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# Towards an explanation of the Euro FX market reaction in the EU: A review of European integration during the EU crises

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**Abstract.** We review market participants' actions and the EU afterthe introduction of the euro and during the crises period and Brexit process. The crucial factor is the feedback effect in the reactions of the market participants and the EU. The euro was introduced in a compromised monetary union agreement, essentially underlining the European integrative process issues that were highlighted by the euro crises. Hence, for this reason, it is hard to explain the euro crises without referencing the European integration theories. On the other hand, it is difficult to understate the behavioural factors, including greed and fear, in the full explanation of thecrises. At the heart of this research is the introduction of a new model of testing the stability of the market extending the variance bound test of (Fakhry & Richter, 2015) underpinned by a Markov Switching GARCH model. We analyse the stability of the Euro FX Market from 1st January 1999 to 31st December 2019. We found a mixture of over and under reactions defining the three sub-periods which given the Euro heuristic influencing both the market participants' and EU's views seem to be an acceptable result.
**Keywords.** Behavioural Finance, EU Integration, Euro, Euro Crises, Long/Short Run, Market Stability.
**JEL.** C51, D81, G01, G02, H77.

## 1. Introduction

The euro's introduction was probably one of the most significant financial events of the last 50 years. Moreover, at its heart lays an influencing concept underpinning the EU integrative process. As stated by Schmitter, (2005), the main objective of scholars such as Ernst Haas and Stanley Hoffmann was how to conceive a process of European integration to eliminate the horrors of the two world wars. The two grand theories of EU integration, neofunctionalism and intergovernmentalism derived by Haas, (1958) and Hoffmann, (1966) respectively, were aimed at European unity in the aftermath of the war. Indeed, in its early manifestations, neofunctionalism was an attempt at theorizing the foundation of post-war European unity as noted by Rosamond, (2000). On the other hand, postfunctionalism was introduced by Hooghe & Marks, (2009) to explain the disruptive nature of a clash between functional

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pressures and national identity in the European integration process in recent years.

The global financial and Eurozone sovereign debt crises highlighted the issues at the heart of European integration, emphasising the incomplete and compromised European monetary union (aka EMU). Hence in this paper, we evaluate the three grand theories of European integration to the crises and Brexit. Since Brexit is seen as a crossroad in the European integration process with others, such as Italy, waiting on the Brexit deal. Brexit could prove to be the catalyst to a fully integrative EU or the disintegration of the EU. However, since our research is about the Eurozone and the Euro FX market; it is not enough to evaluate the European integration process during the observed periods. Since, in essence, the investors/EU actions feedback is the key to explaining the crises and Brexit. Hence, we use the behavioural finance theory influenced by the seminal articles Tversky & Kahneman, (1974) and Kahneman & Tversky, (1979) to evaluate the actions of the market participants during the crises and Brexit process.

Thus, one crucial contribution is using European integration theories and behavioural finance to evaluate the crises in the Eurozone and Brexit process. We believe there are no papers written with a comprehensive evaluation of the EU's actions and market participants during the Eurozone crises and Brexit process in the Eurozone financial market. Another essential contribution is the introduction of a stability model with an emphasis on market participants' reaction. The model derived from the variance bound test of Fakhry & Richter, (2015) uses a Markov Switching GARCH model, which illustrates the differing reactions of market participants in the Euro FX market since the introduction of the euro until 31st December 2019.

Our findings suggest only by combining the explanatory powers of the EU integration theories with behavioural finance that a full picture of the crises and Brexit impact on the financial market could emerge. Damningly, the evaluation signalled too often the EU's actions were the results of reacting to the market participants and did not adequately address the issues at the heart of the crises. These issues included the lack of an available macroeconomic adjustment and fiscal policy to deal with the crisis and the incomplete and compromised monetary union at the heart of the Euro. Also, the market participants' reaction bore the whole mark of the opposite scale behaviours: greed and fear. Moreover, at the heart of explaining the Eurozone crises lay the fundamental truth that market participants were taken by the Euro heuristic factor as identified by Szyszka, (2013). Additionally, our stability model results illustrated the changing behaviour of the Euro FX market during the crises and, in particular, Brexit. The results seem to confirm the Euro FX Market trend, given the euro's strong impression during the observed periods.

However, further research is needed to confirm the validity of our model. One possible study is to analyse for different markets. Another

possible route is to use other Markov Switching Garchmodels like the Markov switching EGARCH model Henry, (2009) to include the asymmetrical effect.

The rest of this paper consists offour sections: literature review, methodology, empirical evidence, and conclusion. The literature review contains the evaluations of European integration and behavioural finance theories during the crises and Brexit.

## 2. Literature review

It is essential to note that the European monetary union and euro's introduction underlinedthe relevancy of financial markets to the EU integration process. Thus, EU integration's critical advanceshave not been political or fiscal integrations, but market integration over the last few decades. Conversely, as stated by Bekaert *et al.*, (2013), the EU's goal has always been full economic and, more importantly, to this research, financial integration. Furthermore, as hinted by Genschel & Jachtenfuchs, (2018), financialintegration was thought to be more acceptable and politically less sensitiveto member states than core political powers such as fiscal policies. Since, according to Gali & Perotti, (2003) fiscal integration was regarded as unnecessary and a harmful "straitjacket" on national fiscal policies. The fear is that fiscal integration would create a vacuum where the need to react to a national recession would lead a clash with the limits imposed by the Stability and Growth Pact. Thus, leading to a procyclical fiscal policy and amplifying the economic fluctuation among Eurozone countries. Moreover, financial integration is a market rather than a supranational induced process, especially in the equity markets and banking sector with the merger of many organisations across borders. Even though this was the result of a spillover effect from the euro and EMU integration process.

A critical factor in any integrative process is the stability in the economy and financial markets. Crucially, the much-criticised Stability and Growth Pact was to prove a stable environment to the monetary union and consequently to the financial market and economy. However, as highlighted by Fakhry, (2019a) and Fakhry, (2019b), the global financial crisis and ensuing euro crises and to a lesser extent Brexit process underlined the issues of the Stability and Growth Pact. Additionally, these events highlighted the fragile stability of the financial market. Conversely as stated by Bernard Baruch and Bertrand Russell:

> "What is important in market fluctuations are not the events themselves but the human reactions to those events."
> "Neither a man nor a crowd nor a nation can be trusted to act humanly or think sanely under the influence of fear".

These two statements were relevant during the crises period; hinting at the need for behavioural finance to explain the market participants' psychological mindset in response to the crises and the EU reactions. However, a crucial factor in understanding the EU reaction is the

integrative process; this means analysing the three primary schools of EU integration during the crises:

- Neofunctionalism as derived by Haas, (1958)
- Intergovernmentalism as originally derived by Hoffmann, (1966); subsequently extended to liberal intergovernmentalism by Moravcsik, (1993)
- Postfunctionalism identified by Marks & Hooghe over several seminal papers including Hooghe & Marks, (2009)

This literature review will be sub-categorised into two sections; the first section will review the EU's actions via the three integration schools. The second section will review the behavioural explanation of the crisis on the EU financial markets.

## 2.1. A review of European integration during the crises

Schimmelfennig, (2017) defines a crisis in European integration as a situation where the decision-making process could and often manifests into a threat leading to a significant disintegration probability. Whereby disintegration is the reduction of the current level, scope and membership of integration. Simply put, an integration crisis is one which could threaten the extent of pooling and delegation, EU policy competences or member states exiting. This definition was at the heart of thecrises within the EU during the last few years. Furthermore, crises are open-ended events that may result in disintegration, the status quo's reassertion, or further integration. In essence, capturing the essence of a decision-based crisis cycle: spill-back, encapsulation and spillover leading to positive, negative or stable changes in the integration process.

**Table 1.** *Integration Theories General Explanation of Crises*

| | Intergovernmentalism | Neofunctionalism | Postfunctionalism |
|---|---|---|---|
| Crisis origin | Exogenous: International Challenges Domestic changes | Endogenous & International: Spillover | Endogenous & domestic: euro-scepticism |
| Crisis mechanism | Bargaining | Path-dependency | Politicisation |
| Condition of crisis outcome | Intergovernmental preferences Power constellation | Interdependence, supranational autonomy and capacity | Insulation |
| Crisis Outcome | N/A | Positive feedback: resilience, Integration | Negative feedback: stagnation, disintegration |

**Source:** Schimmelfennig (2017).

According to Schimmelfennig, (2017), in its most general conceptualisation, an explanation of a crisis generates a deviated response from all three prevailingintegration theories. As illustrated by Table 1, there are varied differences in all categories of an integrated crisis, highlighting each theory's underlining assumptions. These differences range from the explanation of the crisis to the eventual outcome. Depending on the theory;

the outcome could be disintegration or further integration. In summarising, the three theories agree with the importance of crises to the catalyst of theoretical and observational European integration changes. However, they disagree with the source, processes and effects of the crises on the integration process.

## 2.2. The Euro crisis

It is worth remembering that the euro crises resulted from a perfect storm starting with the subprime crisis in the US and developing into a global financial crisis enveloping the global financial and banking sectors. This episode had the devastating impact of spilling over into a debt crisis involving several Eurozone member states. Conversely, impacting the Euro and EMU policies' stability putting into question the membership of some states and the whole European integration process. Moreover, according to Genschel & Jachtenfuchs, (2018); the crisesraised several unsolved issues regarding the integration process:

- Why was there a high level of domestic politicisation?
- Whywas there an intractable distributive implication to the crisis?
- Why was there not an increase in differentiated integration?
- Why did the EU rely on extensive external actors?

