example in Slovenia or Lithuania (Lithuania maintained currency board environment). The central parity of Greek currency was deliberately under-valued at the moment of Greece´s accession into ERM which resulted in gradual exchange rate devaluation in relation to parity, however, within the appreciation zone of the fluctuation band.

Rates of inflation were low as well; Lithuania failed to meet the inflation criterion by as little as 0.1 percentage point (see Table 6).

Table 5: Exchange rate fluctuations within ERM II

	Greece	**Slovenia**	**Lithuania**
Maximum exchange rate deviation:			
- depreciation band	0.0	0.2	0.0
- appreciation band	8.2 (8.1) / 9.0	0.1	0.0

Rem: Exchange rate deviations from the central parity to euro (in %). Greece: The first two data refer to membership in ERM: exchange rate to the median currency (in parenthesis: exchange rate to national currency).
Sources: ECB Convergence Report (2000, 2006), EC Convergence Report (2000, 2006).

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17 *Accession of Cyprus and Malta into the euro area in early 2008 not considered in this survey.*

Table 6: Inflation rate of new euro zone members (HICP, annual average, v %)

	1997	1998	1999	2000
Greece	5.4	4.5	2.1	2.9
	2003	2004	2005	2006
Slovenia	5.7	3.7	2.5	2.5
Lithuania	-1.1	1.2	2.7	3.8

Source: ECB: https://sdw.ecb.europa.eu [1. 4. 2008]

New members of the euro area succeed in achieving all three objectives, i.e. stable exchange rate, low inflation (however, the monetary policy in these countries has been modified to fit with the European Central Bank) and free international capital flow.

When assessing compliance with the inflation and exchange rate criteria, the development of the **Hungarian economy** is worth taking note of. In May 2001, quasi-ERM II (observance of the fluctuation band of 15% in both directions from the central parity; this process was not officially declared as accession into ERM II, however, approved by relevant EU authorities) was implemented in Hungary. After the implementation, exchange rate of Hungarian forint (HUF) gradually appreciated due to restrictive monetary policy and high interest rates that compensated expansive fiscal policy (aimed at low inflation). At late 2002, HUF exchange rate was close to the appreciation band limit. The Hungarian authorities had two options:
- to reduce the interest rates to mitigate the pressure towards appreciation or,
- to keep high anti-inflation interest rates and to revaluate the central parity.

The first option prevailed and the interest rates decreased in November-December 2002, along with strong interventions in foreign currency sector (increasing Central Bank´s foreign exchange reserves). Despite these measures, the tendency to appreciation continued and resulted in speculative attack[18] in mid-January 2003, with speculators´ expectations of exceeding the fluctuation band.

However, mitigation of monetary restrictions has been perceived as abandonment of the anti-inflation policy (giving up the inflation objective) by the investors. Paradoxically, the attempts to stop appreciation of HUF exchange rate resulted in depreciation, caused by „run" from forint. In this situation, the Hungarian government decided – surprisingly - to devaluate central parity by 2.3% in June 2003. This led to further depreciation which was responded by another increase of interest rate by the Central Bank. Thus, the depreciation rate reached approx. 12% from January to June 2003 (however, staying far from the central parity). The development of HUF rate of exchange can be seen on Fig. 2.

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18 On 15 and 16 Jan. 2003, Hungarian Central Bank increased its foreign exchange reserves by 5.3 billion EUR
    (Viktorová, 2005, p. 74).

