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Core or Periphery?
The credibility of the Austro-Hungarian currency
1867-1913

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The consensus view on the operation of the gold standard prior to World War I maintains that there was a marked contrast between the experience of “core” and “peripheral” countries.¹ Enjoying a high degree of credibility, the former could resort to an almost perfectly elastic supply of short term capital, which provided them a more or less automatic offset to any balance of payments disequilibrium. Hence, the more advanced core countries were able to finance their current account deficits without resorting to interest rate hikes with concomitant disruptions on the real sector. When foreign financial resources were needed to settle the current account, these economies could depend on the exchange rate to bear the brunt of the adjustment, relying on the willingness of foreign investors to finance a temporary deficit. Whenever the exchange rate depreciated towards the lower gold point, - i.e. the point at which it might become profitable to convert notes against gold at the central bank and ship the proceeds abroad, rather than purchase foreign exchange - market participants began increasingly to anticipate a future re-appreciation of the currency which, in turn, implied future capital gains. Peripheral countries, in stark contrast, did not enjoy such an easy access to foreign exchange, and lacked sufficient credibility, leaving them no other choice than to attract foreign capital either through interest rate hikes, or to give up convertibility altogether and let the exchange rate depreciate below the gold points.

The vicissitudes of the Austro-Hungarian currency deserve our attention from this point of view, in as much as the Habsburg Monarchy lay in an amorphous middle ground between these polar “ideal types”. On the one hand, its more back²ward economy, its reliance in some parts on foreign capital,³ and especially the gyrations of its currency until the mid 1890s led observers to place it, at least for the first part of the period under consideration, in the plebeian group of “peripheral” countries, and correctly so.⁴ However, the stabilisation of the florin after 1896

(known as *Valuta Regulierung*) and the ability of the Central Bank (Austro-Hungarian Bank) to implement very successfully a shadow (i.e. de facto) gold standard with the exchange rate of the florin remaining within an informal [$\pm 0.4\%$] band was reported to be the one that would have prevailed had a strict gold standard with unrestricted convertibility been implemented, would undoubtedly place the Dual Monarchy in the aristocratic club of core countries, and even more convincingly so after the turn of the century.⁵

This paper surveys the modern history of the Habsburg monetary union⁶ in order to explore a number of related issues pertaining to the nature and evolution of the credibility of its currency, with the goal of contributing to the literature on the working of the financial architecture during the apogee of liberalism and of the halcyon days of the classical gold standard. Being placed squarely in this middle ground between core and periphery, the case of the Austro-Hungarian currency union should afford important insights into the larger picture of European monetary history prior to the debacle of 1914.

I. From flexibility to fixity

The monetary history of the Dual Monarchy between 1867 and 1913 can be divided into three main epochs: 1) from the Compromise of 1867, which gave the constitutional foundations to a de facto monetary union between the two parts of the Monarchy, Austria and Hungary, until 1892, the florin *Österreichische Währung* (fl. *Ö.W.*) was linked to silver, though it was not convertible after 1879, and in reality, the currency actually floated quite substantially (variations could be as large as $\pm 7\%$); 2) In 1892 the silver link was formally severed, and the monarchy went on the gold standard, introducing a new parity and a new currency, the crown (*kronen*) (1kg gold=3280 crowns); 3) though de jure convertibility continued to elude the monarchy, the Austro-Hungarian Bank was successful in stabilising the crown by 1896 and thereafter managed very successfully a de facto shadow gold standard until the outbreak of World War I in 1914.

1. Paper money dragging a silver anchor: 1867-1892

The Dual Monarchy continued the silver standard that prevailed prior to the Compromise with a brief flirtation with gold in the early 1870s. The florin had been inconvertible, in the main, though, because the fiscal demands brought about by the recurrent wars fought by Franz Joseph defending Austrian political hegemony in Central Europe meant frequent resort to a monetary tax, i.e., paper issues.⁷ A number of humiliating military defeats, most recently at the hands of Prussia

and Italy brought this era to a close and called for a reorientation of Habsburg monetary policy.⁸ An agreement was signed with France that was supposed to have paved the way for a resumption of specie payments on a gold basis. The Act of March 9, 1870 created 4 and 8 florins gold 'trade' coins that had the very same gold content as the 10 and 20 francs French coins. The spirit of the times favored universalism, and the liberals on the Continent were dreaming of a monetary union for Europe, perhaps for the world.⁹ Yet, convertibility was elusive, and the Austrian currency effectively continue to float.

In 1871-72 the Austrian National Bank (ÖNB, afterwards the Austro-Hungarian Bank) made some attempts to leave the silver standard, as it began exchanging its silver reserves for gold.¹⁰ In March 1872, the provision that limited the amount of gold in the reserves of the Bank to one-fourth was abolished. Yet, no decisive action was taken, and a return to convertibility (in either gold or silver) remained a mere plan on paper. In fact, while the ÖNB adhered faithfully to its cover ratio, the existence of an outstanding stock of government notes that had the same legal status as the notes of the bank, reduced the effective cover to little, since this stock was of a size comparable to the bank's notes in circulation.¹¹ The crisis of 1873 made the prospect of currency stabilisation even more remote as the bank had to provide large amounts of refinancing that further reduced its reserves. The exchange rate continued to fluctuate below its silver parity, not to mention its gold parity.

The collapse of the silver market, after 1873, precipitated the evolution of the Austro-Hungarian currency away from its former standard.¹² The decline in the price of silver eventually caught up with the floating value of the florin on international exchange markets. A fall in the price of silver below the mint price of the florin (adjusted for arbitrage expenses) signalled profitable arbitrage opportunities. One could buy silver on the open market and have it coined in Vienna and buy Viennese bills-of-exchange of a higher value. In 1879, the Austrian mint was flooded with coinage orders and the government decided to suspend the right to coin for individuals.¹³ This policy, which was echoed in several other countries, prevented silver from becoming a ballast on the florin, and as a result, the price of silver bars went below that of the florin. The monarchy thus embarked on what was essentially a freely floating exchange rate system, since the gold parity was only nominal, and merely used for official accounting, or for

gold denominated foreign debts. Returns from the Vienna bourse show the 8 florins gold coin quoted essentially as a foreign coin.

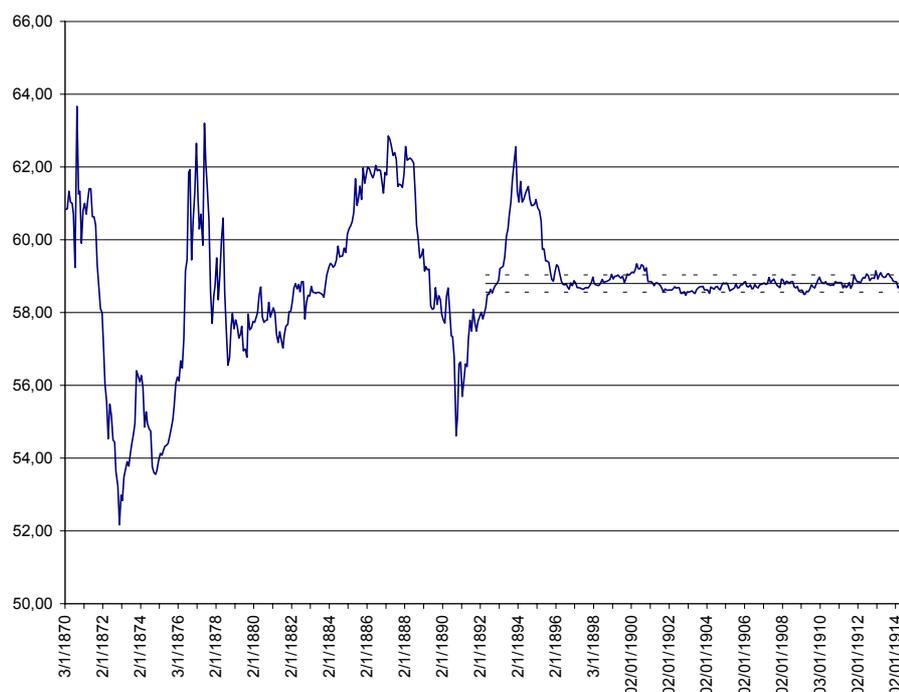
Thus, while the suspension of silver coinage for private account was a further step away from the silver standard, it was hardly a final one. Both Austria and Hungary retained the right to coin silver for their own use. With part of their debt in either silver or paper florins (which were identical after 1879 as silver florins, being legal tender, traded at 1:1 against paper florins), the two governments could benefit from buying silver on the market, and using the proceeds to discharge themselves from their obligations with coins that were cheaper to produce.¹⁴ The gain was proportional to the amount coined and to the existing spread between the price of silver and the exchange rate of the florin. Thus, the depreciation of silver, by rendering silver coinage attractive, created an incentive for governments to increase the silver money supply. As a matter of fact, silver coinage persisted in the Monarchy until 1889.¹⁵ This mechanism however, had its own checks. The government's incentive to coin silver could not lead to massive issues for the resulting inflation would have depreciated the gulden to the point where the advantage of coining silver would have gone to zero.¹⁶ In turn, this complex link with silver generated speculative behaviour on the foreign exchange markets with financiers trying to anticipate the evolution of money supply on the basis of the variations of the price of silver.