As illustrated by Genschel & Jachtenfuchs, (2018), the principal explanation of these issues lies in distinguishing between market and core state power integrations. At the heart of this distinction are three similar assumptions made by the two fundamental theories of EU integration, neofunctionalism and liberal intergovernmentalism:

1. Interdependence increases integration: in essence, both externalities and spillover effects are mostly triggered by interdependent in sector-specific elements. Thus, implying a collective benefit in integrating these elements under a supranational policy coordination to EU members states. Therefore, this integration process is the institutional definition of collective power-solving within the complex conditions of interdependence.
2. The harmonisation of national rules and regulations is key to the supply route of the integration process. Conversely, the delegation process to supranational bodies is limited to supporting regulatory integration via centralised monitoring, enforcement and adjudication. It is essential to note that the EU is not a positive state but a regulatory state.
3. Political supply is not automotive; this is due to distributive conflicts between member states' governments impeding the agreement of common European rules. Nevertheless, both neofunctionalism and liberal intergovernmentalism stipulate that member states resolve differences efficiently and within EU regulations' bounds. Neofunctionalism dictates that an upgrade of common interests can manage conflicts while liberal intergovernmentalism emphasises the resolution of disputes via distributive bargaining.

Central to the crisis is the supply differentiation between market integration and political (i.e. the core state power functions) integration. As

observed by Genschel & Jachtenfuchs, (2018), both neofunctionalism and liberal intergovernmentalism were derived to explain market integration. Since market integration is the liberalisation of trade and incorporation of regulation across the EU, it may benefit all member states. Moreover, any disagreement between member states over regulations may be overcome based onthe most significant common multiple. Thus, resolving conflicts by upgrading common interests and power-based distributive bargaining.

As hinted by Genschel & Jachtenfuchs, (2018), political integration is an entirely different type of beast. Moreover, the functional optimism of both theories become increasingly marginalised. Since political integration involved the turnover of core state powers (such as defence, fiscal, monetary, policing) to the EU, this suddenly becomes an invasion of national state affairs. Thus, leading to a misconception aboutoverall governance and resentment from the nation-states leading to nationalist or Eurosceptics taking advantage. However, central to the political integration issue are two key factors: unlike markets, core state powers have limited resources, and hence the distributive conflicts involved tend to be more pronounced. Thus, leaving little room for conflict resolution by upgraded common interest or power-based distributive bargaining.

Moreover, regulation is less effective in integrating core state power due to compliance cost falling only on the member states. Thus, meaning compliance is a matter of ability rather than willingness. Conversely, political integration could magnify the exogenous shocks or amplify the asymmetric interdependencies leading to endogenous shocks. Therefore, the integration of core state powers needs to be backed by burden-sharing at the European level to reduce excessive risk on member states. Of noteworthy is just because there are difficulties in the supply of political integration does not mean there is no demand for it. However, this demand was met by inadequate supply before and during the crises.

As outlined by Genschel & Jachtenfuchs, (2018), since the mid-1950s, EU policy haspreferred market function integration due to not requiring political functions integration. However, with the increasing market integration activities in the 1990s; there was increasing functional spillover pressures into monetary and fiscal policies. Furthermore, as suggested by Genschel & Jachtenfuchs, (2018), the member states refused to have these fundamental core state powers integrated under the European Union. Hence the European Union opted to regulation integration and horizontal differentiation. Conversely, monetaryintegrationcame into EU regulations with the European Monetary Union's introduction in the Maastricht Treaty of 1992.

The EMUwas a compromise of the power-based distributive bargaining and upgrading of common interest methods. The creation of the ECB to take over monetary policies; however, as argued by Genschel & Jachtenfuchs, (2018), due to member states objections, there were restrictions on EMU policies and ECB actions; in effect, these restrictions denied the ECB the power to act as a lender of last resort to governments:

- Article 123 of the Treaty on the Functioning of the European Union (TFEU) prohibits monetary financing of public debts.
- Article 125 of the TFEU prohibits fiscal debt sharing with member states or the EU institutions; this means no bailouts.
- Article 127 of the TFEU restricts the ECB mandates in the maintenance of price stability.

As hinted by Genschel & Jachtenfuchs, (2018), EMUwas achieved thru horizontal differentiation, mainly due to countries not willing or able to participate in such policies. A prime example is the UK opting out of the EMU policies because the national actors did not have the political or mass support. Another reason is the inability to participatebecausethe entry standards wereprohibitingor the member state felt it was unable to do so for reasons other than political or support from national actors. Moreover, the focus on regulations integration instead of core functionalintegration did help to overcome the issue of domestic politicisation.

As pointed by Genschel & Jachtenfuchs, (2018), a major contributory factor to the Eurozone crises was low compliance with the regulations as evidenced in the excessive deficit or debt of a large proportion of the Eurozone member states in diffidence of the Stability and Growth Pact. Moreover, according to Genschel & Jachtenfuchs, (2018), there are three possible explanation as to the low compliance:

- the cost of full compliance fell solely on each member state
- many regulatory gaps in the Stability and Growth Pact
- insufficient burden and risk-sharing

As hinted by Genschel & Jachtenfuchs, (2018), at the heart of the neofunctionalism and liberal intergovernmentalism theories is a simple truth that integration is the efficient collective responseto a common European problem. The problem is that the EMU was notgenuinely efficient and collective as proved by the crises. In essence, the EMU project created as many problems as it solved. As listed by Genschel & Jachtenfuchs, (2018), the EU has come up with several possible scenarios for the future path of integration:

- "carry on", this implies an ad-hoc problem-solving unreformed EU. However, as recent events have proven this is a risk riddled scenario
- unwind back to the Single market integration policy, thus dropping all attempts at core-power integration and abandoning the EMU and Schengen projects. This option would contain some unforeseen and unknown issues; hence it is deemed to be too costly even for crisis-hit members such as Greece
- increased horizontal differentiational integration whereby unwilling or unable member states opt or forced to opt-out of further integration of state core powers. This option contains no understanding of the solutions to existing problems. Moreover, it would need an increased willingness by the "*able*" to show a multilateral solidarity.

- "doing less more efficiently" implies the EU focusing on a few essential functions and, more importantly, getting involved in regulating these functions.
- Increase full integration for all member states. The fear is that this may leadto an anticipation of a type of federal integration.

As noted by Genschel & Jachtenfuchs, (2018), a lesson from historical federation buildings is that the integration of central functions key to the survival of the EU, in the long run, is a challenging, long and conflictual process.

As argued by Jones, Kelemen & Meunier, (2016), the incomplete piecemeal approach to the crisis presented two intertwined puzzles. The first is that at the start of the Euro crises, the leaders acknowledged that such an approach would be inadequate. The second is the tendency for every step in this piecemeal approach to integrate the EU further rather than disintegrate. As a result, "failing forward" by the constant policy of responding to failures of incremental reform of EU with new piecemeal reform for deeper integration. Providing answers to this intertwined puzzle means analysing both the intergovernmentalism and neofunctionalism approaches. The key argument here is that each school addresses a specific issue within this puzzle; intergovernmentalism captures the dynamism within the critical junctures, whereas neofunctionalism defines the mechanism underpinning links between one critical juncture and the next. The fusion of these two schools would present a complete picture of the EU's response to the Eurozone crisis, thus explaining the fail forward pattern in EU integration.

As argued by Jones, Kelemen & Meunier, (2016), initially the governance structure of the Eurozone had three crucial factors missing to succeed over the long term:

- Fiscal policy
- Macroeconomic adjustment policies
- Banking regulations

Many leading policymakers and academics recognised the issues of limited governance within the Eurozone. Essentially, as the European Commission president Romano Prodi prophesied in the Financial Times in December 2001:

> "I am sure the euro will oblige us to introduce a new set of economic policy instruments. It is politically impossible to propose that now. But someday there will be a crisis and new instruments will be created."

According to Jones, Kelemen & Meunier, (2016), the inadequate policies underpinning EMU planted the euro crises' seeds. Moreover, at the heart of this inadequacy was the lowest common denominator policy facilitated by the intergovernmental bargaining process. For domestic politicalreasons, the national leaders could not agree to a fully integrated monetary/fiscal union under an EU supranational actor. Thus, providing emphasis to the neofunctionalism spillover approach due to the incompleteness of EMU.

Furthermore, as statedabove in Romano Prodi's quote, many of the supranational actors knew that EMU was incomplete; therefore, as neofunctionalism argues the societal actors inevitably would create pressures for a deepening of integration.

As explained by Jones, Kelemen & Meunier, (2016), the euro crises' responses bore the hallmark of failing forward to integration. The key to understanding the EU's reactionsduring the euro crises is inliberal intergovernmentalism, over the short term, and neofunctionalism, over the long term. In the short term, the leaders' response to each stage of the crisis was dictated by the liberal intergovernmentalism bargaining approach which only resulted in the lowest common denominator solutions meaning a piecemeal fix to the EMU issues. In the long term, as argued by neofunctionalism, this led to a further spillover to other policy areas to fixissues neglected by the previous fix. Therefore, giving rise to additional pressures by the societal actors towards the deepening of EU integration. With each response to an event during the crisis, the EU members were ever so slowly failing towards integration.

