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Review of exchange-rate theories in four leading economics textbooks

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In this paper, the parts of four leading economics textbooks that deal with exchange-rate theories are reviewed. The books are by Krugman/Obstfeld/Melitz, Blanchard/Johnson, Mankiw/Taylor and Samuelson/Nordhaus. The theoretical background for this exercise is the fact that exchange-rate theory is one of the weakest parts in 'mainstream economics', meaning the neoclassical and the New Keynesian stream of thought. It is now widely accepted that exchange-rate forecasts are no better than those arising from a random walk in the short and medium run. For the long run, most authors stick to the old purchasing-power-parity theory whose empirical validation is just as weak. Nonetheless the textbooks reviewed here only present exchange-rate theories that have little empirical support. Yet they differ considerably, even though they remain within the leading theoretical paradigm.

Keywords: *teaching economics, open-economy macroeconomics, exchange-rate theory*

JEL codes: *A22, A23, F31, F41*

1 INTRODUCTION

Foreign-exchange (forex) markets are by far the biggest global financial markets. The dollar–euro market is the most voluminous one. On all forex markets on the globe, the daily transaction volume in 2016 was US$5.1 trillion, a multiple of daily transactions of goods and services (BIS 2016). Trade is influenced by exchange rates, but even more so is the pricing of financial assets. Exchange-rate changes can lead to financial and full-blown balance-of-payments crises, but they can also support employment, output growth and economic development. Since the demise of the postwar Bretton Woods currency system, flexible (that is, market-determined) exchange rates predominate in the world economy, especially in developed countries. Among empirical researchers on exchange rates there is a broad consensus that exchange-rate forecasts in the short and medium term fail to beat the random walk. Put bluntly, realistic forecasts are impossible, and the economics profession is unable to explain exchange rates, one of the most important prices in modern economies. For the long run, opinions about explanations and trends differ. Obviously exchange rates are enigmatic. Mainstream economics is in a deep crisis regarding exchange-rate theory. In this essay, we want to find out how leading textbook authors deal with this issue, since textbooks in our profession are supposed to offer canonical wisdom to economics students across the globe.

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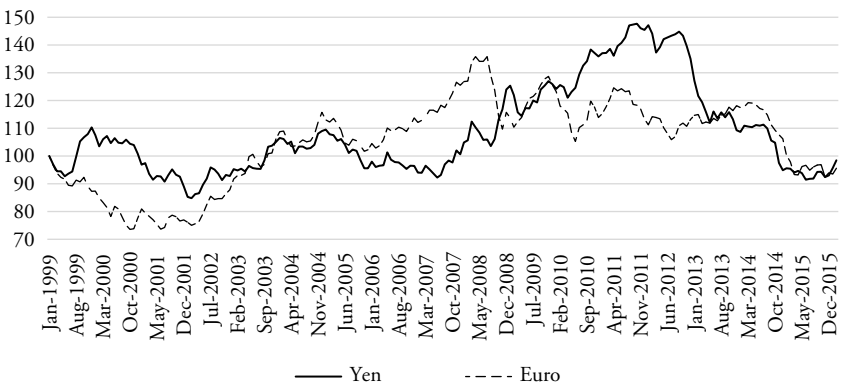
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We discuss here four economics textbooks with a considerable international market share (with two Nobel laureates and two former chief economists of the International Monetary Fund among the authors), namely:

Krugman, P., Obstfeld, M., Melitz, M.J. (2012 [2015]): *International Macroeconomics: Theory and Policy*, 10th edn, Harlow, UK: Pearson Education.
Blanchard, O., Johnson, D.R. (2013): *Macroeconomics*, 6th edn, Harlow, UK: Pearson Education.
Mankiw, N.G., Taylor, M.P. (2014): *Economics*, 3rd edn, Andover, UK: Cengage Learning EMEA.
Samuelson, P.A., Nordhaus, W.D. (2009): *Economics*, 19th edn, New York: McGraw-Hill.

The first two textbooks are at an intermediate level, while the last two are at the introductory level. We will review the underlying theories, compare theoretical differences, and check whether alternative theories are presented, whether up-to-date empirical research is taken into account and whether the stylized facts of exchange-rate behaviour can be explained.

Before the review begins, let us see what needs to be explained, namely, as a representative example, the performance of exchange rates of the two biggest forex markets after the breakdown of Bretton Woods. Figure 1 shows monthly rates for the dollar–yen and the dollar–euro markets since 1999, while Figure 2 shows the long haul since 1973 for the deutschmark (DM) and the euro against the dollar, along with the inflation-adjusted real exchange rate.[1] We see massive movements, both upwards and downwards, with long cycles. The volatility of real exchange rates is high, but not as high as that of nominal rates. Daily rates would show much more volatility. Equilibrium in the sense of static stability periods or a clear trend is not visible (for details, see Priewe 2016). One would expect that exchange-rate theories are in line with these stylized facts describing the behaviour of forex markets.



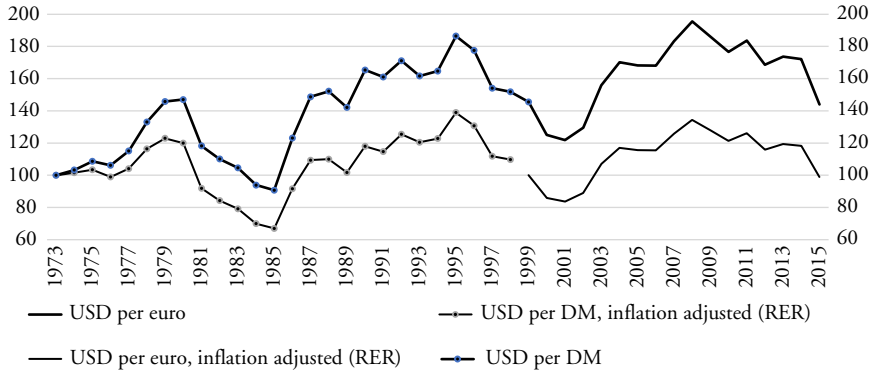
Source: OECD.Stat, AMECO; own calculations.