This situation was aggravated by yet another mechanism.¹⁷ The value of silver acted as a 'floor' for the price of the freely floating florin: the ÖUB held a large stock of silver and presumably the bank would use its reserves, should the florin threaten to depreciate *below* the price of silver.¹⁸ In the language of target-zone theory, silver was thus a 'reflecting barrier' for the florin, even if a moving one. Any change in the relationship between gold and silver prices had to be factored into expectations of future changes in the exchange rate of the florin in terms of gold currencies.¹⁹ Thus, while the automatic link between the florin and silver had been severed in 1879, the latter still continued to have a remote influence on the former through a number of 'indirect' channels: this is how contemporaries explained the correlation between the international value of the florin and the price of silver bars, which in some cases could be striking.²⁰

This situation created a conflict between the Bank and the political authorities. While the accumulation of silver in the vaults of the central bank counteracted the ÖUB's attempts at

accumulating gold in preparation for an eventual adoption of the gold standard,²¹ market expectations on the effects of the movements of silver prices on the florin exchange rate counteracted its objective to stabilise the currency. The ÖUB obviously resented this situation, as it found that the actions of the governments threatened to jeopardise its efforts. The sudden rise in the price of silver in the Summer of 1890, caused by the evolution of the silver legislation in the United States, created a fierce bout of gulden-silver speculation. Tracking the price of silver, which reacted favourably to the Sherman Act, the florin then began re-appreciating. This turned out to provide the proximate solution to the silver question, as the two governments were now faced with the evils of exchange fluctuation without the rewards of seigniorage, and at the same time affecting Austro-Hungarian exports adversely.²²

Figure 1. The Florin/Mark Exchange Rate. Florins / 100 Marks, 1870-1914



Yet, the influence of the episode in determining the subsequent course of action should not be over-emphasised. Discussions over the need to stabilise the currency had been going on for many years, and after 1887, both Austria and Hungary began to make efforts to limit their deficits. Moreover, after 1889, both began to adopt measures providing for the acquisition of gold, in preparation of an eventual adoption of the gold standard. In January 1890, the Vienna correspondent of Crédit Lyonnais' economist intelligence unit – the service d'études financières -

reported on a conversation he had had with the head of the director of the Vienna office of the ÖUB. The director had indicated that plans were being drafted for a “large consolidation loan” that would be split in two separate issues, with Austria obtaining 70%, and Hungary 30%, of the total, and used to mop up the outstanding government paper notes.²³ Indeed, the question of the stabilisation of the currency involved finding a way to recall the outstanding circulation of about 400 million florins in state paper, a legacy of the 1866 military campaign.²⁴

2) *Valuta Regulierung: currency stabilisation in Austria-Hungary, 1890-1899*

Austria-Hungary decided to finally adopt the gold standard in the early 1890s in order to put an end to the further revaluation of the florin that began in 1888 (Figure 1). The price of 100 marks went from 62.5 fl. 1888:1 to 54.5 florin in 1890:9. This 13 % decline in the value of the mark made life difficult for Austro-Hungarian exporters. In addition, the standard, fixed at 58.78 florin was seen as easing the access to West European capital markets.²⁵ As already mentioned, various schemes were discussed in 1890. In October rumours circulated about the parity at which the currency would be stabilised, in turn, causing even further temporary gyrations of the exchange rate.²⁶ From the point of view of the global capital market, there could hardly have been a worse timing. The Argentinean collapse in 1890 had depressed the international bond market and created extreme tensions in London and other leading European money markets, thus making foreign loans, as well as the acquisition of gold, fairly problematic.²⁷ Some argued that German banks, having their funds locked in Latin America, and unwilling to provide for the necessary write-offs, liquidated instead the firmer portion of their portfolios, which typically included Austro-Hungarian securities. In the foreign press many observers were critical of the Austro-Hungarian reform that would result in further difficulties.²⁸ The rumours about the exchange rate continued and volatility persisted.

In early 1892, however, the reform process accelerated. In February of that year,²⁹ *L'Economiste français* reported that the monarchy had initiated formal contacts with the Governor of the Bank of England and the Chancellor of the Exchequer. The meetings had been “satisfying” with British officials providing their Austro-Hungarian counterparts with “unofficial advice on how to avail themselves of the facilities of the London market without perturbing it unduly. The representatives of the Dual Monarchy on the other hand explicitly assured the British that nothing would be done precipitously, and without taking into account the interest of all

parties”.³⁰ On March 8th two commissions of experts gathered separately in Vienna and Budapest.³¹ While the consensus was far from complete, the commissions on balance favoured the adoption of the gold standard and suggested that the parity for the new currency, the crown, should be computed from the average exchange rate of the florin in the past.³² In order to stabilise the currency by providing an anchor to expectations, the new parity was circulated in “unofficial *communiqués*” in the following weeks.³³ Of course, the expected protests were heard from holders of the monarchy’s paper and silver debts, who hoped to get a higher gold value for their claims.³⁴ Nonetheless, in August 1892, the new monetary law was ratified by the Austrian Parliament, and in early 1893 by the Hungarian one.³⁵ This law formalised the new basis of the Austro-Hungarian currency, and revised the existing conventions between the bank and the two parts of the monarchy. The gold content of new gold crown was fixed.³⁶ The ÖUB was to stand ready to purchase gold bars at par, minus a rebate that covered coinage expenses. Silver coinage for government account was tightly limited for the future, and was mostly to consist of recoinage of older issues. The use of silver for the payment of large amounts was prohibited. Finally, and most importantly, it was decided that the two governments would provide gold to the central bank, at the same time as they would withdraw from circulation the state notes which at the close of 1892 amounted to some 312 million florins.³⁷ However, as long as a sufficient gold reserve had not been accumulated by the Bank, it appeared that the completion of the reform, whose “final act” would be the beginning of gold payments by the ÖUB, was to be postponed.

This, in turn, raised the question of how to find ways to provide for the purchase of gold and its exchange for government notes. The issue of new loans was not recommended.³⁸ Instead, it was decided to use the improvement of the price of Austro-Hungarian securities (which had been brought about by the reduction in the burden of their interest rate service through reduced indebtedness and increased taxation) to exercise the conversion option which was included in these securities (as in many government securities of the time). This would have enabled them to raise more funds (and thus acquire the means necessary to implement the reform), while keeping the burden of interest service constant. It was thus decided that the 5% paper and silver “special” (i.e. own) debts of Austria and Hungary would be exchanged, as fiscal authorities had the option, against new 4% bonds.³⁹ The operation - whose negotiations were finalised in early January 1893⁴⁰ - took place between January 24 and February 7,⁴¹ and the proceeds accruing from the

operation was reinvested to purchase gold.⁴² While Hungary had by then essentially reached the level of gold which it needed to repurchase its share of the outstanding notes⁴³, Austria still needed to undertake further action. In February 1894, Plener, the Austrian finance minister, presented to the Austrian parliament additional bills for that purpose. In the meantime, however, the exchange rate still experienced large swings, with the *agio* going up to 7%. Observers explained this in reference to the violent movements of international capital that surrounded the crisis in the United States,⁴⁴ and some worried that the reform was still “imperfect and incomplete”⁴⁵, as long as some form of gold convertibility would not be introduced.