In truth, the euro crises had its origins in the global financial crisis, which started in mid-2007 with the sub-prime crisis in the US[2]. Conversely, as pointed by Hooghe & Marks, (2019), all three integration schools had different explanations for the euro crises. Hence, the crisis was: a case of iterated intergovernmental bargaining, a crisis that extended integration and the constraining effects of politicisation.

*2.2.1. The liberaliIntergovernmentalism explanation*

Firstly, the intergovernmentalism account for the euro crises. As suggested by Hooghe & Marks, (2019), the euro crises had several features which could be explained by intergovernmentalism. The threat to the existence of the Eurozone was vast and immediate. Moreover, the EU did not have the financial resources and legality to intervene as the lender of last resort. Hence the solution was in the intergovernmental bargaining between the member states. The threat of the crisis to the Eurozone's existent throughout the late 2000s to mid-2010s ensured a lengthy and iterated intergovernmental negotiation characterized by substantial interdependence and sharp asymmetries. The resulting series of lowest common denominator deals constrained by the diverged preferences on the distribution of costs did just enough to avert the Eurozone's dissolution. Conversely, minimizing the immediate cost to the northern states in the dominant bargaining position.

As Moravcsik & Schimmelfennig, (2012) states that liberal intergovernmentalism predicts that the risk of catastrophe would unite all sides of the EU to avoid the immediate costs of default. There were high external and internal macroeconomic risks associated with leaving the euro for the southern countries at risk from the high debt. For the more prosperousnorthern countries, the euro's breakup would have meant

[2] see Brunnermeier, (2009); Caballero & Krishnamurthy, (2009); Masood, (2009).

currency appreciation and thus loss of trade. Moreover, liberal intergovernmentalism predicts that the varying motives dictate the major intergovernmental coalitions in the bargaining process. Hence, the less prosperous south pushed for a Europeanised solution, while the richer north demanded the crises countries push through macroeconomic austerity policies.

Furthermore, as stated by Moravcsik & Schimmelfennig, (2012), this led to a "*chicken game*"characterised by hard intergovernmental bargaining and brinksmanship with the north having the upper hand. Intergovernmental bargaining led to further integrative regulations and supranational powers like the SGP, banking union, EFSF and ESM. Therefore, the northern countries push the crisis-hit countries to the brink of sovereign default; while the southern countries tried to convince the solvent countries that a rescue was requiredto save the euro. Conversely, thisbrinksmanship was at the heart of this"*chicken game"*. The result was that the solvent northern countries could push through the strict regulations and fiscal adjustments in return for giving the indebted southern countries the required funds. In short, the northern countries led by Germany were able to push thru their agenda on integration during the crisis.

Moreover, according to Moravcsik & Schimmelfennig, (2012), the new phase of integration in response to the crisis thru institutions and regulations was deliberately limited in scope and power; mainly due to the preferences of the solvent northern countries who had the clout in the intergovernmental bargaining process. However, the imposition of strict fiscal rules and macroeconomic adjustments cannot be forced upon the indebted countries by the EU or the solvent countries; hence the system remains unstable for the foreseeable future.

As highlighted by Schimmelfennig, (2017), from an intergovernmentalism perspective on the crisis, the euro crises was a typical predicament involving intergovernmental bargaining between converging and diverging member states' interests to rescue/strengthen the euro and EMU. The crisis highlighted a clash of interests between common interdependencies and different preferences on the nature of integration.

Additionally, as noted by Schimmelfennig, (2017), in line with intergovernmentalism, the dominant actors were the member states' governments as evidenced in the intergovernmental institutions which coordinated and implemented the rescue programmes and macroeconomics policies as opposed to the classical Community methods. Furthermore, increased integration does not necessarily mean further delegation of core state powers to supranational actors.

*2.2.2. The neofunctionalism explanation*

As hinted by Hooghe & Marks, (2019), neofunctionalism explained the long-term perspective. The euro crises' severity was mainly due to the "*half baked*" functionality of economic and monetary integration introduced by the Maastricht Treaty. Neofunctionalism dictates that path dependency meant that member states were primarily concerned with saving the Euro

generating intense pressures to fixing the flaws when the euro crises hit. Initially, the agreements introducedseveral institutions under the direct influence of member states; subsequence agreements nudged these institutions towards control by the EU. The ECB also obtained more power to act like any central bank to supply money and buy assets through QE and outright monetary transactions policies. Hence, the crisis was the result of an unintended spillover and concluded with enhanced supranationalism.

Neofunctionalism focuses on the endogenous nature of the euro crises; as highlighted by Schimmelfennig, (2017), neofunctionalists attribute the crisis to the functioning of the integrated process. This perspective hints at the true underlining nature of the integration process; it is a very unpredictable, highly complexed and dynamic process. Meaning that while state actors havethe power to shape the initial integration agreement, they cannot control the consequences, moreover, this is the supranational actors' domain. Conversely, the intensity and process of change come thru spillover, where an integration process spills over to another function. The spillover process does not necessarily trigger a crisis; however, a possible explanation for any crisis in the EU isthe existence of a massive spillover.

Further, as argued by Schimmelfennig, (2017), there were several aspects of the euro crises, which could be explained by neofunctionalism:

1. Endogenous causes of the crisis

   The euro crises may have started with an exogenous event in the form of the global financial crisis; however, the onslaught of the integration issues at the heart of the euro crises was mainly due to the inherent economic tensions and institutional flaws of EMU. Put simply; the euro crisis resultedfrom the exogenous shock exposure of endogenous tensions and dependencies highlighted by the lack of a credible fiscal policy to deal with such events. A common argument against the EMU is that monetary union without fiscal union does not work; the result of an intergovernmental bargaining issue, at its heart lays a conflict of interests between the two powerhouses of European integration: France and Germany.Essentially, the same underlining conflict that emerge during the euro crises. As already alluded to previously, Germany had the superior bargaining powers; hence it was able to shape monetary union powerfully according to its preferences: inflation targeting, independent central bank and only fiscal supervision. Furthermore, the rules governing membership of the EMU were relaxed and weakly enforced

2. Path-dependent on the intergovernmental bargaining before the Maastricht Treaty

   The strong backing for the euro and EMU by the Eurozone countries during the euro crises is, possibly, due to the initial endogenous decision on monetary union. Hence, as quoted by Schimmelfennig, (2017), the euro crises resulted from a "*heavily discounted or unintended effect*". However, Eurozone and member

interdependencies' sunk costs prohibited any orderly exit strategy by Eurozone member states during the euro crises. Thus, the member states somewhat reluctantly agreed upon a set of further integrative steps they had initially dismissed during the Maastricht treaty's intergovernmental negotiations.This decision for further integration is path-dependent on the decisions taken during the intergovernmental bargaining for the Maastricht treaty.

3. Trans/supranational actors drove the negotiation and resulting decisions of the states

As already stated previously, a "*chicken game*" between the creditors and debtors ensued after the initial shock. The resulting reaction of the transnational financial markets endangering the debtors' ability and putting downwards pressures on the sovereign debts' prices forced the EU members into actions. Thus, meaning that the creditor member states were now heavily exposed to the debtorsthru the transnational banks. Therefore, forcing all member states to agree on further incremental integrative actions. However, the national actors might have been unable to prevent further contagious effects and eventual disintegration of the Eurozone, if it was not to the supranational interventions by the ECB. Against intergovernmentalism assumptions, the ECB was the main factor in stabilising the Eurozone through monetary instruments that were at the limit of the Maastricht agreement on monetary union. The ECB was able to act against many internal and external policymakers' wishes because the Maastricht treaty granted it the required independence.

As perfectly summarised by Schimmelfennig, (2017), the euro crises hints at the intergovernmental bargaining process becoming embedded into neofunctionalism's strategic path-dependent development of integration. Moreover, the crisis outcomes generally typify the lowest common denominator solutions that are likely to spillover into further integration. This process is the "*failing forward*" argument of Jones, Kelemen and Meunier, (2016) stated previously.

*2.2.3. The postfunctionalism explanation*

According to Hooghe & Marks, (2019) in contrast, postfunctionalism perceived the response by the EU to the euro crises as a result of domestic politics and, particularly, the rise of nationalist opposed to European integration. This issue was critical to the EU's inadequate and inconsistent response throughout the crises leading to the spiral of the crisis. Moreover, the domestic politics during the crisis meant a resistance to supranational solutions. Furthermore, northern governments were reluctant to heed advice to ditch their "*me first*" economic growth policies fearing public opinion. Thus, the combination of fear and greedundermined the EU response nearly led to the collapse of the Eurozone. A further complication, according to postfunctionalism, was the politicization of the crisis.

Conversely, this led to a narrowing of reform options in the wake of the crisis. This procrastination meant that instead of the urgently required reform of the Eurozone; a cocktail of monetary policy, bailouts and tightening regulations resulted. Moreover, the price paid by all sides was high.

