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Abstracts/Résumés

Endogenous crashes in the foreign exchange market: a theoretical model

Louis Raffestin

We present a model of the foreign exchange market in which cash-constrained carry traders trade with short-sighted, boundedly rational chartists. This simple market structure provides a theoretical basis for the fact that the currencies of high interest rate countries tend to crash, sometimes without a fundamental trigger. Crash risk comes from a perverse interaction between carry traders and chartists, and is maximized when both investors are very active in the market.

Nous présentons un modèle du marché des changes dans lequel des carry traders contraints dans leur accès au financement échangent avec des chartistes qui ont un horizon temporel court et une rationalité limitée. Cette structure de marché fournit une base théorique permettant d'expliquer pourquoi les devises à fort taux d'intérêt ont tendance à s'effondrer, parfois sans déclencheur apparent. Le risque d'effondrement est issu d'une interaction perverse entre chartistes et carry traders, et est maximisé lorsque ces deux investisseurs sont très actifs sur le marché.

Liquidity provision in ETF markets: The basket and beyond

Anna Calamia, Laurent Deville, Fabrice Riva

We provide a theory and empirical evidence showing that the liquidity (quoted spread) of an ETF is strongly determined by inventory-risk related variables. We consider a risk averse market maker who optimally chooses

to either manage her ETF position through trading, or resort to the ETF creation/redemption mechanism to exchange her residual inventory for the underlying basket. The trade-off between the ETF price concession and the cost of trading the basket is key in explaining liquidity provision in ETFs. Using data on European equity ETFs, we provide supporting evidence that ETF spreads depend on the risks and costs of inventory management. We also find that the ETF liquidity is linked with the basket liquidity only when market conditions make on-exchange inventory management unsuitable.

Nous développons un modèle théorique accompagné d'une analyse empirique montrant que la liquidité (fourchette de prix affichée) d'un ETF est fortement déterminée par des variables capturant le risque lié à la position détenue par le teneur de marché. Nous considérons la stratégie optimale de celui-ci dans un contexte où il lui est possible de gérer son stock d'ETF à la fois sur le marché secondaire du produit et via le mécanisme de création/rachat. Ce faisant, le teneur de marché doit arbitrer entre d'une part une concession sur le prix auquel il négocie l'ETF, et d'autre part le coût d'illiquidité qu'il supporte sur les actifs constituant le panier répliqué en cas de création/rachat. Nous montrons que cette concession est cruciale pour expliquer les caractéristiques de l'offre de liquidité sur un ETF. L'étude empirique réalisée sur un large échantillon d'ETF européens confirme le rôle clef joué par les variables liées au risque de position. Nous montrons en outre que la liquidité d'un ETF n'est liée à celle des actifs du panier qu'il réplique que lorsque le risque de position des teneurs de marché ne peut pas être géré efficacement sur le marché secondaire de l'ETF.

Multiple channels of financial contagion: an empirical analysis of stock price dynamics

Stefano Nasini, Deniz Erdemlioglu

In this paper we study how the effects on stock price dynamics of different network propagation channels and centrality vary according to the state of the economy. Drawing on the view that decisions and outcomes of financial firms are influenced by multiple network channels, we study the stock price dynamics of listed enterprises connected by supply-chain relationships,

competition linkages and business partnerships. We derive theoretical properties of the proposed network-based econometric approach which allows decomposing these effects into networks propagation and firms structural positions, with a particular focus on firms' centralities. Using comprehensive firm-level network data on 7256 U.S. listed enterprises, we document that stock prices are significantly exposed to multiple network propagation, and at the same time highly sensitive to the structural positions of firms in the networks. These effects are sizable, time-varying and asymmetric over the business cycle during normal versus crisis periods.

Dans cet article, nous étudions la manière dont les différents chemins de propagation au sein des réseaux, ainsi que leur centralité, influencent le cours des actions en fonction de l'état de l'économie. Considérant que les décisions et la performance des entreprises sont influencées par de multiples réseaux, nous étudions la dynamique du prix des actions d'entreprises qui sont reliées entre elles par des chaînes d'approvisionnement, des liens de concurrence et des partenariats commerciaux. Nous déduisons plusieurs propriétés théoriques relatives à l'approche économétrique basée sur le réseau que nous proposons dans cet article. Cette approche permet de décomposer les effets sur les prix en distinguant les effets liés à la propagation des réseaux et les effets liés à la position structurelle des entreprises, en mettant particulièrement l'accent sur leur centralité. En utilisant des données de réseau complètes pour 7256 entreprises américaines cotées en bourse, nous montrons que les cours des actions sont exposés de manière significative à la multiplication des réseaux, tout en étant très sensibles aux positions structurelles des entreprises dans les réseaux. Ces effets sont importants, variables dans le temps, et asymétriques au cours du cycle économique, à la fois pendant les périodes normales et les périodes de crise.

Endogenous crashes in the foreign exchange market: a theoretical model

Louis Raffestin¹

ABSTRACT

We present a model of the foreign exchange market in which cash-constrained carry traders trade with short-sighted, boundedly rational chartists. This simple market structure provides a theoretical basis for the fact that the currencies of high interest rate countries tend to crash, sometimes without a fundamental trigger. Crash risk comes from a perverse interaction between carry traders and chartists, and is maximized when both investors are very active in the market.