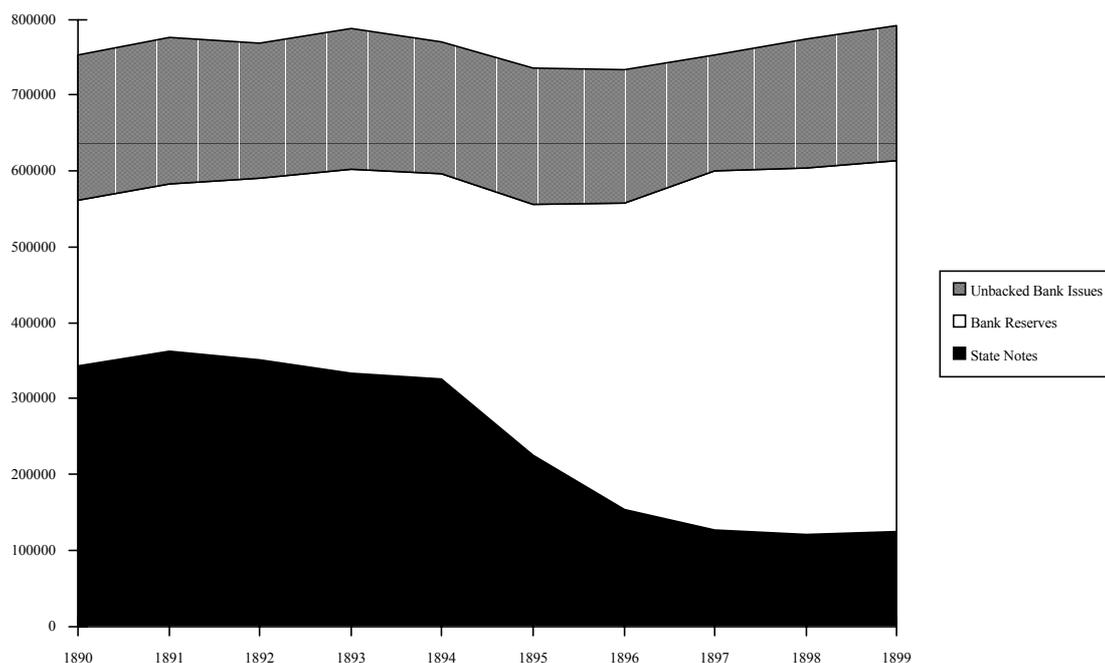
Until 1892 the bank did not have much holdings of foreign bills-of-exchange, but the gyrations of the crown in 1893-94 led the government to ask the bank to be much more involved in this niche of the market at the expense of the Viennese commercial banks. In 1892 the bills held by the bank amounted to a minuscule 47,000 crowns, however, by the early 20th century, the bank held foreign bills of exchange in the amount of between 200 and 300 million crowns. This was in addition to its gold reserves in the neighbourhood of 1,000 million crowns. Thus, market power to influence exchange rate expanded enormously.⁴⁶ The bulk of the repurchase of government paper against gold eventually took place in 1895 and 1896 when 110 and then 70 millions of state notes were withdrawn from circulation (Figure 2). All the reduction in this component of the Austro-Hungarian stock of high powered money gave rise to a corresponding increase in reserves, with the central bank issuing one note for each unit of government paper which was paid back to it in gold.⁴⁷ This obviously implied a dramatic improvement in the “effective cover ratio” of the Austro-Hungarian bank of issue. Bank had to pay a tax of 5% on its notes issued above 400 million crowns.⁴⁸

While the ÖUB had generally fulfilled its statutory limits inasmuch as its ‘own’ notes were concerned, the existence of a huge amount of government paper which was a perfect substitute for bank notes in practice reduced the effective cover. By contrast, the reimbursement of government paper and its exchange for gold drastically improved the effective cover, which increased from 29% in 1890, to 43% in 1895 in 1896, and 61% in 1899.⁴⁹ The stabilisation of the florin eventually took place in 1896 (Figure 1), as the ÖUB began to implement a policy of foreign exchange intervention whenever the value of the still inconvertible florin approached its notional ‘gold’ export point. The timing of the decision is quite understandable, if we recall that

the statutory cover ratio for the ÖUB was 40%.⁵⁰ indeed, it is precisely in the months that followed the consolidation of OÜB's 'effective cover ratio' above the 40% threshold that the bank of issue's adoption of the shadow gold standard can be said to have begun.

Figure 2: Break down of M1 in Austria-Hungary, 1890-1899

millions of florins



The policy was not legally binding, rather it resulted from implicit expectations from government circles. As a matter of fact, debates surrounding the renewal of the statutes of the OÜB, due to expire in 1897, as well as disagreements between Hungary and Austria regarding the degree of control over the common bank prevented the formal implementation of gold convertibility. In 1897, external observers were worrying about the actual success of monetary stabilisation, arguing that the difficulties surrounding the renewal of the privilege of the ÖUB did cast a long shadow on the completion of monetary stabilisation. They feared that if full convertibility of the notes of the Bank was implemented without a clear agreement on the Bank's statutes, then one may face a run on the bank's gold reserve, and – if the bank refused to honour its implicit obligation to redeem its notes in gold - a depreciation of the crown would ensue.⁵¹ After drawn out discussions and temporary extensions of the bank's legal mandate, its charter

was finally renewed by the law of September 21, 1899: though at that date, no agreement was yet reached on the gold convertibility policy.

3) The shadow gold standard: 1896-1914

The issue of convertibility remained on the agenda until the very demise of the Monarchy.⁵² Yet, between 1896 and 1914, the OÜB successfully implemented a shadow (de facto) gold standard, whereby it let the exchange rate fluctuate within informal narrow margins that more or less coincided with the gold points.⁵³ From 1901 onwards it essentially accepted its notes in exchange for gold coins, albeit at its own discretion.⁵⁴ Though it could change its policy at any time, the fact that the public was not particularly eager to use this facility meant that the policy remained stable. The stability of the currency was widely recognised by contemporaries. The public's preference for even small denomination paper money over gold coins, is a good indication of the bank's credibility.⁵⁵ At the same time, the negotiations over the formal introduction of gold convertibility was bogged down in a nexus of complex political agendas, thus explaining the duration and confusion of the debate over the policy of gold convertibility.

The crux of the dilemma was the disagreement between Austria and Hungary over the future of the bank. Since a fraction of the Hungarian establishment pushed for monetary secession, the problem of the possible liquidation of the common bank could not be overlooked. The reserves of the bank had been accumulated through transfers made by both governments, and each part remained legal owner of its share. Had the bank been split up, both governments would have expected to have their investments returned. However, it was unclear what would happen if the liquidation took place at a time when the reserves were below the level of the two governments' claims. This was a compelling reason for not committing the bank to use its gold reserves excessively, and as a result de jure convertibility was postponed indefinitely. Hence, the "provisional" shadow gold standard became the permanent *modus operandi*. The system emerged from the OÜB's decision in 1896 to peg the crown to gold within a narrow margin, and then from its policy, adopted in 1901, to accept convertibility in principle, without a binding commitment.

The question of whether convertibility was desirable or not was intensely debated. According to the German economist, Knapp, for instance, the absence of legal prescriptions committing the OÜB to gold convertibility enabled the bank to maintain lower interest rates by insulating it from foreign disturbances. In contrast, von Mises believed that engraving the actual practice into law

would “considerably improve” the dual monarchy’s international credit, and thus interest rates “for only the de jure gold payments would clearly convince everyone abroad that Austria-Hungary enjoys nowadays a perfectly regulated currency”.⁵⁶ An economically more rigorous argument was articulated by Walther Federn, editor of the *Österreichische Volkswirth*, and much later by Paul Einzig, in his well-known book on forward exchange. Their opinion was that the *de facto* stabilization of the crown after 1892, and its sustained ability to shadow an effective gold standard after 1896, actually conferred on the Austro-Hungarian currency considerable credibility. In effect, Federn suggested that enacting convertibility into law would be counterproductive, insofar as it brought with it the danger that the credibility of the currency would be shattered if the obligation could not be met in times of crisis. “It is not enough to enact convertibility, one must be also be able to maintain it.” In addition, continued Federn, the bank had more flexibility maintaining the exchange rate near *pari* with the current system, without having to resort to raising domestic interest rates. This, in turn, was a distinct advantage to the economy.⁵⁷

Einzig argued also, that this credibility represented a genuine asset for the central bank. Anticipating an argument eventually proposed by Keynes to use the fluctuations of exchange rates within the gold points as a way to prevent costly interest rate increases, the OÜB was able, according to both Federn and Einzig, to derive all the advantages associated with a credible currency. As Einzig put it, “by 1907 the *de facto* stability of the krone had been maintained for about fifteen years [...] The public both in Austria-Hungary and abroad trusted this *de facto* stability to some degree”.⁵⁸ According to him, the public was thus taking bets, each time the crown depreciated, that it would eventually reappreciate. This analysis suggests that at the turn of the century, the crown really belonged to the select club of core currencies, along with the pound sterling, the franc, the reichsmark, and the dollar, rather than to the more mundane group of peripheral currencies that probably included the rubel or the Southern currencies in Europe and in Latin America. However, if we consider the gyrations prior to 1890, and the slow escape from the “silver anchor”, the transition to credibility is sufficiently puzzling to deserve further scrutiny. It is to this issue that we turn in the next section.