As hinted by Schimmelfennig, (2017), the euro crises represented a perfect picture for postfunctionalism, a crisis with all the components of the postfunctionalist perspective on European integration. However, in reality, it was a significant puzzle because it had all the components:

- The anti-EU politicisation
- An increasingly eurosceptic public opinion
- An increase in the popularity of populist and eurosceptic national political parties in member states

Nevertheless, the resulting integration process was not as predicted by the postfunctionalism school. Postfunctionalism predicts that these components should reflect a strong disincentive for national governments in furthering the integration process. In reality, due mainly to addressing weaknesses in the monetary union and banking regulations, the integration process was able to gather pace during the early stages of the euro crises. As stated by Schimmelfennig, (2017), the reasons were simple:

- Formation of strong coalitions of EU friendly national governments, for the most part, the members' national government were from the political mainstream parties which were centre-right or left. Before 2015, most of the snap elections presented an EU friendly national government. Hence further integration was able to proceed without any significant issues.
- Avoidance of constraining referendums, this was done by designing treaty revisions or new treaties in such a way as to avoid the necessity of a referendum. It is essential to note that generally, Eurozone governments have been reluctant to embark onsignificant integration treaties during the euro crises.
- Fear of economic doom if the euro was to collapse or partial disintegration of the EU or Eurozone.
- As stated previously, the critical integration processes during the euro crises were done by the supranational bodies, such as the ECB, out of necessity to contain the crisis did not need the member governments' rectification.

However, according to Schimmelfennig, (2017), in January 2015 Greece elected the left-wing populist Syriza party which formed a coalition with eurosceptic right-wing parties. Thus, enabling the Greek government to hold a successful anti-austerity EU Bailout referendum. However, the negotiations' outcome was an even harsher austerity programme, reflectingthe Greek government low bargaining power in the "*chicken game*"throughout the euro crises.

As summarised by Schimmelfennig, (2017), even though theoretically postfunctionalism was correct to highlight the rise of mass level euro-

scepticism politicisation effects on EU integration and to a certain extent it did make intergovernmental negotiations harder. Nevertheless, the adverse effects predicted by postfunctionalism did not materialize. However, the extensive further integration indicated by neofunctionalism resulting from a "*good crisis*" did not materialise either. Conversely, all three theories are required to gain a deeper understanding of the euro crises and response of the EU. Additionally, as noted by Hooghe & Marks, (2019), the three theories complement each other in explaining the euro crises; while neofunctionalism clarified the issues of supranational reforms in the face of the euro crises. Intergovernmentalism rationalised the diverse national preferences and intergovernmental bargaining, which resulted in partial solutions to the euro crises. Moreover, postfunctionalism explains that domestic politics and the politicisation of the issues underpinning the euro crises led to a war of ideologies between proponents and opponents of European integration.

### 2.3. The Brexit process

As highlighted by Hooghe & Marks, (2019), in explaining the issues and effects involving the EU referendum and Brexit, postfunctionalism certainly has greater leverage. However, this does not mean that we should discount the contributions of neofunctionalism and intergovernmentalism. They both stress the argument of strong economic interdependence as a case against hard Brexit. Nevertheless, in contrast with neofunctionalism and postfunctionalism, liberal intergovernmentalism does further states that Brexit is epiphenomenal.

Conversely, as hinted by Schimmelfennig, (2018a) and Schimmelfennig, (2018b), the key to explaining the Brexit crises lays in a combination of postfunctionalism and liberal intergovernmentalism. The central axis is the activation of article 50 of the Lisbon Treaty, which shifted the emphasis from integration to disintegration. There is a difference between demanding an opt-out from an integrative function and exiting the EU by invoking article 50. As highlighted by Schimmelfennig, (2018a), postfunctionalism seems to explain the UK government's reasonings and actions for the Brexit route. However, according to Schimmelfennig, (2018b), the intergovernmental negotiations after the invoking of article 50 seem to be best explained by liberal intergovernmentalism. Moreover, liberal intergovernmentalism partly explains the preferences of the EU and member states.

#### *2.3.1. The postfunctionalism explanation*

As hinted by Schimmelfennig, (2018a) and Hooghe & Marks, (2019), the rise of UKIP and an increasing number of eurosceptic within the Conservative party forced UK prime minister David Cameron to promise a referendum on the negotiated EU agreement. He was gambling on the hope of appeasing his backbenchers while deflecting the UKIP challenge. An in/out referendum was passed into law the support of 81 Conservatives MPs going against the wishes of the government. As predicted by

postfunctionalism the referendum campaign was fought on national identity versus economic consequences. The leave campaign focussed on the identity and self-determination issues promising to limit immigration and to take back control of the key factors of national concerns. The remain campaign focussed on the inevitable negative economic consequences of leaving the EU with many researches from international and national organisations as well as economic academics highlighting the economic downturn in the short to long term. The two sides sidestepped each-others arguments. The referendum resulted in a close defeat to the remain campaign 51.89% to 48.11%.

Moreover, as argued by Hooghe & Marks, (2019), postfunctionalism analysis of the role of national identity in mass settings, such as the referendum, was proved correct. Further, evidence since the referendum has illustrated the hardening polarisation of the two sides. Few events have demonstrated the impact of politicisation more than the EU referendum. Far from reducing tensions, political infighting and divisions in the UK; the EU referendum exacerbated them on every level. A key argument against the EU referendum is that it consisted of a simple choice to a complicated argument consisting of many compromises and trade-offs.

As stated by Schimmelfennig, (2018a), according to postfunctionalism differentiated integration and disintegration are attributed to a politicisation process, pointing to a shift in European integration issues from interest groups to the masses where political identity plays a more significant role. Here several factors are driving the politicisation process:

- the depth of integration
- exclusive national identity
- Euroscepticism
- referendums

According to Schimmelfennig, (2018a), the demand for disintegration centre around the three hypotheses based on the last three factors:

1. the spillover of integration into identity-relevant areas
2. the rise of Eurosceptic political parties
3. the increase availability or use of EU integration referendums

Conversely, with Brexit, all three hypotheses were central for the increase in the demand for disintegration. As argued by Schimmelfennig, (2018a), the spillover of the EU's enlargement to Eastern Europe gave rise to an unanticipated and undesired increase in immigration to the UK. However, the UK has always supported the enlargement and was one of four states to open its labour market to the new member states in 2004. Nevertheless, despite abandoning their liberal immigration policy and pledging to control the flow of immigration, the UK continued to be the focus of intra-EU immigration due to the EU policies on freedom of movement for any EU citizen. A survey in 2015 highlighted the extent of the UK's population fears with 63% ticking immigration as the number one cause for concern.

According to Schimmelfennig, (2018a), the issue of immigration gave rise to the Eurosceptic UKIP political party with its dual anti-EU and anti-immigration messages. As with all populist political parties, UKIP's success was in politicising and communicating these two issues to the masses. Moreover, UKIP was able to infuse EU membership issues with the immigration issue and frustration with governmental performance. Thus, leading UKIP to electoral success, especially in the 2014 European elections and emphasizing EU membership.

Although, the government did not state the nature of the exit from the EU before or during the referendum. However, the government under pressure from its backbenchers and UKIP decided to go with a "hard" Brexit when the UK invoked article 50, signalling the beginning of negotiations to reach an agreement within two years. As stated previously, postfunctionalism does not have a credible explanation to the negotiations and bargaining in the aftermath of Article 50.

*2.3.2. The liberal intergovernmentalism explanation*

As highlighted by Hooghe & Marks, (2019), the causes of Brexit were not just British but also European. In essence, an explanation Brexit is giving thru the use of two critical principles of intergovernmentalism. The course of European integration is dependent on cooperation facilitated by intergovernmental bargaining, and ironically, intergovernmental bargaining depends on economic interests and NOT on a referendum result. Conversely, both the UK and EU's economic interestis in maintaining the UK's membership of the single market. However, that the negotiations turned out the way they turned out was a lesson in asymmetry. It is one thing to negotiate an opt-out from a function or reform; it is quite another to opt-out from Article 50, the rules governing exit from the EU. Moreover, the UK was in a weak bargaining position in comparison to the EU.

According to Schimmelfennig, (2018b), the negotiations in the aftermath of the invocation of Article 50 supports the superior explanation of asymmetrical interdependence and bargain power of liberal intergovernmentalism. Since liberal intergovernmentalism, as in any other negotiation theory, revolves around the two negotiation sides' initial preference constellations. Thus, the initial preferences of the UK and EU are critical to the Brexit negotiations. Initially, the UK's position was to stem the flow of EU based immigration, however, in the aftermath of the referendum the UK's government decided that a soft Brexit would imply remaining under the EU's influence[3] without having a say in the future direction of the EU. The basis of the UK's preferences is to leave the EU but still have services and goods access to the EU free market. This scenario prompted Michel Barnier comment: "*Cherry picking is not an option*" on 6th December 2016. In contrast, the EU's preferences were to protect the EU and euro's integrity and signal that leaving the EU is very difficult and

[3] The acceptance of EU legislations, Court of Justice jurisdiction, freedom of movement for labour and "*large contributions*" to the EU budget

economically costly. With two polar axis preferences, the negotiations were going to be difficult.