Figure 1 US-dollar per euro and per yen 1999–2015 (index, 1999M1=100, monthly)

1. For pedagogical reasons we use the indirect quotation, that is, the number of foreign currency units per euro for the dollar-euro exchange rate. Hence a rise of the curves indicates an appreciation of the euro or of the yen, respectively. This is in contrast to the direct quotation method used in most of the textbooks reviewed.

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Source: OECD.Stat, AMECO; own calculations.

Figure 2 USD per DM and per euro, nominal and real exchange rates, index 1973=100 (annual values)

2 KRUGMAN, OBSTFELD AND MELITZ

This bulky book deals with exchange-rate theories over 225 pages, almost 30 per cent of the book. Further chapters on the history of the world monetary system, optimal currency areas and the European Monetary Union add to the theories. The latter is completed with a remarkable analysis of the recent euro crisis. The book requires knowledge of the principles of microeconomics and macroeconomics.

Exchange-rate theories are covered in three chapters. Chapter 15 explains the basic concept for the short run, namely the interest-rate-parity (IRP) theory. In chapter 16 the long-run equilibrium on the forex market is analysed, focused on a critical analysis of the purchasing-power-parity (PPP) theory of exchange rates; this theory is partially replaced by a novel approach, coined as a 'general model of long-run exchange rates' (pp. 464ff). 'Long run' means in this context a general macroeconomic equilibrium with full employment and flexible prices. The short run is about a partial equilibrium of both the money and the forex market, in the framework of a macro disequilibrium with fixed or sticky prices and unemployment. All this deals with fully flexible exchange rates. This approach implies that the short run is only a temporary disequilibrium that leads after some time to a general macro equilibrium. The short-run disequilibrium is healed eventually by market forces.

As in many US textbooks, readers find plenty of illustrative examples, boxes, charts, case studies, excerpts from newspaper articles, etc. The historical and institutional environment is addressed in further chapters, including themes like the financial crisis of 2008–2009 and the euro crisis.

What looks like a perfect textbook satisfying all substantial and pedagogic requirements turns out to be highly problematic. What is being offered is a synthesis of mainly neoclassical provenance which tends to combine different strands of theory. Views explicitly relating to Keynes and Keynesians are not mentioned – in particular the role of uncertainty – and neither are approaches from behavioural finance (for example, Frankel/Froot 1990; Neely 1997; Menkhoff 1998; Kindleberger 2000; De Grauwe/Grimaldi 2006; Schulmeister 2009, among many others). The huge body of empirical research of the last few decades is systematically excluded in these three chapters, with a few exceptions (see below). The concepts presented by the authors are mainly rooted in New Keynesianism, even though

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this background is not mentioned explicitly. According to the New Keynesians, neoclassical general equilibrium theory is valid in the long run, with the inclusion of the assumption of rational expectations. But in the short run, since goods and labour markets are considered to be marred by imperfections or rigidities, equilibrating mechanisms are inhibited. Therefore unemployment, inflation, balance-of-payments disequilibrium and exchange rates which overshoot their long-run equilibrium values can emerge.

2.1 Short-run equilibrium

Now we turn to the core of the exchange-rate theory of Krugman et al. (KOM in the following). For the short run, they follow the interest-rate-parity (IRP) theory in its uncovered version. First of all, the forex market is rightly conceived as an asset market. Foreign exchange is part of financial assets. The real (inflation-adjusted) return on forex depends on *actual* interest rates for home and foreign currency and on the *expected* exchange rate. If expectations regarding the future exchange rate are given, the exchange rate on spot markets is determined by arbitrage that equilibrates the interest-rate differential with the expected exchange-rate change. For simplicity, currency premiums (or country-specific risks) are excluded, and assets at home and abroad are considered to be perfect substitutes. Then the returns on the foreign and the home assets are the same, when counted in the same currency, following the law of one price as applied to financial assets. Seemingly, this interest-rate parity is facilitated by arbitrage across currencies.

The authors do not mention speculation, in contrast to arbitrage (KOM do not use either term, except when discussing speculative attacks under fixed exchange rates). Analysing the short-run equilibrium exchange rate, KOM look at nominal interest and exchange rates. They concentrate on short-term interest rates for deposits up to one year's duration. KOM do not elaborate on whose exchange-rate expectations are relevant here. Apparently there is only one uniform expectation for the future exchange rate, which implies a representative agent. But such an assumption is not mentioned explicitly. Perhaps it is the average of diverse expectations of market participants. But individual agents cannot know *ex ante* the average expectation. Certainly it is not the forward rate, otherwise KOM would have mentioned it. Readers are kept in the dark about the formation of exchange-rate expectations. This is an important lacuna: the introduction of uncertainty about expected rates would induce a discussion of speculative activities (see below).