Fig. 2: Hungarian forint - rate of exchange (HUF/EUR, annual average)
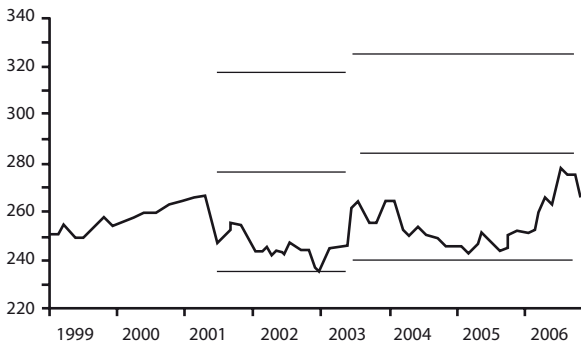
Rem.: Horizontal lines represent simulated membership in ERM II. Central parity was 276.1 HUF/EUR from May 2001; after devaluation by 2.3% in June 2003, it was 282.4 HUF/EUR (middle line). The other lines show limits of the fluctuation band (15%) below and above the central parity. In January 2003 – June 2003, the depreciation amounted 12 %, in August 2005 – June 2006, it reached as much as 15 %.
Source: EC: Convergence Report 2006, p. 103.

Can a development like this be referred to as an example of non-consistent currency (anti-inflation) and exchange rate stabilisation policy? The answer is not easy:

- according to Viktorová, "the oscillation band seems to be much stronger limitation factor of the monetary policy than anticipated before this [appreciation] attack." "This situation indicates any participation of Central and East European countries striving to comply with the inflation target in ERM II causes risk of lacking macroeconomic stability and inconsistent monetary policy."[19]
- according to Dědek, " not any evidence of inconsistency of the Maastricht criteria, in practical terms, has been provided. For rigorous compliance with these criteria, it would be sufficient to activate the asymmetry of exchange rate within ERM II and revaluate central parity." [20]

Nevertheless, another, and perhaps definitive, argument against the "turbulences" of this kind being referred to as inconsistency of the inflation and exchange rate objective is, according to Dědek, Hungarian inconsistence of monetary, fiscal and exchange rate policy. This was the essential cause of speculations by the investors and, consequently, exchange rate fluctuations.

3   "Impossible trinity" in the Czech Republic

The inflation and exchange rate indicators will be evaluated similarly as in the countries that have already introduced euro. The values of the **inflation criterion** and its observance in the Czech Republic are given in Table 7. The inflation is indicated using Harmonized Index of Consumer Prices (HICP, annual average, changes in %). In seven years under

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19 *Viktorová, 2005, p. 75, 78 – 79.*

20 *Dědek, 2006, p. 5.*

consideration, the inflation rate exceeded the reference value only two times, on the other hand, average inflation was approximately 24 % below the reference value.

Table 7: Inflation criterion and its evaluation in the Czech Republic

	2001	2002	2003	2004	2005	2006	2007
Three-countries average	1.6	1.4	1.2	0.7	1.0	1.4	1.3
Criterion	3.1	2.9	2.7	2.2	2.5	2.9	2.8
Inflation in CR	4.5	1.4	-0.1	2.6	1.6	2.1	2.4

Source: Assessment, 2004, p. 4, 2005, p. 7, 2006, p. 8, 2007, p. 8.

In most countries that have accessed into the European Union in recent time, the common issue of inflation has been accompanied by another specific phenomenon, known as Balassa-Samuelson effect (B – S effect). This is an added ´source´ of inflation due to different development of labour productivity and earnings in tradable and non-tradable sectors.[21] In the former sector, the growth in labour productivity is higher (influence of international competition) and, consequently and the earnings grow as well. Rising earnings in tradable sector cause the earnings in non-tradable sector to rise (contagion), however, without adequate increase in labour productivity. As a result, the prices in non-tradable sector are rising and cause influence to grow.

Since the inflation should be kept low, this effect has to be responded to by exchange rate appreciation. Hence, the need of low inflation comes in contradiction with stable exchange rate and leads to appreciation (not speaking about other potential sources of inflation, which may stimulate exchange rate appreciation).

According to various assessments, the contribution of the B – S effect to overall national inflation rate ranges 1 – 4 percentage points.[22] The assessments by IMF – used in some Czech analyses[23] – are shown in Table 8 (annual average in 1996 – 2003).