As stated by Schimmelfennig, (2018b), in intergovernmental bargaining between the EU and UK, the EU had both material and institutional superior bargaining power. A major bargaining advantage is the UK exports 44% to the EU, while the EU only exports 6-7% to the UK. Institutionally, the EU had superior power due to four circumstances:

1. The European Commission negotiated on behalf of all the EU member states. Thus, giving it unity and hence superior bargaining power
2. The withdrawal agreement requires the consent of the European Parliament meaning any member state not happy with the agreement could theoretically block it
3. Article 50 imposes two years to complete the process; however, a country could extend the period, if the European Parliament votes in favour of a request to extend by the exiting nation
4. A requirement of ratification by each member state for a "mixedagreement" that is an agreement beyond a basic free trade deal

According to Schimmelfennig, (2018b), in line with liberal intergovernmentalism, the EU bargaining powers was reflected in the first step agreement. The terms of the agreement were:

1. Negotiations on further agreements only start once there was sufficient progress on the withdrawal terms
2. All parties honour financial obligations under the current financial framework ending in 2020
3. Avoidance of a hard border andcontinuation of internal market and customs union in Ireland
4. Guarantee the rights of EU citizens residing in the UK after the withdrawal

*2.3.3. The neofunctionalism explanation*

As Hooghe & Marks, (2019) and Cavlak, (2019) states central to the neofunctionalism explanation of the effects of Brexit on the UK is the concept of spillover, which states thatan agreement to integrate a function into the EU spills over to another function. This concept works asymmetrically, meaning that EU integration had spilt over several national public organisations' and governmental departments' workings. The big issue is to unwind the long duration of the spillover effect of EU integration is going to be both complicated and time-consuming. Furthermore, there are the knowneconomic issues; in addition to thesocial, cultural and political issues currently in play. These issueshas resulted in a 21 months transitional period after the completion of the Brexit negotiations.

Conversely, the big question is whether spill back is successful in the disintegration of the regulations and functions inthe aftermath of Brexit. Whether or not spill back is successful, the EU hopes that the difficulties experience by the UK in the negotiations and inevitable unwinding of integration processeswillillustrate how difficult and costly it is, and thus

discouraging others. Moreover as argued by Hooghe & Marks, (2019), another critical factor in neofunctionalist reading into Brexit is centred around the fact that the health of the UK's economy is to a certain extent heavily dependent on the EU as illustrated earlier and by Fakhry, (2019a). Therefore, the threat of economic disruptions would serve as a disincentive to a hard Brexit.

As argued by Schimmelfennig, (2018b), the differences in the three integration theories explanation of Brexit highlight the strengths of the theories:

- Postfunctionalism explains how Brexit came into being
- Neofunctionalism explains the effect the UK from Brexit
- Liberal intergovernmentalism explains the factors behind the Brexit negotiations, including the reasoning for the UK weak position in the intergovernmental bargaining process

### 2.4. A review of behavioural finance during the crises

As observed by Barberis, (2013), central to the global financial crisis is the concept of a bubble in real estate during the late 1990s – early 2000s, particularly in the USA[4]; meaningthat prices reached levels which were unsustainable due to irrational thinking or friction in the housing market. There are two concepts behind the realisation of a bubble:

- investor beliefs.

  One theory of beliefs is the bullish vs bearish friction in the market, which leads to bearish investors omitting the market altogether. The prices reflect the bullish investors' views; hence the market becomes overvalued.

  A second belief theory argues that investors extrapolate historical outcomes too far into the future. The argument based on the representativeness heuristicstates that many people base their expectation on "*over-extrapolating*" small samples of the overall observations. Thus, prices rise and hence bubbles form.

  Lastly is the theory of overconfidence in the analysis and information. This theory dictates that investors could become overconfidence in the information or analysis leading to increases in the prices and hence a bubble formulation.

- investor preferences

  The first theory is that investors often become less risk-averse and increasingly profit maximisers once they profit on an asset. Thus, keep investing in the asset, rising the price and therefore triggering a bubble.

  Another theory is the overvaluation of a new idea due to investors relating these to lotteries. The basis of this theory is that investors may think that the new concept could be a high lottery-payoff, hence

[4] Although not limited to the USA, there was evidence of real estate bubbles in the UK and across Europe (particularly in Spain)

investing in the asset in the hope of obtaining a significant payoff on a small investment and thus increasing the price and creating a bubble.

According to Barberis, (2013), the most likely explanation of the housing price bubble is a multi-level deviation of the past extrapolation theory:

1. The homebuyers
2. The mortgage lenders
3. The securitisation firms
4. The rating agencies
5. The investors

Ofcourse, in some countries, securitisation did not apply; hence, the over-extrapolation hypothesis suggests mortgage lenders were basing the hypothesis on past low mortgage default rates. In summary, the commonality between most of the recent bubbles is a tendency for market participants at different levels to over extrapolates past performance too far into the future.

As highlighted by Barberis, (2013), the accumulation of subprime-linked mortgages and securities requirescognitive behaviour analysis. The puzzle was why, despite the enormity of the risk, did banks take on the exposure?" There are three possible explanations:

- the bad incentives view dictates incentiviseparticipants only care about their compensations and bonuses in the short term and not about the risk to their organisation in the long term
- the bad model view implies faulty reasoning on behave of participants who were genuinely unaware of the risks posed to their organisations. This explanation may have been due to the belief and/or model usedthat tended to extrapolate past growth too far in too the future without taking account of risk
- the bad luck view hypothesises that rational participants could not have foreseen the subsequent bad performance, hence the risk to the organisation was due to bad luck. This explanation can be ruled out due to any careful and exhaustive analysis of these assets, especially during the years immediately precedingthe crisis, by rational participants, would have highlighted the riskiness of these assets.

However, as argued by Barberis, (2013), both the bad incentives and models' views are incomplete views of the pre-crisis period. On the one hand, these organisations employedhighly skilled and intelligent employees, which begs the question about the plausibility of the bad model view. On the other hand, the fact that a high number of participants knowingly and repeatedly exposed their organisations to high risks just for the stake of a bonus does not sit well with the human mind.

As suggested by Barberis, (2013), an alternative hypothesis dictates that participants were vaguely aware of the high risks. However, by belief manipulation, they deluded themselves into thinking that their model/belief was not risky and was positive for their organisation's wellbeing. Psychologically speaking, an explanation of this mindset is thru the concept ofcognitive dissonance; in simple terms, the discomfort that

exists when an action conflicts with the typically positive self-image. Conversely, to remove this discomfort, many resorts to the manipulation of their mindset. Hence, by manipulating their beliefsinto thinking their model was not endangering the organisation or livelihood of many people, they could maintain their positive self-image and remove any uncomfortable cognitive dissonance. An example would be for the market participant not to analyse the subprime loan or security carefully.

Moreover, as noted by Barberis, (2013), a similar explanation could be used for the credit rating agencies. The agents' dilemma was a trade-off between personal dissonance by giving the required ratings and competition by not giving the required ratings. As in the market participants' cases, the agent overcomes this dissonance by manipulating their beliefs via merely convincing themselves that the asset prices, in this case, houses, will continue to rise and thus subprime defaults will remain low. Since, according to the representativeness heuristic, people naturally tend to believe past trends will continue.

Furthermore, as stated by Barberis, (2013), twoadditional factors in the manipulation of beliefs occurred in the case of the subprime securitisation:

1. they were overly complicated assets to understand, and hence it was complicated to prove they were highly risky assets. Therefore, making it easier for many participants to delude themselves about the risks posed
2. the representative heuristics which dictated that since the prices of the underlining asset, in this case, houses, were likely to continue rising, hence these subprime securities were likely to continue to have low risks

Moreover, as argued by Barberis, (2013), the belief manipulation hypothesis is a valid alternative to the bad belief, bad model and bad luck views explaining what happened before the global financial crisis.

By the end of 2005/early 2006, the housing market bubble burst, and subprime defaults rose. Nevertheless, as subprime defaults rose, the subprime loans' securitisation was continuing; eventually leading to the global financial crisis. As noted by Barberis, (2013), a surprising feature of the crisis was the dramatic decline of many risky assets of various types. Given the relatively small size of the subprime loan, the widespread and dramatic nature of the falls in prices of risky assets did, to say the least, take most people by surprise. Moreover, the speed at which the crisis spread globally suddenly bought into context the financial market's integrative nature.

As Barberis, (2013) hints, a possible explanation is the amplification mechanism. During s crisis, the amplification mechanism dictated that any market participant facing a loss in the value of subprime backed securities tend to sell other risky assets. Thus, pushing down the other risky assets' prices, forcing them to sell their other less risky assets, thereby ensuring a loss or margin spiral. This behaviour is fundamental to explaining the global spread of the crisis, particularly to Europe.

However, as noted by Barberis, (2013), the loss aversion and ambiguity aversion related amplification mechanisms may also have played a vital

role in the global financial crisis. Ambiguity aversiondictatesthat in situations where participants cannot assign probabilities to future trends, they become increasingly averse. An extension to the ambiguity aversion is the competence hypothesis presented by Heath & Tversky, (1991). The competence hypothesis dictates thatthe level of competence at analysingthe situation determines whether the person is ambiguity averse or seeking. This hypothesis partly explains the global financial crisis; the explanation maintains that the initial loss on the subprime backed securities made investors less competent in analysing risky assets. Hence, increasing ambiguity aversion leading to a reduction in their holding of risky assets, therefore further reducing these assets' price.