II. Speculation and credibility: some indicators

As argued in the introduction, one important theme of the literature on the pre-1914 international monetary system is that speculation was stabilising for core countries but

destabilising for the peripheral ones. One view on the matter, developed, for instance, by Marcello de Cecco and inspired by the experience of countries such as Italy, is that speculation was for them a rampant plague that could at times jeopardise their precarious financial balance.⁵⁹ But the Habsburg experience has suggested different conclusions: focusing on the period of flexibility, Yeager forcefully argued that the “usual horror stories about disruptive speculation [...] proved inapplicable” to the Habsburg case.⁶⁰ While remaining cautious about explaining what he saw as essentially “mild” fluctuations of the florin, he clearly pointed to speculation and arbitrage as factors that contributed to the “breadth, depth and resiliency” of financial markets, something that, according to him, was inherently stabilising. Einzig makes an essentially similar claim, but instead for the period of fixity.⁶¹ In the end both periods of flexibility and quasi-fixity, have inspired the general view that the Habsburg precedent provides a benign perspective of short term capital movements and foreign exchange speculation. In the main, if a currency is not undermined by fundamental weaknesses, then no undue fluctuations of the exchange rate should take place without triggering profitable and moreover stabilising arbitrage. If we accept this conclusion, we should then either recast our view of the problems faced by “peripheral” countries, or alternatively think of the florin and the crown not as peripheral currencies, but as part of the core club.

a) Futures of the past

In order to discuss this matter, a useful route is to collect information on foreign exchange speculation – as opposed to the level of the exchange rate, which was extensively discussed in the preceding section. Specifically, one very important source from that respect, is the returns from forward transactions which – unlike what was the case among the leading “core” currencies – developed in central European financial markets to purchase cover against the movements of weaker currencies. Futures in foreign exchange facilitated transactions in both goods and securities across borders if both countries were not on the same commodity standard. Thus, while there was no reason for futures among the German reichsmark, the French franc, or the pound sterling to develop (because all were on the gold standard in the late nineteenth century and expected to remain so), among the rubel, mark, and the gulden such a need did exist, insofar as Germany was both Russia’s and Austria-Hungary’s most important trading partner, and both were effectively on a flexible exchange rate until the 1890s. In order to cover merchants’ risks, as well

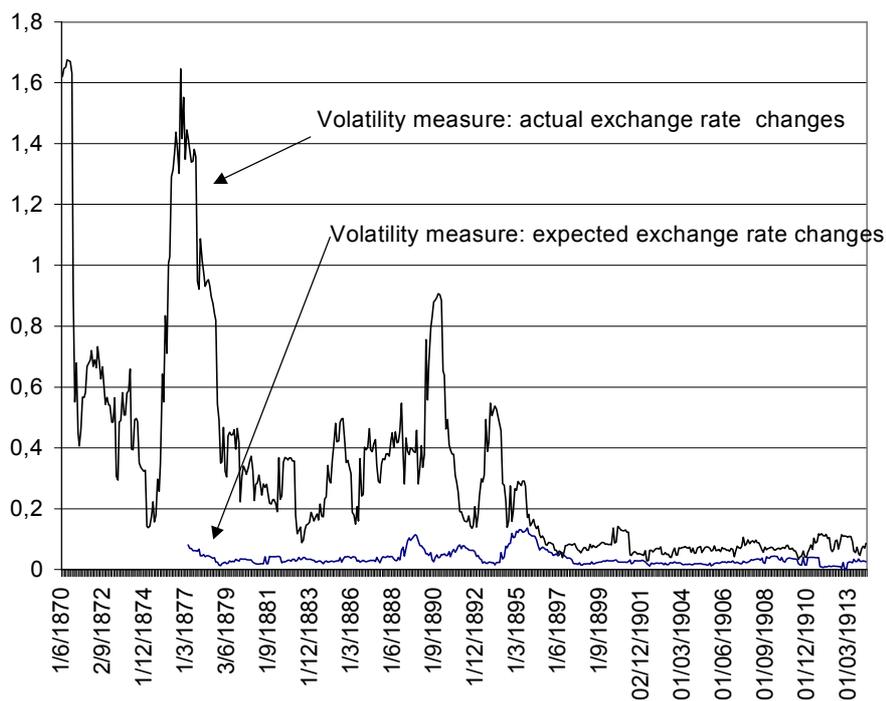
as risks associated with securities denominated in foreign currencies, the largest markets in currency futures evolved in Central Europe during the last third of the nineteenth century with traders specialising in the business.⁶² A large forward market in rubels came into being first in Breslau and Königsberg, – and then in Berlin,⁶³ and futures in rubels were also traded in Vienna.⁶⁴ Berlin lost its dominant position in rubel futures at the end of 1894 after the infamous bear squeeze⁶⁵ when the Russian Finance minister announced that the government intended to defend a fixed exchange rate, and the Russian Central Bank began publishing these rates in mid-April 1895.⁶⁶ Gulden-mark futures came into being out of the same considerations, probably well before the data began to be published in 1876.⁶⁷

In Vienna, as in other European markets, there was also a forward market in general securities. These forward transactions were to be settled – liquidated – mostly at the end of the month, named after the French word *«liquidation»*. As emphasized by Haupt, international arbitrage in securities was a routine operation in late-nineteenth-century Europe that involved little or no apparent risks and brought substantial profits.⁶⁸ It rested on lending securities where the «report» rate was high and borrowing money where the rate was low. Doing so, however, involved an element of risk due to the possibility of exchange fluctuations. This was especially a problem for arbitrage between western European financial centres and Central and Eastern ones such as Vienna and St. Peterburg, which had close financial connections with Western Europe (large chunks of Russian and Austro-Hungarian securities were held in Western Europe), but which experienced violent exchange rate movements. Obviously, the only way to be covered against these fluctuations was to have a forward exchange market that would clear at the same dates as the markets for forward securities, and thus enable one to perform a «true» (i.e. risk free) arbitrage. It is, thus, hardly surprising to find that, along with the «ultimo» quotes for general securities there were also in Vienna «ultimo» quotes for German marks and Russian rubles, in addition to the «spot» (or «per cassa») rates. Interestingly, this provides a rationale for the development of the forward markets that points to the combined influence of floating exchange rates and international financial arbitrage.

Data were collected on spot and forward rates for the first of every month (first day after the «liquidation»), whenever possible.⁶⁹ If data were unavailable (typically, if that day was a bank holiday, we used the next available quote. The ultimo rates represent market expectation one

month ahead. Figure 3 plots both the florin exchange rate and the forward florin exchange rate. While a large number of exercises could be conducted using these series, this paper, which provides the first insights and results of an ongoing research effort, seeks to make two main points. First, we discuss the hypothesis according to which forward speculation was destabilising. Second, we use simple tests to study the evolution of the credibility of the florin over time.