Table 8: Balassa – Samuelson effect

Country	%
Czech Republic	1.6
Hungary	1.9
Poland	1.2 – 1.5
Slovak Republic	1.0 – 2.0
Slovenia	0.7 – 1.4

Source: Schadler (ed.), 2005, p. 150 (with reference to other sources).

21 *See e. g. Mandel, Tomšík, 2003, p. 166 – 167, 262 – 264.*

22 *Viktorová, 2005, with reference to relevant literature. Similarly Šaroch, Tomšík, Srholec, 2005, p. 16.*

23 *Dědek, 2006, p. 8 – 9.*

The data above document comparatively small impact of the Balassa – Samuelson effect. Dědek even indicates "overestimation of the B – S effect."[24] From this perspective, the compliance with the inflation rate criterion is not under risk.

As far as the **exchange rate convergence criterion** is concerned, the Czech crown (CZK), so far, has not been fully integrated in the ERM II, hence, the compliance with this criterion can only be simulated – see Fig. 3. The hypothetical central parity has been based on ECB method, according to which the parity is indicated by average exchange rate in the first month of the period under evaluation (28.72 CZK/EUR in January 2006).

Fig. 3: Simulated membership CZK in ERM II
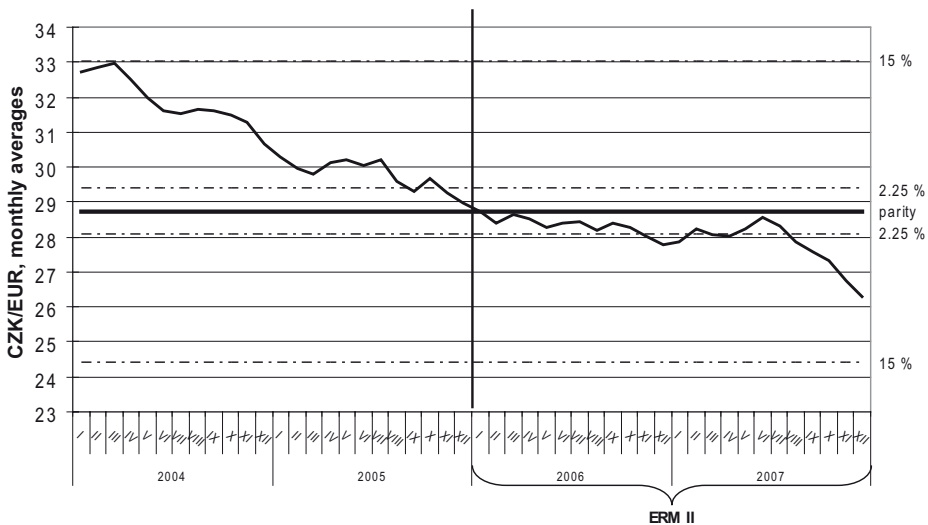
Source: www.cnb.cz (foreign exchange rates)

Overt the time of hypothetical participation in ERM II (2006 – 2007), the Czech crown has been appreciated - with some fluctuations - by 8.5 %. The narrow fluctuation band was exceeded already after 11 months, with following appreciation, however, the broad band (i.e. 15 %), by far, was not exceeded. Naturally, devaluation of central parity and "severe tension" (i.e. dramatic reduction of foreign exchange reserves of the CNB) did not occur. This can be attributed to foreign exchange interventions aimed at exchange rate stabilisation or dramatic increase in Czech interest rates (anti-depreciation measures). This can be documented by the data shown in Table 9.

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24 Ib., p. 10. Similar conclusions drawn by Pazour (2006, p. 806) – The author claim the influence of this effect being in order of tenths of percentage point.