The IRP equilibrium is shown in the following equation, in which R is the nominal interest rate, suffix € and $ stand for interest rates in the respective currencies for one-year deposits, $E_{\$/€}$ is today's nominal exchange rate for the euro (dollar per euro) and $E_{e\$/€}$ is the expected nominal exchange rate in one year (p. 394):

$$R_{\$} = R_{€} + (E_{e\$/€} - E_{\$/€})/E_{\$/€}.$$

Then today's nominal exchange rate is:

$$E_{\$/€} = E_{e\$/€}/(R_{\$} - R_{€} + 1).$$

KOM read the equation this way: if interest rates and the expected exchange rate are given, the actual nominal exchange rate has to adjust in order to guarantee interest-rate parity. Assume the US interest rate is two percentage points above the euro interest rate, then the actual euro rate has to be two percentage points below the expected value in one year. And if the US interest rate rises further by one percentage point, everything else constant, the euro must fall immediately by one percentage point. The second term on the right-hand side of the first

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equation is the expected exchange-rate change. Of course, if one of the four variables changes, the equilibrating adjustment may come from any of the other variables or jointly by two or three of them. KOM seem to suggest that the expected exchange rate is a given, as are the foreign and domestic interest rates. Presenting the expected exchange rate as a given rules out uncertainty. Of course, they also play with exogenous changes in expected exchange rates; once they are fixed again, agents can recalculate interest-rate parity. Although everything is formally correctly presented by KOM at this elementary level, they do not raise the question of how interest-rate parity can be implemented if two or more of the four variables – rather than only one – are unknown or uncertain.

Short-term interest rates are determined by the money (KOM call it asset) market, at home and abroad, with an exogenous money supply being controlled by the central bank and money demand being dependent on the interest rate and on output, as in the standard representation of the LM part of the IS–LM model. It is surprising that KOM still understand monetary policy as fixing the money supply although no major central bank endorses this approach, while those that did this officially long ago (like the German Bundesbank until 1998) followed *de facto* a different practice. Today all major central banks set short-term interest rates, while the money supply is adjusted endogenously to the money demand. The authors concede this, but only in a special box on monetary policy in Canada (p. 525), without drawing general conclusions. Yet implicitly they do not follow the old loanable funds theory for explaining interest rates.

Since the IRP theory determines exchange rates by interest rates, monetary policy and output growth are indirect determinants. Therefore they hold that an (expected) output increase, everything else held constant at home and abroad (like money supply and the expected exchange rate), raises the interest rate and appreciates the spot rate.

Besides interest rates, the key factor for exchange-rate determination is the expectation of the future exchange rate which is, as mentioned, assumed to be exogenous: 'For now, we will take expected future exchange rates as given' (p. 391). One has to conclude that for the short run the forex market equilibrium is then determined solely by interest-rate arbitrage. Although readers might be curious to learn what determines exchange-rate expectations, they learn some 100 pages later, but only in a few lines, that the 'anchor' for short-term expectations is rooted in the model of the long-run exchange rate, which is by definition the long-run equilibrium rate (p. 471):

> Long-run factors are important in the short run because of the central role that expectations about the future play in the day-to-day determination of exchange rates. That is why news about the current account, for example, can have a big impact on the exchange rate. The long-run exchange rate model of this section will provide the anchor for market expectations, that is, the framework market participants use to forecast future exchange rates on the basis of information at hand today. (Pp. 471–472)

How do they know what anchors people's expectations? KOM's anchor is their belief in rational expectations theory – a risky undertaking: if this theory fails, their exchange-rate theory collapses.

2.2 Long-run equilibrium

The long-run real (inflation-adjusted) equilibrium exchange rate is determined by KOM via a mix of PPP and a peculiar non-monetary theory of real exchange rates (see pp. 464ff). The PPP theory, in both its absolute and relative form, is rejected for the short and medium run, while the absolute version (which stipulates converging price levels) is also rejected for the long run. The main causes for the rejection are

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attributed to rigid prices and factor costs as well as high transaction costs which hinder arbitrage in the goods markets. Despite this, when considering the long run, KOM see much truth in PPP in its *relative* form, as in the old monetary theory of exchange rates. The latter holds that in the long run inflation rates only depend on the growth rates of the money supply, while the exchange rate depends on money growth relative to that of another country. This long-run equilibrium equalizes real interest rates (pp. 473ff). However, since this approach does not hold empirically, factors other than monetary ones may play a role. So KOM call for a combination of relative PPP with their 'general theory of exchange rates in the long run'. This theory holds that countries that produce goods which are in relatively high demand will have a currency that tends to appreciate in real terms. If the trend growth rate of productivity is higher than in other economies, the currency tends to depreciate, and vice versa. This non-monetary approach is supposed to complement PPP and compensate for the latter's shortcomings.

There is indeed a need to explain the long-term dynamics of real exchange rates. One may think of the Balassa–Samuelson effect, the Dutch disease, the strategic undervaluation of exchange rates, or the special role of a reserve currency. But this is not what KOM have in mind. They present in a few pages their general theory of the long-run equilibrium exchange rate, which is no more than a sketch. Empirical backing is not provided, nor a reference to specific literature. As far as we know, no one else follows this approach.

It is also amazing that current-account balance issues are not addressed in KOM's long-run equilibrium concept. Issues of sustainability of external balances, especially high deficits and external net debt (net international investment position) are not addressed. Yet they are dealt with very briefly in chapter 17 on 'output and the exchange rate in the short run', in which a sort of Mundell–Fleming model (KOM do not use this label) is presented that attempts to model simultaneously the equilibrium of the output market, the asset market and the current-account balance (pp. 509–510). The book shows an amazing neglect of current-account issues in the context of long-run equilibrium exchange rates. This is in contrast to long debates within the IMF searching for equilibrium current account and corresponding equilibrium real exchange rates.