Figure 3. The volatility of the florin and the crown.



b) Volatility of expectations and stability of the exchange rate

Regarding the first issue, our starting point is the intuition that the forward florin should contain, in an efficient market, information on the expected rate of exchange. In fact, with risk neutral and rational speculators, the forward rate quoted at the beginning of the month for 30 days ahead, should just be a measure of the expected exchange rate for that horizon. It follows that, if speculation was inherently stabilising, the volatility of the forward rate should be less than the volatility of the spot rate.⁷⁰ As a matter of fact, scholars who have investigated the issue of “excessive volatility” on financial market, have always sought to demonstrate that expectations were more volatile than the outcomes they were supposed to anticipate.⁷¹

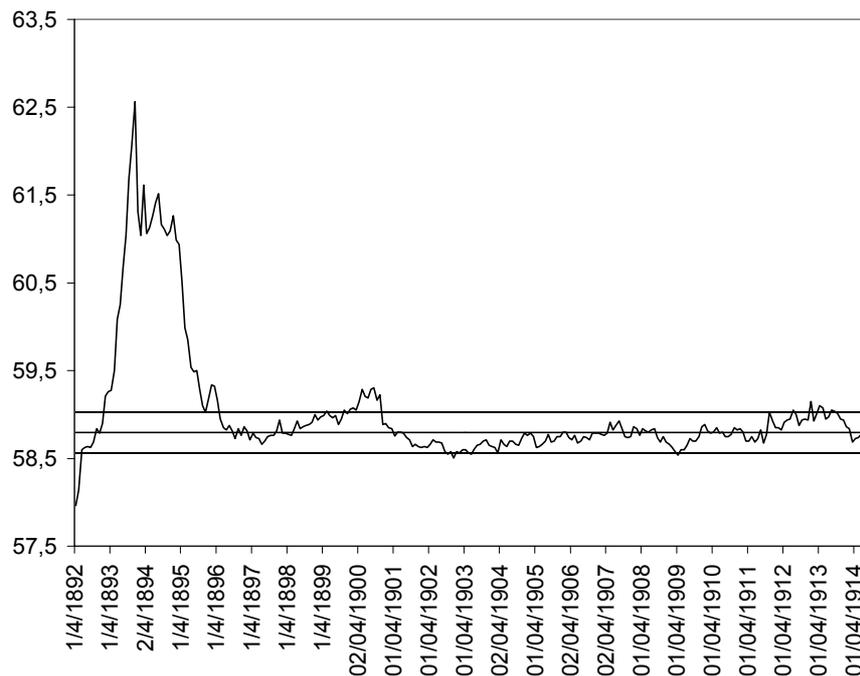
In order to explore this question we have computed a measure of the volatility of exchange rate changes both expected and actual. Formally, we computed a weighted average of a) expected changes in the exchange rate and b) actual changes in the exchange rate.⁷² These two measures of volatility⁷³ (Figure 3) reveal several episodes of extreme exchange rate volatility until 1896, against a relatively high level of general volatility. The Summer of 1870, the period 1876-1878, and, perhaps not surprisingly given the discussion above, the year 1890 stand out as exceptional. The final such episode was 1893-1894, after the half-hearted attempt at stabilising the florin failed. In addition, the considerable reduction in exchange rate volatility that followed the stabilisation of the florin in the late 1890s become obvious.

A second striking feature is that the volatility of expected changes in the exchange rate was almost always smaller and more often dramatically smaller than the volatility of actual changes. Thus the forward market does not seem to have been in itself a cause of instability – a conclusion which echoes that of Yeager.⁷⁴ In fact, it is interesting to remark that it is precisely in 1876, when the exchange rate fluctuated violently, that we begin finding a systematic series for the forward exchange rate. This, in itself, suggests that the formal quotation of a forward rate was a consequence of the uncertainty created by the gyrations of the Austrian currency: thus the development of the forward exchange market in Vienna might be seen as a response to, rather than as a cause of, exchange rate instability.

Finally, Figure 3 enables us to distinguished among three phases: 1) The era of the “true float” (1876 -1888) during which the volatility of the spot rate was quite high, but that of the forward rate was very small; 2) The era the gradual stabilisation of the florin (1889-1896) when the volatility of the exchange rate tended to decline (albeit with occasional outburst of instability), that of expected exchange rate changes increased cyclically. This can be interpreted as the outcome of speculative behaviour with agents on the Vienna market taking bets on the future evolution of the florin/crown based on frequent announcements and rumours. Repeated announcements and rumours that were in turn proven wrong may have led investors to take unwarranted speculative positions, and thus create additional source of expectational instability that were not entirely mirrored in true outcomes. 3) The period after 1897 was the era of the shadow gold standard. During that epoch, the volatility of actual exchange rate changes declined substantially, while the volatility of expected exchange rate changes returned to its pre-1889

level. Moreover, the evolution of both volatilities is much more correlated after 1897 than before. This suggests that the stabilisation of the florin accompanied an improvement in the informational environment, resulting in a lower volatility ratio. The smaller variations of the crown after it was stabilised were probably also better predicted.

Figure 4. The Crown – Florin Exchange Rate



c) A credibility test

In order to assess the credibility of the Habsburg currency throughout the period of its stabilisation (1892-1914), we perform a test which is a variant of Svensson’s “100% confidence band”⁷⁵ This test rests on the following intuition: a credible currency should be expected by market participants to remain within its pre-assigned band. From 1896 onwards, the OÜB began shadowing an informal band of $\pm 0.4\%$ around parity, set in March 1893. We investigate whether (and when) market participants recognised this principle and priced the forward florin accordingly. In other words, this test rests on comparing the forward florin with the $[\pm 0.4\%]$ zone which the OÜB is supposed to have operated from 1896 onwards.⁷⁶

This is depicted in Figure 4, representing the forward rate during the period 1892:1 to 1914:2, the crown parity, and the notional fluctuation band. As can be seen, the early 1893 attempt at

stabilising the crown was short lived. Very soon, market participants expected the crown to depreciate well below parity. By 1894 however, the move was brought to a halt and the trend was reversed. The favourable expectations surrounding the crown accelerated in 1895, and by the Spring of 1896 expectations entered the target zone. Moreover, they basically stayed there until the First World War, apart some brief discrepancies, the most notable one being the one around 1900. However, as is evident from Figure 1, which describes the spot exchange rate, this move of expectations out of the “band” was associated with a move of the exchange rate itself out of the band: apparently, the OÜB decided to let the florin fluctuate a bit more. In other words, the observed expected depreciation reflects the transitory weakness of the crown, and possibly a widening of the band,⁷⁷ rather than a fundamental credibility problem, whereby a currency lying inside its band is expected by the market to depreciate. After 1900, the expectations were invariably within the band, indicating that the interventions of the OÜB not only stabilised the exchange rate, but also convinced the market that the crown would remain within a tiny fluctuation band of less than $\pm 0.4\%$. Clearly, according to the simple but powerful measure used here, the florin had become a credible currency in the eyes of the market.

Conclusions

This paper has reviewed the record of the Habsburg currency during the final half century of its existence. While typically portrayed as a member of the group of peripheral countries, it does not seem to have been the focus of especially vicious speculation. The forward exchange market, where florins (crowns) were traded against marks seems to have been at worst a mere instrument for cover, at best a source of stability, but in any case, not a source of exchange rate fragility. The remarkable achievement of the Dual Monarchy, despite well known internal political problems which some might have seen as natural sources of exchange rate instability is quite fascinating and puzzling at once. It is, in fact, amazing, how quickly the credibility of the bank was established after it began to make a serious effort at maintaining the parity of the currency in 1896. One would have thought, that the market would have been more sceptical at accepting its policy at face value, particularly initially. Yet, this was not the case: the bank's credibility was

almost immediate, and as a matter of fact, even the Bosnia-Herzegovina or Balkan crises do not seem to have had a major impact on the stability of the currency. Further research would be useful to understand just how this credibility was established so quickly.