Table 9: "Severe tension" indicators in development of the CZK exchange rate

Period	Interest rate differential (percentage points)	Changes in foreign exchange reserve (%)
2006 I	- 0.5	15.4
II	- 0.7	- 4.0
III	- 0.8	- 2.0
IV	- 1.1	- 4.8
2007 I	- 1.2	- 3.3
II	- 1.3	- 2.9
III	- 1.2	- 4.5
IV	- 0.9	- 0.8

Rem.: The interest rate differential is the gap between 3 M PRIBOR and 3 M EURIBOR (in all cases, quarter average is shown); changes in foreign exchange reserves indicate year-on-year difference (December, in %,). The reserves are given in EUR.
Sources: www.cnb.cz (financial markets; statistics related to the balance of payments); www.sdw.ecb.europa.eu (statistical data) [1. 4. 2008]

The third objective of the "impossible trinity" is **free capital flow** (the other option: capital control). In the Czech legislation, the imposition of capital controls has been provided for in the Foreign Exchange Act (no. 219/1995 Coll.) as one of emergency measures in the foreign exchange sector. Capital control can be imposed by the Government in the event of unfavourable development of the balance of payments, both in terms of efflux and inflow of capital.

In the recent history of the Czech economy, the measures imposed by the Czech National Bank in the course of the currency mini-crisis in the spring 1997 can be regarded as a form of capital control. The access to loans (granted in CZK) and used for purchase of foreign exchange by non-residents was disabled from 22 May to 17 June 1997.[25] It was an exceptional preventive measure and has not been implemented since that time. Free capital flow has been observed by the Czech authorities.

To summarize, all three objectives of the "impossible trinity" (the first two being accepted as Maastricht convergence criteria) have been complied with concurrently.

4   Which are the risks associated with the "impossible trinity"?

When assessing compliance with three objectives of the economic policy before accession into euro zone, particularly in the period of membership in ERM II, specific features of the Maastricht convergence criteria should be considered, particularly:
- low inflation criterion allows exceeding the reference inflation rate by 1.5 percentage point and, as such, it is broad enough,

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25 *Fixed CZK exchange rate, protected by CNB´s interventions (amounting approx. 2.3 billion USD) for 10 days, was abandoned on 27 May 1997.*

- fluctuation band within ERM II is rather broad, allowing appreciation up to 15 % over the central parity,
- revaluation of central parity is not detrimental for compliance with the exchange rate criterion.

In specific conditions of the Czech economy, featuring long-time capital inflow (particularly, direct foreign investments) – along with surplus of the trade balance (see enclosed tables P1, P2 and P3), continuing trend towards CZK appreciation can be expected. This trend is consistent with the exchange rate criterion and, additionally, it contributes to low inflation.

Consequently, there is no risk of failure to comply with the exchange rate criterion, except for two eventualities:

1) Revaluation resulting from strong appreciation could bring about another appreciation expectations and, consequently, speculator attacks. Of course, the attacks can be fought off, however - given strong appreciation, not corresponding with the development of fundamental economic indicators - it may raise expectations of exchange rate correction (i.e. depreciation) which, finally, may put under risk compliance with the exchange rate criterion (depreciation currency crisis).

2) Depreciation currency crisis may also be "transmitted" as a result of contagion of the economic situation in one of the countries of a specific region (Central and East Europe). In this case, the investors may extend negative assessment of that country to all countries of the region, considering similar economic situation in that region. Begg et al. (2002) refer to this phenomenon as "flight to quality" where "investors seem to withdraw funds from entire regions rather than just the country where financial instabilities originate. Imperfect information on the part of international investors drives this kind of contagion. [...] Contagion is important in the context of accession [into the euro area – rem. by M. H.], because it is plausible to assume that market views about the ACs are indeed highly correlated, [...] news that the process of accession derailed in one country is, therefore, likely to affect market views about other countries in the group." [26]

Owing to expected determination of the relevant authorities (European Central Bank, national central bank) to protect the exchange rate, however, these risks seem improbable. [27]