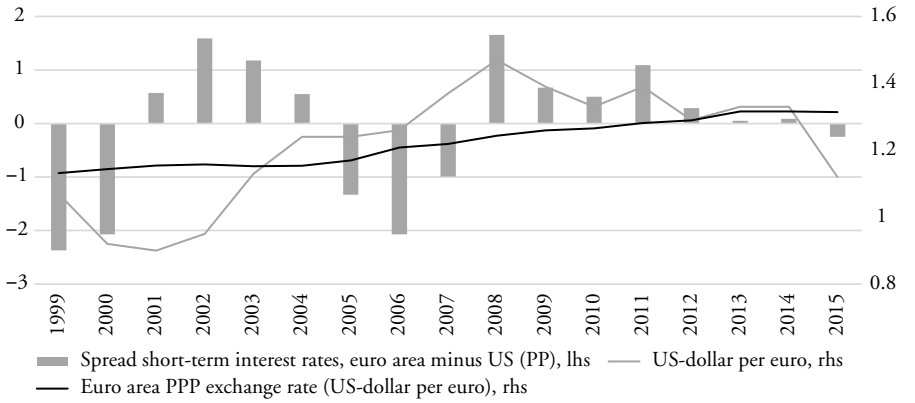
2.3 Criticisms

Regarding KOM's notion of the short-run equilibrium within the framework of IRP, the authors avoid explaining the key variable, exchange-rate expectations. As mentioned, they are treated as givens. If the expectations of future exchange rates are guided by the long-run equilibrium rate, how can huge volatility and even long-standing misalignments occur? KOM seem to suggest, even though it is not stated explicitly, that expectations are fairly stable and anchored to some value. If we are to believe KOM, exchange-rate changes should be expected to result from interest-rate changes, inflation and growth expectations, monetary policy changes, etc. These so-called fundamentals do indeed change, but at a fairly slow pace (Priewe 2016).

How can the authors' combination of short- and long-run equilibrium explain the variation of the dollar–euro rate from US$0.82 to US$1.60 per euro in 2001 and 2008, respectively, with changes of similar magnitude in the case of the dollar–yen rate? Does arbitrage on goods markets, that is, implementing the law of one price, following PPP, play any role at all if the transaction volume on the dollar–euro market, US$1.3 trillion daily, is almost completely unrelated to the comparatively miniscule trade of goods? Why does the adjustment of sticky goods prices and wages take on average 8 years, as found by econometric research? Doesn't the long-term deviation from PPP show a tendency of predominant misalignment (see Figure 3)?

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Note: In the first phase until 2004 we see a textbook performance, then the interest-rate differential drops but the euro skyrockets until 2008. Afterwards the performance is mixed. The deviation from PPP is swelling up and down, in the positive and negative areas, but never exceeds 25 percentage points (based on annual data).
Source: OECD.Stat, own calculations.

Figure 3 US-dollar per euro, PPP exchange rate and spread of interest rates 1999–2015 (annual values)

To demonstrate our point: the euro appreciated 88 per cent from its trough in 2001 to its peak in 2008, on average 9.4 per cent per annum (using daily rates). Assuming that this annual appreciation of the euro were expected *ex ante*, the interest-rate differential would have to be also 9.4 percentage points. But both nominal short- and long-term interest-rate differentials between the euro area and the US never exceeded 2.4 percentage points since the advent of the euro in 1999 (Priewe 2016: 42). Using the PPP theory, in whatever variant, would have to explain also the question of why such strong deviations emerged, and why it took so long to reduce them; neither PPP nor IRP theory can explain this. Our point here is the following: KOM's theories are not even in line with the stylized facts of exchange-rate behaviour, let alone with the results of meticulous empirical investigations. In other words, the exchange-rate volatility and deviations from PPP among the OECD countries have remained strong and by and large similarly high since the end of the Bretton Woods era, while inflation rates and interest rates have strongly converged. There is an obvious misfit between interest-rate differentials and exchange-rate volatility, compared to what IRP would suggest. This reduces the explanatory power of IRP even further.

When addressing exchange-rate volatility, KOM draw implicitly on Dornbusch's (1976) model of overshooting (pp. 435ff, without mentioning Dornbusch). This theory is built within the framework of PPP and the monetary theory of exchange rates which KOM in the main do not want to follow. Rogoff, erstwhile fervent follower of Dornbusch's model, has long ago considered this theory as elegant but useless in explaining reality (Rogoff 2002).

In our opinion, KOM make a crucial mistake in their short-run analysis. If one drops the assumption of given present expectations for future exchange rates, then the actual spot-market rate depends essentially on changing expectations. If these expectations are not anchored in some fundamentals and if expectations are competing and not uniform among market agents, differing expectations will be traded on forex markets. Agents bet on different future spot rates, meaning they speculate while taking risk, that is, going

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beyond arbitrage. Thus spot-market rates are subject to uncertain and often volatile expectations of future spot rates and future interest rates, with present short-run interest rates fixed by monetary policy. The obvious evidence of differences between future spot rates and present forward rates can be explained by neither the uncovered nor the covered IRP theory. Yet, the difference between spot and forward rates can be well explained by covered IRP, endorsed by strong evidence. This means that the present forward rate often deviates from the actual future exchange rate, hence the former is not a reliable predictor of the latter. Speculation is mostly practised in the form of technical trading of so-called chartists on forex markets. All this is fairly well elaborated in exchange-rate research based on behavioural finance and Keynesian theories of expectations (for a critique of IRP, see also Harvey 2004; Moosa 2015; Priewe 2015; 2016: 31ff).

KOM pay little or no attention to the reality of forex markets, and they seldom refer to econometric and other empirical findings. In their exposition of the short-run equilibrium exchange-rate theory, based on their version of IRP, they keep quiet on the innumerable analyses that have shown that the IRP in all variants cannot explain short-run exchange rates any better than the random walk (first Meese/Rogoff 1983 and 1988; more recently Baille 2013 and Rossi 2013 for summaries). But KOM's theory was developed precisely for the short run, and it is the cornerstone of their exchange-rate theory!