On the surface, one might be tempted to conclude that the conventional ranking of Austria-Hungary in the group of peripheral countries is inappropriate on the basis of its financial development and sophistication. Austria-Hungary might well have been considered as a sound country, so that the gold-point band was immediately credible to the market, because the Austro-Hungarian Bank itself was already credible. Here, it might be useful to distinguish between credibility of the institution and credibility of a given policy. But basically, the main finding is the considerable credibility of a country that has not been portrayed in the literature as one of the main players in the late-19th early-20th century financial world. Given that a division of the Bank between the two constituent parts, Austria and Hungary, was bound to have monetary consequences, the above consideration suggests that such a split was not truly expected by the market. Two additional inferences come immediately to mind: one is that the scholarly literature might well have underestimated the true economic performance of the monarchy, though this is rather unlikely.⁷⁸ A more plausible explanation is that the monarchy's financial sector was far better developed than might be expected on the basis of its macroeconomic performance.⁷⁹ As a consequence, our framework for analysis of pre-1914 international monetary relations – and especially the supposed dichotomy between core and peripheral countries – should be seen as somewhat too narrow and restrictive. We conclude on the basis of the evidence presented in this paper that the amorphous zone between core and periphery, might well include another category of countries whose importance has so far not been properly acknowledged in the literature. This very thesis has, in fact, been suggested in a recent book on the Rothschilds by Niall Ferguson. He

proposes a typology of late-19th century countries that uses the countries' net external position to define its place in the hierarchy of development: in between the "net creditors (Britain and France)", and those who had to "borrow large amounts from abroad (Russia and Italy)", Ferguson finds room for the "self financing but not capital importing" countries whose archetype was, he argues Austria-Hungary. According to him, these "financial factors had a bearing on diplomacy". This paper suggests that they might have had a bearing on the exchange rate record of the monarchy as well.⁸⁰ Future research should determine more fully just how that record came about.

¹ For a survey, see Barry Eichengreen and Marc Flandreau, Editors' introduction, in: Barry Eichengreen and Marc Flandreau (eds.), *The Gold Standard in Theory and History*, London: 1997.

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³ Admittedly, the balance of payments accounts of the Monarchy are not available for the whole period under consideration.

⁴ Fluctuations in the gulden were as high as 5-7 percent within a year even in politically normal times. Walther Lotz, *Die Währungsfrage in Österreich-Ungarn und ihre wirtschaftliche und politische Bedeutung*, *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft im Deutschen Reich*, 13, 1889, no. 4, pp. 1265-1303, here p. 1278.

⁵ Though the currency was pegged to gold within a narrow margin, the commitment to convert it to gold depended on the good will of the bank without being a legally binding commitment.

⁶ On the Habsburg Customs Union, see John Komlos, *The Habsburg Monarchy as a Customs Union: Economic Development in Austria-Hungary in the Nineteenth Century*, Princeton: 1983.

⁷ S. Pressburger, *Österreichische Notenbank 1816-1966*, Vienna, 1966.

⁸ Some observers went as far as to claim that the weak florin was a “kind of Chinese Wall” around the country. Lotz, *Die Währungsfrage*, p. 1288.

⁹ Marc Flandreau, "The Bank, the States, and the Market: An Austro-Hungarian Tale for Euroland, 1867-1914", *Oesterreichische Nationalbank, Working Paper* No. 43, March 2001.

¹⁰ Robert Zuckerkandl, *The Austro-Hungarian Bank*, in: United States. National Monetary Commission. *Banking in Russia, Austro-Hungary, the Netherlands and Japan*. Washington: Publications of the National Monetary Commission XVIII (no. 2) 1911, p. 89; (also appeared in: *Conrads Handwörterbuch der Staatswissenschaften* 3rd ed. According to Zuckerkandl, this was in fact made to avoid the capital loss that would follow the depreciation of silver which managers of the ÖNB had supposedly forecast.

¹¹ . Each stock was of about 400 millions florins.

¹² . On the causes of silver depreciation see Marc Flandreau, *The French Crime of 1873: An Essay on the Emergence of the International Gold Standard, 1870-1880* , *The Journal of Economic History*, Vol. 56, 1996, N° 4, pp. 862-897.

¹³ . The *Neue Freie Presse* remains the key source on the episode. On February 1879, it was first decided that only coinage orders accompanied with the actual delivery of the silver bullion would be honoured. While this increased the arbitrage cost by creating a risk that the price of silver would turn against the speculator by the time the coinage would occur, it hardly prevented arbitrage itself. The unlimited coinage for private individuals was then suspended in March 1879. The bottleneck that resulted from the huge orders was not cleared before the summer; *Neue Freie Presse*, August 22, 1879, p. 6.

¹⁴ The issue of paper notes of both the state and of the bank was limited by law.

¹⁵ As emphasized by Zuckerkandl: despite the suspension of silver coinage, in 1879 “the governments of Austria and Hungary continued [...] to coin silver [for their own account] and so the volume of silver florin [in the Bank’s vaults] continued to increase from year to year [...] continuing after 1887.” Zuckerkandl, *The Austro-Hungarian bank*, p. 96.

¹⁶ Theoretically, while no seigniorage is derived if no silver is being coined at all, no seigniorage is also derived if so much silver is being coined that the price of gulden declines to the price of silver. Between these two extremes where no profit is made, a rational government seeking to maximise revenues would pick the optimum. Other things being equal, this point increases with the spread between the exchange rate and the gold-silver price ratio.

¹⁷ Leland. B. Yeager, *Fluctuating Exchange Rates in the Nineteenth Century : The Experience of Austria and Russia*. In: Robert Mundell and Alexander Swoboda (eds.), *Monetary Problems of the International Economy*. Chicago: 1969.

¹⁸ Though the question of what the Bank would do remained open, it could be speculated that it would act in such a way. Yeager argues along these lines. Yeager, *Fluctuating Exchange Rates*.

¹⁹ This was the essence of the reasoning provided by Yeager, *Fluctuating Exchange Rates*, p. 68. In a more modern language, one might conceive the gulden problem as that of a currency whose exchange rate was stabilised within a band of fluctuating size. The upper bound was provided by the gold parity, since the law of 1867 had provided for the issue of a gold 25 francs florin. This florin could always be issued in the (improbable) case that the gulden exchange rate would improve dramatically. The lower band was provided by the silver parity. Regardless of what the central bank did, a depreciation of the exchange rate below the silver price could not occur as

long as there existed legal tender silver coins in circulation. In such a system, if silver was the most volatile currency, then only part of the volatility would have been transmitted to the gulden, exactly as observed at the time. Yeager also noted that, “All along, however, the exchange rate moved much less violently than the silver price ” (p.68). Any change in the lower band was then factored into the exchange rate. See Eichengreen and Flandreau, Editors’ introduction. As is well-known in target zone theory, the closer was this ‘reflecting barrier’ (the price of silver) from the florin exchange rate the more dramatic was the impact of its fluctuations. Target zone models study the distortions which the introduction of a fluctuating band induces on the ‘freely floating exchange rate’. A well known result is that the larger is the band, the smaller is the distortion, because the probability that the freely floating exchange rate ever hits the band goes to zero. Note, that when silver was very depreciated, its effect on the florin by the second channel was almost zero, but its effect through the first channel (increased incentive to coin) was much greater.

²⁰. On this and on the reactions in the parliament and in the press, see Yeager, *Fluctuating Exchange Rates*.

²¹ For an analysis of a similar mechanism in other countries using a ‘limping’ standard, see Flandreau, *The French Crime of 1873*; L. Luzzatti, “Delle Attinenze dei Biglietti di Banca col Bimetallismo, *Nuova Antologia di Scienze Lettere, ed Arti.*, Rome 1886, pp. 524-45.

²² Yeager, *Fluctuating Exchange Rates*.

²³ Archive of the Credit Lyonnais, (Hereafter ACL), DEEF, 73211, memo written by Schürk, January 10, 1890, “Conversation privée avec le directeur de la Banque d’Autriche-Hongrie à Vienne”.

²⁴ These notes were still outstanding and the governments alternately sterilised or reinjected them into the circulation as a way to provide short term finance. This, the bank claimed, counteracted the bank's actions: untimely paper issues annihilated the effects of monetary contraction, for instance, when the bank raised its discount rate. Cyril Nemeč, *La Banque Austro-Hongroise et sa Liquidation*, Paris 1924, p. 16. For instance, according to the *Lyonnais* economists, it was in a sense "to be regretted that the State did not borrow from the bank rather than issue its own notes. Had the bank remained the master of the overall circulation, it would have thus been in a better position to exert an effective control on the money market. In effect the issue of State notes has often counteracted the Bank's discount policy. For instance, when the Bank rose its discount rate, either to attract foreign capital, or to stem gold exports, the State rendered the effect of such a measure illusory, due to its undue note issues". p. 48, *Banque Austro-Hongroise, deuxième période, "Relations avec l'Etat"*, ACL, DEEF, 40407.