As suggested by O. Dědek in his quoted survey, inconsistency of the Maastricht criteria (i.e. inflation and exchange rate) is only a fiction. Meeting these criteria – so far, documented empirically - is not pure coincidence. This can be explained, on the one hand, by their inter-connection with the main instrument of monetary policy, i.e. interest rates, on the other hand, by the fact both criteria are closed in one direction only ("semi-opened" intervals). Increasing interest rates will lead to (unlimited) drop of inflation and - at the same time - to (unlimited) exchange rate appreciation. In consequence, the low inflation will allow reduction of long-term interest rates, as required in the Maastricht criteria. Introduction of relatively fixed exchange rate (after accession into ERM II), while maintaining free international capital flow, will be understood as abandonment of the independent

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26 *Begg et al., 2002, p. 67.*

27 *For details see Helísek, 2008.*

monetary policy and full subordination to the policies of the European Central Bank, as in case of EMS and EMR in late 1990s. However, any limitation of an independent currency policy should not result in dramatic increase in national interest rates (with following un-favourable impact on production and employment), considering current (and, obviously, sustainable) low inflation in CR. [28]

5   Conclusion

Let us conclude this survey with an interesting proposal to mitigate the contradiction between the inflation and exchange rate criterions. This proposal has already been put forward by W. Buiter [29] (quoted before), requiring re-definition of the inflation criterion in such a manner to include only prices of tradable sector in the price index (this proposal is the response to already mentioned Balassa- Samuelson effect), and to allow asymmetry of the exchange rate criterion (unlimited exchange rate appreciation). These changes would require amendment of the Treaty on European Union, a fact which is highly improbable. However, this will not be necessary, considering the facts above.

Abstract
Accession into euro area is conditioned (among others) by stable low inflation rate and stable currency exchange rate (participation in ERM II). Treaty on EU defines obligation to maintain free international capital flow. It concerns three objectives and theory of "impos-sible trinity" considers simultaneous fulfillment of all these three objectives infeasible. Experience resulting from the first wave of euro area members shows temporary limita-tion of capital flow, or loss of autonomous currency policy. Stable exchange rate is main-tained, but extension of fluctuation zone denies its character of "stable exchange rate". In conditions of ERM II (Greece, Slovenia, Lithuania) stable exchange rate, low inflation rate (with connection of currency policy with European Central Bank) and free capital flow were reached. Present development of the Czech economy shows the same development. Maintaining low inflation by restrictive currency policy together with simultaneous ap-preciation of exchange rate (or revaluation of central parity) is not in contradiction with Maastricht convergence criteria.

Souhrn
Přistoupení k eurozóně je podmíněno (mimo jiné) stabilní nízkou inflací a stabilním měnovým kurzem (účast v ERM II). Ze Smlouvy o EU vyplývá povinnost udržovat volný mezinárodní pohyb kapitálu. Jde o tři cíle, jejichž současné plnění může být považováno

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28 *"There are some good reasons not to join too early. [...] According to the impossible trinity, adopting a fixed exchange rate implies the loss of the monetary policy instrument, in effect importing the ECB´s policy. In particular if their [i. e. countries accessing into the euro area – rem. by M. H.] inflation rates are signifi-cantly higher than the eurozone rate, this would implay a very vigorous disinflation policy. It makes sense, therefore, to wait until their inflation rates have converted to the eurozone level" (Baldwin, Wyplosz, 2006, p. 341–342).*

29 *Buiter, 2000, p. 13 – 14.*

za nemožné (teorie „impossible trinity"). Zkušenosti první vlny členů eurozóny vykazují dočasné omezeních pohybu kapitálu nebo ztrátu autonomní měnové politiky. Pevný kurz je sice udržen, rozšíření fluktuačního pásma však zpochybňuje jeho charakter „pevného kurzu." V podmínkách ERM II (Řecko, Slovinsko, Litva) bylo dosaženo pevného kurzu, nízké inflace (při navázání měnové politiky na Evropskou centrální banku) i volného pohybu kapitálu . Dosavadní vývoj české ekonomiky svědčí o stejném vývoji. Udržování nízké inflace restriktivní měnovou politikou při současné apreciaci kurzu (nebo dokonce s revalvací centrální parity) není v rozporu s maastrichtskými konvergenčními kritérii.