It comes, then, as a big surprise that KOM indeed refer to the empirical literature mentioned above, but no fewer than 250 pages after having finished chapter 14 on short-run exchange rates. In a short section on the efficiency of forex markets (pp. 657–661) they report on this literature in a few paragraphs, conceding that empirical research found that IRP can neither forecast the direction (that is, the sign) of exchange-rate changes nor the intensity of change. It is also admitted that the assumption of country-specific risk premiums cannot rescue IRP, and neither can the imperfect substitutability of assets. They even conjecture that exchange-rate volatility might be so large that it cannot be explained by the model of overshooting exchange rates. Moreover, they raise the prescient question of whether exchange rates might perhaps have a 'life of their own', which cannot be explained by conventional models and methods (p. 660). KOM briefly discuss the empirical findings and argue they are not yet conclusive, as expectations cannot be measured. Having reported about this research which would, if true, completely undermine their theories, readers may wonder why they don't question their whole long-winded exchange-rate theories if the latter are not even in line with the stylized facts. Apparently KOM seem to doubt, at times, the efficient market hypothesis of Eugene Fama for forex markets, but in other sentences they reject doubts. In the end they maintain all of the underlying theory of expectations which is intertwined with KOM's exchange-rate theory for the short and the long run. KOM close this short, partly self-critical passage with a call for learning from old theories but also for being open-minded to new insights (p. 661). Scientific methodology stipulates that theories cannot be verified, they can only be falsified. KOM seem to reject falsification over more than 3 decades and hope for future econometric falsification of the already existing falsification. KOM attempt to immunize their theories against evidence and critique by calling the existing evidence 'ambiguous' – after a few pages reviewing empirical findings that overwhelmingly do not back the 225 pages of theories presented before this passage.

The authors are aware that the issues at stake are big:

> A judgement of market failure, on the other hand, might imply a need for increased foreign exchange intervention by central banks and a reversal of the global trend toward external financial liberalization. The stakes are high, and more research and experience are needed before a firm conclusion can be reached. (P. 661)

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And:

> Tests of excessive exchange rate volatility also yield a mixed verdict on the foreign exchange market's performance. Together with the recent history of financial crises, this is not good news for those who favor a pure laissez-faire approach in financial globalization. (P. 662)

These few sentences stand against what the authors had presented in their exchange-rate theories. It seems they serve as a fig leaf.

3 BLANCHARD AND JOHNSON

The 600-page book is an ambitious introduction to macroeconomics. In nearly 50 pages, scattered over different chapters, the authors (henceforth B&J) deal with exchange rates. In those macroeconomic models introduced by B&J, exchange rates are important building blocks, similar to KOM's textbook. Blanchard is also a proponent of New Keynesianism. Until recently he was the chief economist of the IMF, the predecessor of Obstfeld.

The book also discusses different theories and models of exchange rates, but as was the case with KOM, their perspective arises from a limited spectrum of mainstream economics (neoclassical, monetarist and New Keynesian theories). Illustrations, boxes, examples and case studies are amply interspersed. Exchange rates are explained and integrated into macro models, mainly the well-known Mundell–Fleming model and the IS–LM models upon which the Mundell–Fleming rests. A discussion of flexible and fixed exchange rates is added, as well as the limitations of macroeconomic policies in open economies. Despite many similarities to the textbook of KOM, there are remarkable differences.

B&J also endorse the uncovered IRP theory which is considered key for the short and medium run. The PPP theory is briefly mentioned but rejected, as it cannot explain empirically observed exchange rates, as B&J hold. For the long run the authors have little to offer. Some remarks can be interpreted as a limited acknowledgement of PPP. Besides these, B&J hint at the role of monetary and fiscal policies and at the necessity that central banks keep an eye on current-account balances. These remarks could be interpreted as meaning that in the long run policies play a role in guiding exchange rates toward equilibrium, but it is not stated explicitly. If it were, B&J would implicitly concede that forex markets alone cannot find and sustain equilibrium exchange rates. The long-run theory of real exchange rates of KOM is not even mentioned by B&J. So the meaning of a long-run exchange-rate equilibrium and how it is achieved remains open.

The core of B&J's explanation of exchange rates is the IRP theory. The actual nominal exchange rate on spot markets is a function of the ratio of domestic and foreign interest rates and of the expected exchange rate. In contrast to KOM and many others, they do not only use actual but additionally the *expected* interest rates at home and abroad (pp. 476ff), and they assume that the expected future exchange rate changes permanently. With today's spot-exchange rate E_t being dependent on the ratio of the home and foreign one-year nominal interest rate (i_t) and on the expected exchange rate in $t + 1$, B&J write (p. 476):

$$E_t = (1 + i_t)/(1 + i_t{}^*)E^e_{t+1}.$$

And:

$$E^e_{t+1} = (1 + i^e_{t+1})/(1 + i^e_{t+1}{}^*)E^e_{t+2}.$$

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Plugging the second equation into the first gives

$$E_t = [(1 + i_t)(1 + i^e_{t+1})]/[(1 + i_t{}^*)(1 + i^e_{t+1}{}^*)]E^e_{t+2}.$$

For n periods we get

$$E_t = [(1 + i_t)(1 + i^e_{t+1}) \dots (1 + i^e_{t+n})]/[(1 + i_t{}^*)(1 + i^e_{t+1}{}^*) \dots (1 + i^e_{t+n}{}^*)]E^e_{t+n+1}.$$

E is the nominal exchange rate, t the period, * denotes 'abroad', the suffix e stands for 'expected'. Their clue is now that E^e_{t+1} is determined by next year's expectations E^e_{t+2}, and the latter by expectations in the third year and so on, and hence also by i^e_{t+n}. All expected future interest and exchange rates feed into today's spot rate. B&J see the causality as starting from the expectations of future variables and ending at the present spot-exchange rate. This gives much more weight to the role of expectations.