According to Barberis, (2013), the second fundamental explanation isthe loss aversion theory of Kahneman & Tversky, (1979). This obverse that losses are more sensitive to market participants than profits of similar magnitudes. The less obvious observation is that the degree of aversion may vary with time, depending on the trend of losses or gains. Thus, any recent loss increases loss aversion making them less willing to take risks that they would have taken otherwise. In terms of the global financial crisis, the initial decline in the price of subprime securities made market participants loss averse; thus, selling the risky assets on their books, further reducing the price and increasing loss aversion. Both the ambiguity and loss aversions played a big part in the amplification mechanism during the global financial crisis and arguably in turning the crisis from a local to a global event since the subprime crisis began in the US housing market.

Another explanation of the global financial crisis as provided by Szyszka, (2010) is thru the fear/hope conundrum[5]. As explained by Lopes, (1987) and Shefrin & Statman, (2000), the two emotions dictating risk management are fear and hope. While fear is determined by an overweighing of the worst-case scenario probabilities relative to the best-case scenario, hope or greed is the opposite effect. Simply put, hope (greed) make market participants unduly optimistic on investment opportunities, while fear makes them increasingly unoptimistic on investment opportunities.

The global financial crisis is a lesson in both hope and fear. In general, hope rises during a booming economy and asset pricing bubble; however, fear increases during a recession and/or financial crisis. According to Szyszka, (2010), macroeconomic factors shaped the background to the pre/post-financial crisis. Hence, the pre-crisis asset price bubble in the housing market and securitised loans was, to a certain extent, the result of over-exuberated hope created by an overheating global economy, particularly in the US. Also, taxes and the cost of finance were low, which gave rise to optimism in the financial market. Essentially, during times of a booming economy, risk-free assets generally offer low rates of returns relative to the optimism in the financial market.

[5]Szyszka, (2010) refers to greed and fear but Shefrin & Statman, (2000) and Lopes, (1987) refer to it as hope and fear

As hinted by Szyszka, (2010), market participants began to exhibit increasing hope given this background of long-lasting economic prosperity. The feeling of hope was demonstrated by the substitution ofmoney and safe-haven assets with loans and ever increasingly risky assets to get a growing return on investment. However, there is a thin line between hope and greed. As some market participants became increasingly hopeful of maximising asset returns, they took ever-increasing risks, in essence, investing in high yielding securitised subprime loans. Furthermore, the unconscious development of greed as the market participants increased their hopes meant that some turned to massive financial leverage to increase their returns. This unconscious feeling of greed meant that often many market participants were indebtedmore than ten times their worth on the expectation ofmaximising their returnson the high-risk assets in the belief of the continuation of the booming economy and housing market bubble. Market participants exhibited increasing greed in the later stages of the securitised subprime loans price bubble due to the underlining housing market bubble's collapse in late-2005 to mid-2006. The continuation of investment in these high yielding/high-risk assets even after the collapse of the underlining assets' market is a sign of greed being the overwhelming psychological emotion in some market participants' mindset. Conversely, afundamental explanation is that greed blinds market participants on the risks of such assets.Thus, making them overconfident and unable to analyse market and risk trends, hence underestimating and underpricingrisk.

As Szyszka, (2010), suggests, fear and hope have opposite attractions on the behaviour of market participants and generally on the trends in the markets. Hence, it comes as no surprise that when the global financial crisis hit; market participants' fear levelsrose quickly. Furthermore, an ever-increasing level of fear inevitably leads to panic, which intensifies the depreciation of assets. Thus, increasing the inflow of investments in safe-haven markets such as particular sovereign debt and commodities markets, more specifically the high graded sovereign bonds and gold markets. During the global financial crises, as market participants grow ever anxious concerning the securitised subprime loans market, they became increasingly worried about the extent of the global financial sector's holding of these "*bad*" assets. Hence fear increased and spread to the global financial sector as observed by panic runs on the global banking sector terminating in the bankruptcy of Lehman Brothers, an investment bank at the heart of the securitised subprime loans, among other major global financial institutions. There are two further conceptualisations of fear that could exuberate a crisis:

- The policy effect dictates the action or inaction of policymakers has the potential of hiking fear among market participants. This issue is key to the lengthening of the crisis, the indecision or incorrect actions bythe central banks and government had a negative impact. In the aftermath

of the Lehman Brothers bankruptcy, central banks and governments across the globe were forced into action by events.

- The spillover effects dictate that if a financial institution has trouble selling a "bad" asset, it may try to sell a "*good*" asset. Hence, turning the good asset into a bad asset because the market is overflooded and therefore, the price drops.This situation occurred during the global financial crisis.

As stated previously, the roots of the euro crises had its origins in the issues at the heart of European monetary union. Put simply; EMU was an incomplete and compromisedintegrative process with many issues that were exposed by theeuro crises as hinted by Genschel & Jachtenfuchs, (2018) and Jones, Kelemen & Meunier, (2016). Nevertheless, as indicated by (Cohen, 2003), in the aftermath of the euro's introduction, many were optimistic about the new currency's prospects, some even predicting the euro will challenge the US dollar for global supremacy. Relatively few, such as Feldstein, (1997), questioned theenthusiasmtowards the new currency. Many pieces of research into the integrative nature of the EMU and the euro in the early yearsfound that the euro and EMU had a hugely beneficial impact on the integration process in the economy and financial markets as argued by Danthine, Giavazzi & Von Thadden, (2000) and Trichet, (2001) amongst others.

This optimism added to the initial rebuttal of the global financial crisis as merely temporary contagious effect from the US, as stated by Dabrowski, (2010) meant that the European response was late and uncoordinated. Furthermore, as Galati & Tsatsaronis, (2003) and Baele *et al.*, (2004) pointed out the impact of the euro and EMU wasnot uniform across the Eurozonemeaning that a two-tire Eurozone was developing, namely the core member states and the periphery member states (primarily the GIIPS[6] nations). Even before the euro criseserupted, there were signs of macroeconomics weaknesses amongst the Eurozone member states. As highlighted by Dabrowski, (2010) and Szyszka, (2013) amongst others, someperiphery member states had weak macroeconomics fundamentals before the introduction of the euro. Moreover, the global financial crisis highlighted the inadequatefinancial regulations and economic policies at the heart of the integrative process as hinted by Dabrowski, (2010), Szyszka, (2013), Jones, Kelemen & Meunier, (2016) and Genschel & Jachtenfuchs, (2018). A key point reflected in thedisoriented and confusing miscommunication by the EU and member states as hinted by Carmassi & Micossi, (2010) and Fakhry, (2019b).

Initially, the euro crises were an extension of the global financial crisis to the European scene. It was a case of how to implement an economic recovery plan sand save the European banking system; which was the case throughout the global economy. It was not until the Greek government fiscal deficit revision announcement on 5th November 2009, as stated by

[6] GIIPS or PIIGS nations are Greece, Ireland, Italy, Portugal and Spain. However many prefer to omit Ireland, therefore referencing the GIPS or PIGS.

Fakhry, (2019b) that the euro crises increasingly became Europeanised as illustrated by Metiu, (2011), Mohl & Sondermann, (2013) and Szyszka, (2013). Once again, the spotlight fell on the inadequate and disintegrated financial regulations and economic policies at the heart of the integrative process highlighted by Szyszka, (2013), Jones, Kelemen & Meunier, (2016) and Genschel & Jachtenfuchs, (2018). Moreover, the lack of a coordinated response and often confusing communication by the member states and EU continued to hint at the intergovernmental bargaining and disagreement. The vital macroeconomic issues at the heart of the euro crises, as hinted at previously in this paper, amongst others were:

- A monetary union of difference economies
- Inflexibility of monetary policies
- Lack of fiscal watchdog and rising sovereign debt

According to Szyszka, (2013), several behavioural traitsthat were, to a certain extent, implicit in prolonging and intensifying the euro crises. The first is thehuman/macroeconomic time horizon conflict. According to Kahneman & Tversky, (1979), humans tend to make decisions in short time horizons and focus on the fear of immediate losses while discounting remote outcomes. As hinted by Szyszka, (2013), this differs with the work and type of the person. Typically, investors evaluate their investment decision on a yearly basis while politicians like to think in terms of an electorate term. Moreover, consumers usually evaluate their consumption in accordance to their monthly salary. However, theories dictate that the laws of macroeconomics tend to be on a longer time horizon spectrum. Thus, there is a danger thatthe laws of macroeconomics are often overlooked by this short-sightedness by market participants and policymakers in the decision-making process.

As highlighted by Szyszka, (2013), the importance of this issue is that some of the peripheral member states (i.e. Greece, Ireland and Spain) were blinded by the previous economic upturn extrapolation errors and short-termism on all three levels: governmental, consumer and market participants. The advanced of EMU and the Euro created a false sense of stability andprolong economic growth that was extrapolated into the future, failing to see the strategic consequences of EMU and hence associatedrisks. This false sense created a level of confidence in the economy and financial markets created by the integrative process of EMU and the Euro, which led to an overspend in all three levels across some Eurozone countries. Thus, creating a bubble and an overleveraged economy based on high consumptions and limited savings.