Klíčová slova
euro, eurozóna, konvergenční kritéria, nedosažitelná trojice, ERM II

JEL classification / JEL klasifikace
E52, F31, F36

Contact address / Kontaktní adresa
doc. Ing. Mojmír Helísek, CSc.
Institute of Finance and Management, Institute of Finance and Administration
Estonská 500, 101 00 Praha 10
(e-mail: mojmir.helisek@vsfs.cz)

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Appendix

Table P1: Balance of payments of the Czech Republic (billion USD)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
current account	0.5	-0.8	-1.4	-4.1	-3.6	-1.3	-1.5	-2.7	-3.3	-4.3	-5.8	-5.8	-1.9	-4.6	-4.4
capital account	-0.6	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.6	0.2	0.4	1.0
financial account	3.0	3.4	8.2	4.2	1.1	2.9	3.1	3.8	4.5	10.6	5.6	7.0	6.4	5.1	5.2
errors&omissions 1)	0.1	-0.2	0.6	-0.9	0.7	0.3	0.0	-0.3	0.5	0.3	0.6	0.4	-0.8	-0.8	-1.0
change in foreign exchange reserves	-3.0	-2.4	-7.5	0.8	1.8	-1.9	-1.7	-0.8	-1.8	-6.6	-0.4	-0.3	-3.9	-0.1	-0.8

Rem: 1) including exchange rate differences. Change DR: - = increase.

Table P2: Current account - Balance of payments of the Czech Republic (billion USD)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
trade balance	-0.5	-1.4	-3.7	-5.7	-4.9	-2.6	-1.9	-3.1	-3.1	-2.2	-2.5	-0.5	2.5	3.0	5.8
services	1.1	0.5	1.8	1.9	1.7	1.9	1.2	1.4	1.5	0.6	0.5	0.6	1.5	1.5	2.7
revenues	-1.1	-0.0	-0.1	-0.7	-0.8	-1.1	-1.3	-1.3	-2.2	-3.6	-4.3	-6.1	-6.5	-8.2	-12.5
current transfers	0.1	0.1	0.6	0.4	0.4	0.5	0.6	0.4	0.5	0.9	0.5	0.2	0.5	-0.9	-0.4
current account	0.5	-0.8	-1.4	-4.1	-3.6	-1.3	-1.5	-2.7	-3.3	-4.3	-5.8	-5.8	-1.9	-4.6	-4.4

Table P3: Financial account – Balance of Payments of the Czech Republic (billion USD)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Direct foreign investments	0.6	0.7	2.5	1.3	1.3	3.6	6.2	4.9	5.5	8.3	1.9	3.9	11.6	4.7	7.8
portfolio inv. 1)	1.6	0.9	1.4	0.7	1.1	1.1	-1.4	-1.8	0.8	-1.6	-1.2	2.0	-3.4	-1.4	-2.5
other invest.	0.9	1.8	4.3	2.2	-1.3	-1.7	-1.8	0.7	-1.8	3.9	4.8	1.0	1.7	1.8	-0.1
short-term	0.1	0.6	1.0	-0.9	-1.6	0.2	-1.0	0.8	-1.7	2.9	3.8	-1.2	-2.7	-0.2	0.4
long-term	0.8	1.1	3.3	3.1	0.4	-2.0	-0.7	-0.1	-0.1	1.0	1.0	2.2	1.4	2.0	-0.4
financial account	3.0	3.4	8.2	4.2	1.1	2.9	3.1	3.8	4.5	10.6	5.6	7.0	6.4	5.1	5.2

Remark: 1) from 1 Jan. 2000, incl. financial derivates
Source: Balance of payment (CNB). www.cnb.cz (1 May 2008)