This approach shows that the uncertainty of expectations can potentially lead to the instability of exchange rates since future exchange and interest rates are not known; future interest rates depend partly on future inflation and future monetary policy, neither of which are easy to forecast. Although B&J explicitly endorse the theory of rational expectations, and even devote some 100 pages to this theme, they cannot explain expectations of prospective interest and exchange rates. But their presumption is that such rational and uniform expectations exist. They point to actions and decisions of market participants which influence growth, inflation, monetary policy and interest rates. B&J argue that the volatility of exchange rates comes precisely from the instability of these expectations. The 'anchoring' of short-run exchange rates in stable, long-run, fundamentally determined exchange rates does not seem to exist in B&J's model, in contrast to KOM's model, but eventually the invisible hand of the market is incorporated in the hands of the traders and their mindset.

Expectations on interest and exchange rates come from myriads of information that are gathered and interpreted by market participants. Existing information is already priced in, and all new information that pops up is used to correct or change past expectations. This is the 'news approach' to exchange-rate formation to which B&J cling. Fishing permanently for new relevant information on future exchange and interest rates is conceived as a rational response of market agents on forex markets. This way, they search for rational expectations and by trial and error they eventually approach them.

However, empirical research on the behaviour of forex traders shows that traders seldom use information on fundamentals, and furthermore it is not always clear what the relevant fundamentals are; often trashy or arbitrarily selected short-term information is used, and interpretations of data differ (cf. Ehrmann/Fratzscher 2005, Priewe 2016). 'Irrational speculation' is brushed aside by B&J as an outdated theory. In doing so, they make the seemingly irrational, chaotic behaviour of forex traders look like a rational discovery process. Thus rational expectations return through the back door. That the expectations are rational is not proven by B&J, it is a mere assertion.

Regarding the exchange-rate volatility after 1973, B&J write:

> For some time, the fluctuations were thought to be the result of irrational speculation in foreign exchange markets. It was not until the mid-1970s that economists realized that these large movements could be explained, as we have explained here, by the rational reaction of financial markets to news about future interest rates and the future exchange rate. This has an important implication: A country that decides to operate under flexible exchange rates must accept the fact that it will be exposed to substantial exchange rate fluctuations over time. (P. 478)

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Do the authors really want to tell us that the 88 per cent appreciation of the euro against the dollar in 2001–2008, as mentioned above, was such a 'substantial' fluctuation that it was needed by forex traders to detect the 'true' information? Was it not instead, on all counts (interest rates, PPP, current accounts, etc.), the consequence of distortionary movements of grand-scale market failure? Doesn't such strong volatility lead necessarily to exchange-rate misalignments over extended periods?

Since B&J interpret IRP as totally dependent on *expected* exchange and interest rates, they implicitly depart from the assumption of arbitrage that equalizes returns on the same assets denominated in different currencies. This way, they deviate from the traditional IRP. If they would concede that traders have different and competing expectations, and that there is no representative agent, they would have to conclude that different expectations feed into bets; forex markets are then huge betting platforms; those who refrain from betting are followers, lemmings that practise technical trading. All this should be considered as speculation, mostly of the destabilizing type, and once excessive deviation from fundamentals is reached, stabilizing speculation sets in.

Our criticism of KOM for ignoring the exchange-rate literature of Keynesian and behavioural origin (see above) applies to B&J as well. B&J – implicitly – rule out noise traders or see at least a predominance of 'fundamentalists'. B&J do not even mention that there are different groups of traders. From their perspective, widespread technical trading, based on 'trending', cannot be understood. Critical readers will get the impression that the authors do not properly distinguish arbitrage and speculation, the latter being nourished by all the uncertainties on future expectations which B&J address correctly. Neither B&J nor KOM understand that fundamentals, including interest-rate parity, current account balances, etc., do not guide exchange rates, either in the short or in the long run. Their full disregard of PPP appears overdone since there should be a consensus that ever-increasing deviation from PPP is not possible and not visible in reality.

If our critique is correct, that is, if IRP fails to explain exchange rates, what then governs exchange rates and their gyrations? Both textbooks dodge this question and are of course blinded to finding answers for questions they don't raise. Therefore, they don't address what is empirically visible and described by many others in great detail: speculation, herding and jumping on bandwagons, technical trading, trending, etc. They don't seem to care about the microeconomics of forex markets, although it is the New Keynesians who call aloud for microfoundation of macroeconomics. Strongly worded, one might wonder whether the authors really understand what those 100 000 forex traders in the City of London (and more elsewhere) are really doing. Are they only searching for news about 'fundamentals'?

In this review we have not commented on B&J's analysis of flexible and fixed exchange rate regimes or their macro models of open economies. Their analysis draws on the view that flexible exchange rates have been proven to be superior to fixed ones, just as is claimed by KOM. Our critique of the disconnect between IRP theories and empirical evidence in KOM's book applies equally to B&J. They ignore econometric research. They share the hubris of most textbook authors: what we write is correct, we do not intend to teach doubts.

4 MANKIW AND TAYLOR

This book is considered today to be the most important introductory economics textbook, covering both microeconomics and macroeconomics. The authors (M&T in the following) devote some 35 pages to exchange rates, in a remarkably understandable and accessible style of writing. With regards to exchange rates, this textbook differs strongly from

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those of KOM and B&J. The authors' theoretical background is rooted in the monetary theory of exchange rates and the loanable funds theory of interest rates.