According to Szyszka, (2013), the next behavioural trait is the underestimation/underpricingof risk. At the heart of this trait lays greed which blinded consumers, market participants and governments into pursuing avenues which led to increasingly higher consumptions, profits and popularities respectively. Other behavioural factors were influencing thistrait of which overconfidence is the critical aspect:

- above-average effect

- calibration effect
- illusion of control bias
- ungrounded optimism

Thus, resulting in the underpricing of risk. A key contributory factor to overconfidence is wishful thinking, as observed in many politicians and market participants as reasoned by (Szyszka, 2013). Other vital contributory factors are:

- the self-attribution bias which states people tend to attribute successes to one-selves while ascribing failures to external factors such as bad luck or other people mistakes
- the confirmation bias suggests people often seek to analyse their performance by selecting information consistent with their opinions while excluding information that conflicts with their views. Hence, thru this selective approach, they may have an illusion of validity as described by Einhorn & Hogarth, (1978).

As argued by Szyszka, (2013), these factors influenced the underpricing of risk by all three levels contributing to a seemingly never-ending bull market. Thus, misjudging or missing of certain warning signs that would have prevented this overconfidence. Moreover, market participants thought they could beat the market on their skills rather than the markets' general trend. Furthermore, people's tendency to overplay certainty and downplay uncertainty created an environment where theunderpricing of risk could foster. According to Kahneman & Tversky, (1979), the prospect theory dictates the decision-making process is affected by the S-shaped value and weighing functions of the utility of a total assessment. Furthermore, the weighing function is set to 0 when the probability is very low and set to 1 when the probability is high. Thus, pointing at the tendency for market participants to account for only highly likely events in their decision-making process.

The third behavioural trait during the euro crises was the euro heuristic; as derived by Szyszka, (2013), the term indicatesmarket participants willing to put all EMU member states under the same euro label. The theoretical argument is there is an overload of daily news for any human to process, hence the requirement to simplify arises, this simplification is often called a heuristic. The heuristic may be a useful procedure in dealing with the information overload; however, there is a danger that using heuristic techniques to base decision-making processes on could lead to misjudgements as argued by Tversky & Kahneman, (1974). The euro heuristic led to market participants underpricing some EMU member states' risk when the macroeconomics factors were telling a different story. As stated by Szyszka, (2013), an example is the annual spread in the10-year government yields of Germany and Greece, which was a mere 0.27 percentage points in 2007. There are two possible psychological explanations for the euro heuristic. The first explanation is the halo effect, meaning humans' tendency to form an impression in one area influenced by an opinion in another area.

Moreover, as argued by Nisbett & Wilson, (1977), humans sometimes concentrate on the most visible characteristic of a piece of information and attached significance to it in forming an opinion on a different matter discounting any other information. Another explanation could be the availability bias as derived by Tversky & Kahneman, (1974) is the tendency to rely heavily on events/information from memory. Since not all memory is available at any given time, thus leading to short-termism or salient event heavily distorting beliefs.

As stated previously, there was too much optimism surrounding the euro and EMU at the time of their launch, which carried until the early parts of the global financial crisis. Thus, providing emphasis to the halo effect and availability bias which converted into the optimism in the financial markets. Hence meaning market participants disregarded relevant macroeconomics factors which highlighted the risks and valuations of the periphery member states, primarilythe GIPS states, sovereign debt.

As stated by Szyszka, (2013), a puzzling factor in the euro crises is the European banks' somewhat belated action in reassessing the Greek sovereign debts on their balance sheet. The Greek crisis started with the announcement of the upwards amendment of the fiscal deficit in 5th November 2009; the banks did not react by amending their financial statements until late 2010-early 2011. Why did it take that long to reassess the risk on their balance sheet? In truth, bad news travels slowly, simply put it is hard to accept bad news. Theoretically, market participants tend to deploy over-optimism or wishful thinking inthe belief that positive results can still be possible. Hence, as stated by Barberis & Thaler, (2003), cognitive conservatism underweights any new information contradicting an earlier positive view. Moreover, since market participants are bynature loss avert, therefore mentally, they are discouraged from admitting failure. Furthermore, as suggested by Kahneman & Tversky, (1979), market participants may take higher risks to avoid or postpone loss.

As identified by Szyszka, (2013), the influence of external players, such as hedge funds and rating agencies, during the euro crises, cannot be underestimated. Among the strategies hedge funds use are short-selling and hedging by buying derivatives such as CDS. Simply put short selling is a strategy whereby the hedge fund bets on the price of an asset falling, hence the strategy illustrated by Figure 1. Another strategy often used by hedge funds is hedging against a country or organisation by buying a derivative, often Credit Default Swap, against the possibility of a default.

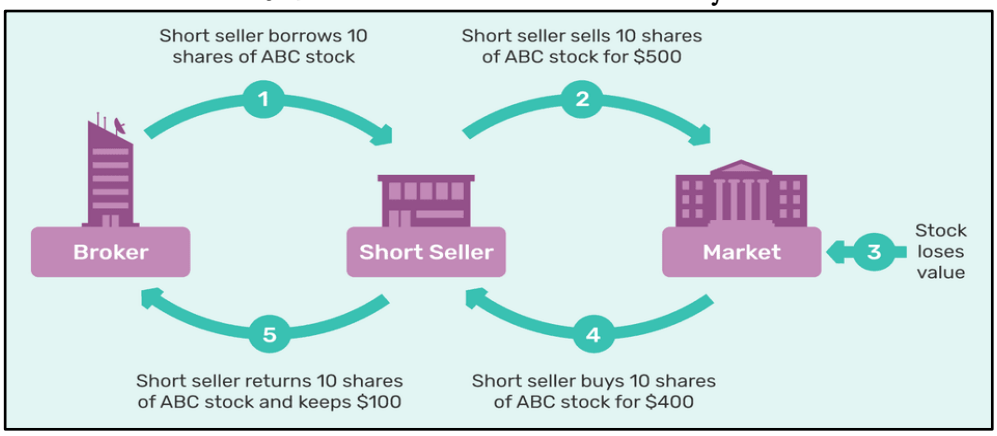


**Figure 1.** *Short-selling strategy*

EU and national politicians blamed these two strategies during the euro crises for intensifying the crisis. A key behavioural factor underpinning these hedge funds strategies is herding, essentially herding is where market participants reactto information or event in a similar way. Thehedge funds often used this strategyto bet on a fall in the euro against the dollar and Greek default during the euro crises.

As indicated by Szyszka, (2013), the second relevant players during the euro crises were the rating agencies who were partly to blame for the global financial crisis as highlighted previously. During the euro crises, it was a case of belated action followed by a quick reaction. The failure to recognise the risk disparity among the EU members gave rise to countries with weak macroeconomics factors being given the same triple-A rating as Germany, essentially Spain and Ireland. Furthermore, Greek sovereign debt ratings as investment grade even though macroeconomic factors pointed towards a downgrading were instrumental in market participants' continued investment. Additionally, the credit rating agencies only acted long after the markets classed the Greek yields as junk. Nevertheless, the rating agencies overreacted in the Portuguese and Irish sovereign debts downgrading, even though both countries have agreed to undertake IMF restructuring programs and their economies were in better health than the Greek.

On 23rd June 2016, the UK voted in the referendum to leave the European Union by 51.89% to 48.11%. The results signalled the start of the so-called Brexit process whereby negotiations over the UK's withdrawal from the EU could start. This process was initiated by the UK's government on 29th March 2017 when they invoked Article 50 of the 2007 Lisbon Treaty which sets out the guidelines and conditions of a member state withdrawal from the EU. In terms of the financial markets, Brexit was a lesson in market participants' reaction to news and miscommunication by politicians. As highlighted by Fakhry, (2019b), except for Finland, on 24th June 2016 the losses on the Eurozone stock markets were higher than 5% averaging 8.17%. In the UK, the FTSE 100 loss 5.62% of its value.

There were some behavioural traits at play during the Brexit process. As observed previously, market participants tend to extrapolate events into the future. During the referendum and Brexit processes, there was a sense that market participants were not only extrapolating vertically but also horizontally. Indeed, there was an element of vertical extrapolation analysis of the economic consequences of Brexit in the UK. This analysis was bought about because market participants did not have any comparable eventto base their perception, which led to a highly volatile and uncertain market. A possible explanation is that market participants exhibited ambiguity aversion. As pointed by Ellsberg, (1961), market participants become increasingly ambiguity averse during any situation where the information's quality or confidence levels are unknown. Another explanation is the availability bias; market participants did not have any comparable situations; this caused them to link Brexit to the recent euro crises. At the heart of the market participants' fear of Brexit lays a fundamental truth in that humans fear any social signals as hinted by Zweig, (2010). Thus, meaning any media communication affecting the financial market in any way leads to a reaction from the market participants. Since mixed news and political communications about Brexitwas plentiful, market participants' perception was negative. Another critical factor is that Brexit was an emotionally charged event which triggered a snowball effect on the financial market, causing a loss of confidence as suggested by Zweig, (2010).

The basis for horizontal extrapolation wasthe fear that the UK would signal others to follow suit and exit the EU and particularly the Eurozone. This situation would have had a ripple effecton the integration process, as highlighted previously and led to uncertainty in the integrated financial market of the EU. Particularly the Eurozone, as many member nations were growing disincentivised with the whole EU integrative process (e.g. Italy, France and Holland). The prolonged and complicated process of Brexit is partly down to the fact that the EU does not want to give too many concessions to the UK, in the process illustrating that a life outside the EU could be worth considering.