²⁵ The devaluation of the florin (Figure 1) meant that foreign investors would be getting more florins for their mark, increasing the incentive for them to make direct investments in Austria-Hungary. von Mises, *Das Problem gesetzlicher Aufnahme der Barzahlungen*, p. 987-98.

²⁶ On this see the reference to the *Neue Freie Presse* in Yeager, *Fluctuating Exchange Rates*.

²⁷ Still in 1892, when the reform was barely beginning, an Austrian expert, Alfred Ostersetzer [1892] emphasised that it was important to avoid "scaring London" by buying up gold in excessive quantities, because that would bring about a "rise in the discount rate in this market as well as in Berlin". Ostersetzer pointed out the dangers of "brutal withdrawals that would frighten the Bank of England and the English money market, which are *"un véritable paquet de nerfs"*. Quoted by Arthur Raffalovitch, *L'Economiste Français*, July 23, 1892.

²⁸. See e.g. *L'Economiste français*, (same issue as below): "Certains iraient volontiers jusqu'à tenir l'Autriche pour hautement coupable de songer à abandonner l'étalon d'argent". Note, of course, that Austria-Hungary was not strictly speaking on a silver standard. Contrary to what the above quote suggests, experts fully understood this. For instance, Raphaël-Georges Lévy wrote in *L'Economiste français*: "Il s'agit de passer du papier à l'or: car en Autriche l'étalon argent ne subsiste que de nom, le véritable étalon est à l'heure actuelle un billet de banque inconvertible." *L'Economiste français*, May 14, 1892, p. 683.

²⁹ On fait savoir que [...] tant le chancelier de l'échiquier que le gouverneur de la Banque d'Angleterre ont eu avec les mandataires autrichiens des entrevues fort satisfaisantes, au cours desquelles ils ont donné à ceux-ci des conseils officieux quant à la marche à suivre pour utiliser l'intermédiaire du marché londonais sans le troubler inutilement et hors de propos; ils auraient d'autre part reçu de ces derniers l'assurance espérée que rien ne serait fait avec précipitation et sans tenir compte des intérêts de chacun", *L'Economiste Français*, "Correspondance de Londres", 13 February, 1892. The French economics newspaper also commented on a favorable article on the Austrian position, published in the *Times* of February 12, 1892.

³⁰. *L'Economiste Français*, "Correspondance de Londres", 13 February, 1892.

³¹. The inquiry in Austria was entrusted to a commission of 36 persons under the presidency of Steinbach, Minister of Finance, while in Hungary a commission of 21 gathered under the presidency of Wekerle. The gold standard was thus adopted, and the experts drew the general lines which the government then followed with some liberty in the ensuing monetary law promulgated in the Summer. Arthur Connant, *A History of Modern Banks of Issue, with an account of the economic crises of the present century*. New York: 1896.

³² See *L'Economiste français*, 7 May 1892, p. 581, and Connant, *A History of Modern Banks of Issue*. (However, there were several voices, on the Austrian side, who advised against the adoption of the gold standard).

³³ See *L'Economiste français*, 14 May 1892. These communiqués were issued between April 18 and April 23, 1892.

³⁴ See e.g. the letter by “J. R.” in *L'Economiste Français* (April 23, 1892, p. 521) who complained that the Austrian government had picked an exchange rate that favoured its own interest. The decision to use the average exchange rate gave less weight to the improvement that had taken place in the second half of 1890.

³⁵ The text of the law may be found in the *Reichsgesetzblatt*, 1892, n° 126, p. 641. A French translation is available in *Bulletin de Statistique et de Législation Comparée*, 1892, Tome XXXII, pages 319 ff.

³⁶ 3280 crowns (equal to 1640 florins) would be coined from one kilogram of fine gold. The ÖUB, for her part, was buying gold at 1638 florins (3276 crowns) per kg of fine gold. In some instances, the Bank would raise its purchasing price (between 1638 and 1640) to encourage the import of gold.

³⁷ Of the 312 million florins of outstanding paper notes Austria was to reimburse 70% while Hungary was to pay 30%.

³⁸ For a survey and a discussion of the available options for the operation, see Arthur Raffalovitch, in *L'Economiste français*, July 23, 1892, p. 108.

³⁹ It was common, typically at difficult financial times, to include a conversion option, when new bonds were issued. In such circumstances fairly high interest rates were offered. This option

enabled public authorities, once credibility was restored, or if international borrowing conditions improved to redeem their debt at par in exchange for new ones that had lower interest rates, reflecting these new conditions. This could be quite attractive: switching from 5% to 4%, reduced the burden of interest service by 20%. Alternatively, the debt burden could be increased without adding new charges. See *The Economist*, July 23rd 1893 for a technical summary of the whereabouts of Austro-Hungarian conversions.

⁴⁰ *The Economist*, January 7, 1893

⁴¹ ACL, DEEF 73211, “Réforme de la Valuta”. 95 percent of the holders accepted the scheme, while the other 5% preferred to get their capital back.

⁴² ACL, DEEF 40407, Banque Austro-Hongroise. Formal schemes to acquire gold with the proceeds of various loans were organised with the same syndicate that had helped in the conversion process in order to obtain gold. Nemeč, *La Banque Austro-Hongroise*, p. 69.

⁴³ *The Economist*, January 14, 1893.

⁴⁴ Lyonnais economists explicitly related the movements in the Austro-Hungarian exchange rate that took place in 1893 to a form of ‘contagion’ coming from the US crisis. Another factor, the Lyonnais economists argued, was the fact that the Berlin market which had begun to divest itself of Russian bonds after Bismarck’s *Lombardverbot* of 1887, had purchased South American securities instead, which began to depreciate after the Argentinean crisis. Fearful of causing further fall in the price of the bonds they had in their portfolio, the German banks had instead disposed themselves of their Austrian and Hungarian securities, whose price was comparatively more resilient. This was the cause of the Austro-Hungarian ‘agio’ of 7%. *Crédit lyonnais*,

“ Réforme de la Valuta ” ACL, DEEF 73211. For the movements in 1894, see the *Neue Freie Presse*, December 31, 1894. For various views on the matter, see Arthur Raffalovitch, *Le marché Financier en 1893-4*, p. 113; Connant, *A History of Modern Banks of Issue* (who relies on the *Neue Freie Presse*), and Komlos, *The Habsburg Monarchy as a Customs Union*.

⁴⁵ One illustration of this is the memos of the Lyonnais.

⁴⁶ von Mises, *Das Problem gesetzlicher Aufnahme der Barzahlungen*, p. 1000.

⁴⁷ An analysis of money demand in Austria-Hungary during these years is found in John Komlos, "Financial Innovation and the Demand for Money in Austria-Hungary, 1867-1913," *Journal of European Economic History*, 16 (1987): 587-606.

⁴⁸ von Mises, *Das Problem gesetzlicher Aufnahme der Barzahlungen*, 1014

⁴⁹ End of year figures. At the same time, the composition of the reserve in terms of gold or gold currencies, as opposed to silver, increased considerably. Silver represented 68% of the reserve in 1890, but only 26% in 1899.

⁵⁰ A fairly typical figure among gold standard countries. See Marc Flandreau, Jacques Le Cacheux and Frédéric Zumer, *Stability without a pact? Lessons from the European Gold Standard 1880-1913*. 26th Economic Policy Panel, *Economic Policy*, 1998.

⁵¹ *Note sur la Valuta Autrichienne et la Valuta Russe*, ACL, DEEF 73211, November 1897.

⁵² During World War I the crown floated again.

⁵³ $\pm 0.4\%$ around parity. This loose figure is the one that contemporaries reported, relating it to the shipping charges between Vienna and foreign centers. For figures on gold shipping charges in Europe, see Ottomar Haupt, *Arbitrages et Parités*, Paris, 1894.

⁵⁴ The bank sought to keep the value of the gulden pari with London at 1 Pound Sterling = 11.9 Gulden. “Because they would like to maintain this parity, and because they do not consider it advantageous to raise the discount rate, they have instituted a policy to buy bills-of-exchange on England if the value of the Gulden is falling. It is clear that it is not doing this in order to make a profit, but to maintain the rate of exchange at pari.” Georg F. Knapp, *Staatliche Theorie des Geldes* (Leipzig: 1905), p. 250.