M&T follow the PPP theory (pp. 612–636) for the long run, but apparently also, with a few caveats, for the short and medium run. They write succinctly: 'Purchasing power parity provides a simple model of how exchange rates are determined' (p. 615). Furthermore: '… large and persistent movements of nominal exchange rates typically reflect changes in price levels at home and abroad' (p. 615). Arbitrage on the goods market leads to the same price for similar goods across countries, and exchange rates adjust accordingly. Although certain limitations are addressed (like transaction costs, applicable only to tradable goods, deviations with imperfect substitutes), by and large the theory is seen as correct. This implies that exchange-rate changes compensate for price-level differentials and do not vary much – hence nominal exchange rates would have to be rather stable among OECD countries with overall low inflation. Empirical evidence is not provided, apart from a few hints on hyperinflation episodes in countries whose currencies had depreciated roughly in parallel with inflation. There is no differentiation between absolute and relative PPP.

Empirical evidence would have taught readers that strong deviation from PPP is the rule, and compliance the exception, at least on the deepest forex markets, the dollar–yen and the dollar–euro market. As already mentioned, periods of deviation are often long. This need not imply that PPP is a false theory *per se* – it could be a sensible target, but floating exchange rates are driven by other factors. Yet M&T do not discuss such issues.

After the general endorsement of PPP theory, the authors attempt to explain real (that is, inflation-adjusted) exchange rates in a stunningly simple manner by combining a model of the credit market with a model of the forex market in a two-country model with flexible real exchange rates (pp. 625–628); the approach is summarized in figure 29-4 (p. 627). In the credit market equilibrium, the equilibrium real interest rate is determined by credit supply, understood as a loanable fund from the saving in the period, and credit demand comprising investment and net capital exports (or net capital imports if negative). The latter is, from the definition of national accounting, the trade balance (if for simplicity trade and current-account balances are considered identical). Net exports, corresponding to net capital outflow, is seen as demand for foreign currency and at the same time supply of domestic currency, say the pound. Domestic credit supply is determined by the propensity to save and the interest rate. The intersection of supply and demand for credit determines the domestic equilibrium interest rate, say in the UK. The same applies of course for the foreign country, say the US. As mentioned, the demand for dollars, that is, the supply of pounds, depends only on the domestic interest rate relative to the US interest rate. Lower British rates trigger more net capital exports and hence a larger supply of pounds on the forex market. The pound supply is independent of the real exchange rate, it depends only on the real interest rate relative to the one abroad.

What determines, then, the demand for pounds which is the same as the supply of dollars? With a lower value of the pound (that is, depreciation, using indirect quotation), the UK's net exports to the US increase; US net imports of goods and of capital rise, so they need more pounds to import more from the UK. Vice versa with a pound appreciation. Hence the demand for pounds depends on net exports, as a falling function of the exchange rate. Thus the intersection of the supply of and the demand curves for pounds determines the equilibrium exchange rate. In other words, net capital flows, the flipside of net exports, of both countries determine the real exchange rate. Nominal exchange-rate changes reflect only inflation differentials. Real exchange-rate changes occur due to net capital flows, as shown.

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A real appreciation of a currency makes goods more expensive relative to the foreign country, and thus violates PPP. Therefore the model used by M&T is not fully in line with PPP. Only if the response of net exports with respect to exchange-rate changes is infinitely elastic would PPP hold perfectly. Hence, PPP is considered to be a special case of a horizontal demand curve for foreign currency, derived from the net exports as a function of the real exchange rate (p. 626). Readers have to conclude that in reality perfect PPP might not be reached, but deviations are small.

M&T's model explains interest rates in both countries with the loanable funds theory. Therefore real interest rates differ between the countries, which means that interest-rate disparity is assumed. This is not written explicitly, but it follows from a short text in chapter 29, section 2 (pp. 826ff, condensed in figure 29-4) and from the rationale of the model. According to the IRP theory, interest-rate disparity can only occur if exchange-rate changes are expected. However, exchange-rate expectations do not exist in M&T's model. M&T do not only disregard IRP, they model exchange rates in outright contradiction to IRP. Furthermore, if there were interest-rate parity, there would be no net capital outflows and no net capital inflows in their model, hence no forex supply and no forex demand, hence no exchange rate at all. M&T's model is simply flawed.

In the next sections exchange-rate changes are discussed. They stem from (increased) budget deficits in the home country leading to a real appreciation of the home currency. Budget deficits are conceived as less saving (compared to a balanced budget), hence less credit supply, inducing higher interest rates (crowding-out private investment) and less capital outflows, also less net exports and less demand for domestic currency. In a similar vein they discuss trade policy effects on exchange rates (for example, an import quota), and exchange-rate effects of capital flight. Empirical evidence on exchange-rate performance, volatility, etc. is not provided. The real world is carefully concealed in this textbook: real exchange-rate movements of more than 50 per cent and nominal variations of 100 per cent within a few years, long and heavy deviations from PPP as seen on the dollar-euro market and elsewhere, do not fit M&T's model.

The usage of the loanable funds theory suffers from similar downsides. Modelling savings as credit supply without mentioning the capacity of banks, or the banking system, to generate finance for investment is more than outdated. It is strongly at odds with modern banking.

It is stunning that this introductory textbook has gained so much worldwide prominence. Its secret seems to be the extreme reduction of complexity, thus the ousting of competing theories and the sparse and often arbitrary inclusion of reality – pedagogics of excessive simplifications and omissions, with a loss of touch with reality.