KEYWORDS: currency crashes; chartists; carry traders; funding constraints; rational expectations.

1. Introduction

Every moment of the distribution of floating exchange rates seems to contain a puzzle for economists. Currencies appear disconnected from fundamental factors in terms of expected values (Meese and Rogoff, 1983), as well as volatility (Baxter and Stockman, 1989) and kurtosis (Huisman et al., 2002). Brunnermeier et al. (2008) recently showed that such a disconnect is also present in skewness: high interest rate countries appear subject to crashes that cannot always be linked to a fundamental trigger.

To explain these behaviors of currency prices, two broad approaches have been developed. The first puts forward macro-based explanations², while the second focuses on financial markets, arguing that frictions at the investor level may be the primary cause of non-fundamental price movement. The latter “microstructure” view postulates that the rules followed by investors, the

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² Dornbusch (1976) notably argues that exchange rate volatility is a natural consequence of fundamental volatility when uncovered interest rate parity holds. Devereux and Engel (2002) postulate that the exchange rate disconnect from fundamentals may be due to the fact that consumer prices are relatively insensitive to changes in nominal rates. With respect to skewness, the “sudden stop” literature (pioneered by Calvo, 1998), explains crashes in emerging countries through a combination of push and pull factors.

constraints they face, and the structure of the markets have a non-negligible impact on market prices. This approach has received significant empirical support from Evans and Lyons (2002), who showed that order flow – an indicator of the net demand from customers and foreign exchange (FX) dealers – is correlated with the short to midterm returns in the FX market³.

FX market models have been successful in reproducing some of the empirical features of exchange rates (see King et al., 2013, for a survey). However, they have been largely silent on the issue of currency crashes, which is surprising considering that large swings in exchange rates are particularly costly to the countries that experience them. This study fills this gap by showing that negative (positive) skewness arises naturally for high-yield (low-yield) currencies once we account for three basic features of FX investors: heterogeneous trading strategies, bounded rationality, and funding constraints.

In brief, we provide a partial equilibrium model that belongs to the rational expectations family (Lucas, 1972), in which exchange rates move in accordance with demand for currencies from three types of traders:

- (i) “Chartists”, or “momentum traders”, who aim to identify short-term trends in price dynamics and tag along;
- (ii) “Carry traders” who borrow in a low-yield currency and lend in a high-yield one and are subject to leverage constraints; and
- (iii) “Noise traders” who trade randomly according to their idiosyncratic needs.

Because their strategy is based on tracking trends, chartists will typically follow the direction of the market, magnifying the impact of a given demand shock on the exchange rate. This will induce excess volatility in prices and increase downside risk for carry traders, who are typically long on the high-yield currency. *Currency crashes then occur when the losses of carry traders are sufficiently large to make their funding constraint bind, which triggers margin calls.* Importantly, crashes do not necessarily have a fundamental catalyst: because momentum traders are boundedly rational, they will also exaggerate meaningless noise trading shocks.

In terms of modeling, this paper is at the intersection of different strands of literature. It is linked to the heterogeneous agents literature where excess

3 Other studies later confirmed the connection between financial demand and exchange rate dynamics (see, for instance, Evans and Rime, 2016).

volatility arises due to perverse interactions between agents who follow different trading rules. This framework has notably been applied to the FX market through the so-called “chartists and fundamentalists” models (Frankel and Froot; 1990; De Grauwe and Grimaldi, 2006). The paper is also related to the large literature on volatility and informational effects. In particular, Kodres and Pritsker (2002) study a model in which non-fundamental movement arises when “order flow is misconstrued as being information based”, which is close in spirit to the way chartists interpret shocks in our set-up. Ito et al. (1998) argue that such information effects may be particularly important in understanding the FX market. Finally, through the way it models margin calls for carry traders, this work is connected to the papers that study the link between funding constraints and crashes, such Greenwood et al. (2015), or Mendoza (2010) in the context of the FX market.

Three papers are related to ours from a more conceptual perspective. Plantin and Shin (2018) provide a theoretical model in which currency crashes result from a coordination game between carry traders. Brunnermeier et al. (2008) argue that exchange rate crashes are linked to the funding constraints of carry traders and may arise without a fundamental trigger. Sokolovski (2018) confirms this finding and adds that the relationship between carry trade and crash risk grows stronger when FX volatility is high, consistent with our model in which the excess volatility from chartism triggers margin calls for carry traders.

The dynamics modeled in Plantin and Shin (2018) are different from ours, in that they are not based on any interaction with other agents or on funding constraints. Thus we believe both papers should be seen as complements. Brunnermeier et al. (2008) and Sokolovski (2018) are the closest to this paper in spirit; however, both studies are of an empirical nature. Our goal is to provide a theory that backs these findings in hopes of improving our understanding of the channels through which crashes may occur.

Overall, this study makes four contributions.

First, we offer an explanation for currency crashes, distinguishing fundamental crashes from purely endogenous ones. The former stem from decreases in the investments of carry traders – linked to real macroeconomic variables – while the latter come from chains of events triggered by noise trading shocks. In both cases, the steps that lead to a crash are comparable: shocks are magnified by short-term-oriented chartists with active investment rules before turning into crashes through margin calls.