⁵⁵ The coins, being more cumbersome than the notes, and seen by the public as no better, did not remain in circulation, but were returned to the bank’s vaults. Ludwig von Mises, *Das Problem gesetzlicher Aufnahme der Barzahlungen in Österreich-Ungarn*, *Schmollers Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft*, 1909, pp. 985-1037; here, 992, 995.

⁵⁶ Ludwig von Mises, *The foreign exchange policy of the Austro-Hungarian bank*, *The Economic Journal*, June 1909, pp. 201-211, here p. 211. It is not entirely clear from his writing whether von Mises had in mind the short term or long term interest rate. The reference, omitted here, to the monarchy’s «enormous foreign debts» and the mention that since «for more than twelve years the bank has upheld the policy of a gold paying bank [...] any legal prescription can affect the [discount rate] but little» suggests that he referred to the yield on government bonds. As Federn observed however, this cannot have been related to the yield on government gold bonds. As for the paper bonds, everybody knew that legal convertibility could also be repelled at will, so that the guarantee it provided was limited. Walther Federn, *Die Barzahlungen*, *Der Oesterreichische Volkswirt*, 17 Juli. 1909, p. 3.

⁵⁷ Federn, *Die Barzahlungen*.

⁵⁸ Paul Einzig, *The Theory of Forward Exchange*, London: 1937, p. 331; John M. Keynes, *A Treatise on Money*, London: 1931.

⁵⁹ Marcello De Cecco, "Short term capital movements under the gold standard" in Jorge Braga de Macedo, Barry Eichengreen and Jaime Reis, *Currency Convertibility the Gold Standard and Beyond*. London, 1997, pp; 102-112.

⁶⁰ Yeager, *Fluctuating exchange rates*, p. 74.

⁶¹ In fact, the only source of instability according to him, was the speculation on "news" regarding political moves that may have affected either the price of silver or the parity of the gulden.

However, then governments were to be blamed, and not the speculators. A similar philosophy is at the heart of the ideas developed by Einzig, and according to which, given that there was no inherent weakness of the Habsburg currency, exchange rate depreciation was systematically matched by the anticipation of an eventual return to parity and thus enabled the OÜB to save on interest rate hikes: speculators were doing the adjustment, buying crowns when it depreciated, or at least not selling it, despite possible higher interest rates abroad. Einzig, *The Theory of Forward Exchange*, p. 332-3.

⁶² Lotz, "Die Währungsfrage," p. 1279.

⁶³ Gerhart v. Schulze-Gävernitz, *Volkswirtschaftliche Studien aus Russland* (Leipzig: 1899), pp. 503-504.

⁶⁴ Knapp, *Staatliche Theorie des Geldes*, p. 252. That there was no such organized counterpart within Russia itself, and that the Russian government charged a Berlin bank to intervene in the markets in order to maintain the value of the rubel, is a clear sign of the underdevelopment of

Russian financial intermediation. In a sense, a German private bank assumed functions otherwise associated with a central bank.

⁶⁵ See Arthur Raffalovitch, in *L'Economiste français*, July 23, 1892; Yeager, *Fluctuating exchange rates*.

⁶⁶ Schulze-Gävernitz, *Volkswirtschaftliche Studien*, pp. 527-30.

⁶⁷ Einzig, p. 31-38. There were forward markets in Vienna in other major currencies, but these were small and were not quoted in the official publications. (An exception was the 20 French Franc gold piece and the rubel which were quoted forward). Walther Federn, *Das Problem gesetzlicher Aufnahme der Barzahlungen in Österreich-Ungarn*, *Schmollers Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft* 34 (1910), pp. 151- 172, here p. 164.

⁶⁸ Haupt, *Arbitrages et Parités*.

⁶⁹ Data were collected from the Wiener Börsekammer, *Coursblätter*, in the archive of the Wiener Börse A.G., Strauchgasse 1-3 1014 Vienna, Austria. Many thanks are due to Erich Foltyn for collecting the data, and to Mrs. Christine Picha for facilitating the data gathering to bring the project to fruition. Forward rates were also published in the *Wiener Zeitung* as well as in the *Neue Freie Presse*. A comparison among the sources indicated only marginal occasional deviations due to typographical error. Spot (per cassa) exchange rates with Germany are reported from January 1870 and until the Summer of 1914 in all three sources. Until February 1873, though, they are reported in florins per 100 marks bancos, the Hamburg unit (Hamburg was Germany's prominent foreign exchange market until Germany's monetary unification which shifted business to Berlin). Rates switched to German marks in February 1873 with the advent of the new German currency. From January 1900 quotes are given in Crowns per 100 mark. In order

to get a continuous series (florins per marks) we divided the Mark Banco exchanges by 1,5 and the Crown exchanges by 2. The sources report both «Geld» and «Waare» rates. «Geld» prices were the bid price, the price at which people were willing to buy foreign exchange and offer local money. «Waare» was the price at which people were offering to sell the "goods" (in this case Marks). (At times the highest and lowest rates of the day as well as the mid-day rates were also reported. These were not sufficiently systematic to be useful.) Forward rates are available from November 1876 until June 1889 under the heading “Liquidations Course”, but no distinction was made between bid and ask rates. From July 1889 onwards, the forward rates were quoted as «Ultimo», and the distinction between bid and ask rates appeared. With the new century quotes also switched to crown rates and figures were adjusted accordingly. Given that forward rates are quoted for the end of the month (liquidation date) the best date to collect the figures is the first day of the month *after* the previous liquidation. When this was a bank holiday, we collected the next available observation. J. Schneider, and O. Schwarzer, Statistik der Gold- und Wechselkurse in Deutschland (1815-1913) (St. Katharinen: 1990), and J. Schneider, O. Schwarzer, and P. Schelzer, Statistik der Gold- und Wechselkurse in Deutschland und in Ostseeraum (18. und 19. Jahrhunderts) (St. Katharinen: 1993), have spot, but not forward rates.

⁷⁰ This is because the former, being an expectation of the latter, should also be more stable. If expectations are rational (thus not destabilizing), volatility of expectation is less than volatility of realization (realization= expectation+random error that is uncorrelated and thus adds to ex post volatility).

⁷¹ Robert Shiller, Market Volatility, Cambridge, MA: 1989,

⁷² Expected changes in the exchange rate are measured as the difference between forward rates and spot rates, and are also known as the forward premium. Actual changes in the exchange rate are just the difference between two consecutive spot exchange rates.

⁷³ Letting x_t be the exchange rate change (actual or expected) the measure we use

$$\text{is : } v_t = \sqrt{\sum_{i=-5}^{i=5} \frac{(x_{t+i})^2}{11}}$$

⁷⁴ Yeager, *Fluctuating Exchange Rates*.

⁷⁵ Lars Svensson, "The simplest test of target zone credibility", IMF staff papers, 38, September, 1991, 655-665. See also, Heinz Glück and Eduard Hochreiter, "Exchange Rate Policy in the Transition to Accession: Any Lessons from the Austrian Experience?" Unpublished Manuscript, Austrian National Bank, 2001.

⁷⁶ It is easy to see that, provided that uncovered interest parity holds (a relation which tends to be true whenever there is free capital mobility as was the case in the nineteenth and early twentieth centuries) the relation we examine here is the same as the one used by Svensson.

⁷⁷ Perhaps the bank had a slightly broader implicit target in mind during those days than the one officials later acknowledged.

⁷⁸ Max-Stephan Schulze, *Patterns of Growth and Stagnation in the late nineteenth century Habsburg Economy*, *European Review of Economic History*, 4 (2000) 3: 311-340.

⁷⁹ This conclusion echoes the one reached earlier by one of the authors: «A number of interesting conclusions emerged from the pattern of development of Austria's industrial sector. Austria failed to exhibit many of the characteristics usually attributed to underdeveloped economies of nineteenth-century Europe.» Komlos, *The Habsburg Monarchy as a Customs Union*. p. 216. See also Jürgen Nautz, *Ethnische Konfliktlagen in der österreichisch-ungarischen Währungsunion*. in

Berhard Nagel and Jürgen Nautz, Nationale Konflikte und monetäre Einheit. Ein Plädoyer für die Währungsunion. Vienna, 1999, pp. 27-105.

⁸⁰ Niall Ferguson, The World's Banker. The History of the House of Rothschild. London: 1998, p. 938.