5 SAMUELSON AND NORDHAUS

Samuelson/Nordhaus's textbook, *Economics*, is the mother of all economics textbooks, now in its 19th edition, in the tradition of the 1st edition from 1948. Like no other book, Samuelson had shaped the canonical beliefs of the global economics profession. This book has forged to a strong extent the emergence of a mainstream in this discipline. The 700-page volume is a book for beginners, at the level of principles, and is therefore not comparable with KOM or B&J, and is even more elementary than M&T. The outstanding talent of Samuelson is, firstly, to reduce complex problems to what is conceived of as their roots; secondly, to merge and synthesize different strands in economics, mostly tilted to the (neo)classical side; and, thirdly, to write a much easier and more

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comprehensible textbook than anybody else (not least by limiting maths to a level below the necessary minimum).

The authors, henceforth S&N, devote only twenty pages to exchange rates and the International Financial System, of which only ten pages are directly concerned with exchange rates. This somewhat easy-going approach to exchange rates could be interpreted as though S&N assign little weight to the subject matter. Indeed they simplify strongly and are quiet on any controversial issues.

They approach forex markets as if they were like all other markets, so they show an upward-sloping supply curve for dollars, and a downward-sloping demand curve for dollars. The supply of dollars comes from people in the US who need foreign currency to purchase foreign goods and financial assets, and conversely for the demand for dollars from foreigners. The intersection of the curves is the equilibrium point, no matter whether in the short run or in the long run. Then they turn to shifts of demand and supply. They highlight first a recession in Japan which reduces Japanese imports and the related demand for dollars, pushing the demand curve downward, followed by a depreciation of the dollar. Then they point to the tightening of monetary policy in the US with higher interest rates, which increases the Japanese demand for dollars, shifting the demand curve upwards and appreciating the currency. They refrain from mentioning interest-rate parity, since this would imply that the interest-rate differential heralds expected depreciation or appreciation. Forex markets with flexible exchange rates have 'equilibrating power' for the balance of payments, since the current and the financial account are automatically rebalanced once one of the two accounts moves into imbalance (p. 552). It is noteworthy to mention that a balance in the current account (or containing imbalances) is not addressed here. And what is called 'equilibrium' is an accounting identity. Then, in a kind of *ex cathedra* statement, they summarize what other textbook writers took many chapters to explain:

> In the short-run, market determined exchange rates are highly volatile in response to monetary policy, political events, and changes in expectations. But over the longer run, exchange rates are determined primarily by the relative prices of goods in different countries. An important implication is the purchasing power parity theory of exchange rates. (P. 552)

They add the usual caveats regarding PPP. They admit that financial flows can overwhelm the mechanism for PPP for many years, yet PPP is considered a useful long-term guide. And here is where it all stops. Empirical evidence is not provided. Different and competing theories are excluded so that students get the impression that the basics shown are uncontested in the economics discipline. Not a single word is mentioned about possible consequences of exchange-rate volatility and misalignments.

Subsequently the authors turn to fixed and flexible exchange-rate regimes with the historical trends toward the latter. They are cautious in judging that the flexible-rate regime is superior, but they hint at the advantage that 'the perils of speculation' undermining fixed-rate systems are overcome and that sovereign monetary policy can be conducted under flexible regimes. Implicitly, they seem to contend that speculation (of the stabilizing type) occurs only with fixed-rate regimes, while there is no speculation whatsoever under flexible-rate regimes. They also assume that the Mundell–Fleming model holds (implying that countries committed to floating can cope with the heavy volatility of exchange rates, volatile capital inflows and outflows, etc.).

These are basic tenets of what can be called mainstream macroeconomics. Reasoning and empirical evidence is sparsely provided here, and the obvious, seemingly legitimate excuse is that this can hardly be done in a book for beginners. Eventually doctrines are forged, taught and learnt almost everywhere on the globe.

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6 BOTTOM LINES

All four textbooks, offspring of different strands within US mainstream economics, argue along surprisingly different lines. In particular, this applies to the judgement on both IRP and PPP theories. IRP theories are interpreted conspicuously differently by KOM and B&J, disregarded by M&T, and simply asserted by S&N. PPP is outright rejected by B&J and defended without reservation by M&T, the others being between the poles. All textbooks draw on a narrow sample of theories, this being mostly the case with M&T. Important other theories which question IRP, PPP and flexible exchange rates are excluded, apart from the historical comparisons of fixed and flexible regimes. Despite a valuable presentation of the economic history of exchange rates in all four books, the specificities of modern forex markets and the making of exchange rates are absent. The volatility of nominal and real exchange rates, chronic misalignments, long phases of deviation from PPP and also deviations from uncovered IRP are not satisfactorily explained. Generally, deviations from fundamentals, aligned to the functioning of the real economy, are not well understood. The models used have strong theoretical shortcomings, mostly rooted in the limited understanding of uncertainty and the formation of expectations. Problematic current-account imbalances are largely disregarded in the context of long-run equilibrium exchange rates. The limited perception (or outright disregard) of empirical research, both of the macroeconomic analyses of exchange rates and of the microeconomic structure of forex markets, including the behaviour of actors, is amazing, since a great part of what the modern economics discipline is doing is empirical research. Of course, one must not expect that textbooks can be at the frontier of research, but that empirical research bounces off to preserve old models is a stunning phenomenon, especially in a textbook like the one from KOM which devotes so many chapters to the subject matter. This critique weighs heavily, as the empirical evidence has existed for more than 3 decades (since Meese/Rogoff 1983). The discontent is not about empirical details, but about compliance with stylized facts of reality.

The textbooks reviewed here look like a global oligopoly – with limited competition amongst them – which immunizes itself against outsiders in order to maintain or expand their dominant position on the global textbook market and thus corroborates traditional mainstream thinking. Since floating exchange rates and the post Bretton Woods monetary system, together with unleashed capital mobility, are key pillars of financial globalization, the textbooks contribute to letting this globalization appear in a shining light, by ignoring major problems and disregarding any serious alternative.

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