## 3. Methodology

The crises have highlighted the importance of a stable financial market underpinning the EU integration process. Several pieces of research had been conducted over the past few years emphasising this issue Groba, Lafuente & Serrano, (2013), MacDonald, Sogiakas & Tsopanakis, (2018), Trabelsi & Hmida, (2018) and Fakhry, (2019b) to name but a few. In analysing the efficiency of a number of the most affected Eurozone financial markets during the recent crises, Fakhry & Richter, (2016) and Fakhry, Masood & Bellalah, (2017) found that in general, the financial markets were unstable. As hinted by Fakhry, (2019b), there is a strong linkage between financial markets integration and stability. Indeed, the

thinking behind the Stability and Growth Pact and mandate of the ECB were partly to keep market stability.

Theoretically, if a market is unstable, it is regarded as reactive, as indicated by behavioural finance. Moreover, as put by Bernard Baruch Lee, Jiang & Indro, (2002:2277):

> "What is important in market fluctuations are not the events themselves but the human reactions to those events."

As hinted by Barberis, (2013), Szyszka, (2010), Szyszka, (2013) and Masood *et al.*, (2017) among many, the reaction of market participants tend to deviate between overreaction and underreaction. Indeed, during the crises, there was a hint of both reactive trends in the Eurozone financial markets as alluded previously.

A critical factor in our research is the shifts in volatility regimes, this phenomenon has been the subject of many pieces of research, mainly in the FX markets, over the years: Haas, Mittnik & Paolella, (2004), Kanas, (2005), Brunetti *et al.*, (2008), Chakrabart & Sen, (2011), Beg & Anwar, (2012) and Chortareas, & Jiang, (2017). The EMU effect on regime shifting has only been the subject of a relatively few number of researches: Frommel, (2004), Frommel, (2006), Wilfling, (2001) and Wilfling, (2009) to name a few. We use a Markov Switching GARCH model to analyse the shift in reactive behaviour in the Euro FX markets since as suggested by Fakhry, (2018), it is possible to model the shift between overreaction and underreaction regimes by using the Markov Switching GARCH model.

### 3.1. The market stability hypothesis model specification

As alluded by Fakhry, (2018), the simple statement underpinning our hypothesis is that any financial market's stability depends on the market participants' reaction during any period. This point crucially underpins every factor in the global financial markets and decisions by monetary policymakers. Moreover, here is the critical factor during any period there is a mixture of highly volatile sub-periods hinting at overreaction and highly stable sub-periods hinting at underreaction. However, for any observed period, the market should stabilize if the reactions balanced out. Essentially, this means that the overreaction and underreaction cancel out; hence the sub-periods of high and low volatility deviates towards zero. This ideology is the essence of our hypothesis; the model suggests that the markets stabilize as the reaction approaches zero.

$$RS_T = SS_{O,T} - SS_{U,T} \to 0$$

Condition 1: $RS_T \gg 0$, an overreaction

Condition 2: $RS_T \ll 0$, an underreaction (1)

However, if the null hypothesis is correct, the market participants react to the news or event in ways that do not agree with our market stability hypothesis. Primarily the market participants exhibit either overreaction or underreaction towards the news or event; this is where our model differs

from any previous model. Since, Equation 1 states that reaction at time T, $RS_T$, is the difference between the overreaction at T, $SS_{O,T}$, and the underreaction, $SS_{U,T}$, during any observed period. Hence, in a null hypothesis, Condition 1 and Condition 2 should illustrate market participants' overall reaction status during the observed period.

$$SS_{\{O,T \atop U,T} = \frac{\left(\sum coeffiocients_{\{H \atop L}\right)-1}{SD\left(var\left(Price\right)\right)} \leq FStat \tag{2}$$

Primarily, our model's simple top-level equation is the variance bound test introduced by Fakhry & Richter, (2015). We derived both our independent variables $SS_{O,T}$ and $SS_{U,T}$ from the variance bound test in Equation 1 and Equation 2 is a hypothesis suggesting the null hypothesis of each stable status, where $SS_{O,T} > FStat$ and $SS_{U,T} > FStat$, essentially means the market is volatile and hence inefficient. However, at the heart of the equation is the summation $\left(\sum coeffiocients_{\{H \atop L}\right)$ whereby the coefficients the high or low volatility are summed. As with Fakhry & Richter, (2015), we follow the first pre-requisite step advocated by Shiller, (1981).

$$lim_{t \to T}\, var(Price) = \frac{\sum_{q=1}^{Q}\left(Price_q - \mu\right)^2}{Q} \tag{3}$$

However, since we are only concerned with the market's stability and reaction to news and events; we do not follow the second step as described by Fakhry & Richter, (2015) and advocated by Shiller, (1981). This change was partly due to the estimation of the model underpinning the coefficients, but mainly because we deemed it unnecessary Fakhry, (2019b).

$$y_t = \mu_{S_t} + b\left(y_{t-1} - \mu_{S_{t-1}}\right) + \varepsilon_t \text{ where } S_t = \begin{cases} 0 \text{ is one regime} \\ 1 \text{ is another regime} \end{cases} \tag{4}$$

$$P(S_t = s_t | S_{t-1} = s_{t-1}) = \begin{bmatrix} p00 & p10 \\ p01 & p11 \end{bmatrix} \tag{5}$$

The model underpinning our coefficients is any variant of the Markov switching GARCH model. In essence, the Markov switching GARCH model is an extension of the Markov switching model introduced by Hamilton, (1989) and Hamilton, (1990). As illustrated by Hamilton, (1989), severalresearchers have pointed to a weakness in analysing economic data and business cycles in a stationary linear data set. This issue pointed to a changing environment in the underlining economic trend which a non-stationary regime-switching model using a discrete-state Markov process could pick up. As stated in Equation 4, the model specifies that the dependent variable $y_t$ is regime dependence on the mean with probabilities of Equation 5 of a transition between regime 1 and 2.

$$h_t = \omega + \alpha_p \varepsilon_{t-1}^2 \quad (6)$$

$$h_t = \omega + \alpha_p \varepsilon_{t-1}^2 + \xi d_{t-1} \varepsilon_{t-1}^2 \text{ where } d_{t-1} = \begin{cases} 0, \varepsilon_{t-1}^2 > 0 \\ 1, \varepsilon_{t-1}^2 \leq 0 \end{cases} \quad (7)$$

$$h_t = \omega_{S_t} + \alpha_p \varepsilon_{t-1}^2 \quad (8)$$

However, as stated by Hamilton & Susmel, (1994) and Cai, (1994) amongst others, financial markets often interchanged between periods of low and high volatility. Furthermore, as argued by Hamilton & Susmel, (1994), the importance of this is two folds, on the one hand, the risk determines the price of any financial asset or index; on the other hand, the conditional mean of econometric models depend on the correct conditional variance. Conversely, due to issues regarding path dependence in Markov Switching GARCH arising from the literal translation of Bollerslev, (1986) GARCH model. Thus meaning the models of Hamilton & Susmel, (1994) and Cai, (1994) were base on the ARCH model of volatility of Engle, (1982) given by Equation 6. In essence, both Hamilton & Susmel, (1994) and Cai, (1994) were variant of the SWARCH model illustrated by Equation 7 and Equation 8, respectively.

$$h_t = \omega + \alpha k_{t-1} + \beta h_{t-1} \text{ where } k = \varepsilon^2 \text{ and } h = \sigma^2 \quad (9)$$

$$h_t = \omega_{S_t} + \alpha_{S_t} k_{t-1} + \beta_{S_t} h_{t-1}$$

$$h_t = \omega_{S_t} + \alpha_{S_t} k_{t-1} + \beta_{S_t} \overline{h}_{t-1} : \overline{h}_{t-1} = \hat{\xi}_{t-1|t-2} h_{t-1} \quad (10)$$

$$\text{where } h_t = \left(\omega_0 + \alpha_0 k_{t-1} + \beta_0 \overline{h}_{t-1}, \dots, \omega_{S-1} + \alpha_{S-1} k_{t-1} + \beta_{S-1} \overline{h}_{t-1}\right) \quad (11)$$

As noted by Haas, Mittnik & Paolella, (2004), GARCH models provide a better description of volatility than ARCH models. Further, ARCH models contain only part of the information on volatility, the impact of news or new information on the volatility captured by $\alpha$. In reality, the persistence of volatility is the other vital information captured by β in the GARCH model illustrated by Equation 9. Conversely, a direct substitution would seem to be the answer; however consider Equation 10, $h_t$ would depend on the entire regime history, which would render direct estimation virtually impossible. A possible method of implementing an MS-GARCH model was introduced by Gray, (1996) as illustrated by Equation 11. Klaassen, (2002) argued it would be more convenient to use $\overline{h}_{t-1} = \hat{\xi}_{t-1|t-1} h_{t-1}$ instead of $\overline{h}_{t-1} = \hat{\xi}_{t-1|t-2} h_{t-1}$as used in Gray, (1996).

$$y_t = \mu_{S_t} + \varepsilon_t$$

$$\varepsilon_t = h_{t,S_t}^{\frac{1}{2}} \epsilon_t, \epsilon_t \sim N(0,1)$$

$$h_{t,S_t} = \omega_{S_t} + \alpha_{S_t} k_{t-1} + \beta_{S_t} h_{t-1,S_t} \quad (12)$$

$$\text{where } k = \varepsilon_t^2 \text{ and } S_t = 1, \dots, S-1$$

We use a much more efficient and powerful MS-GARCH model derived by Haas, Mittnik & Paolella, (2004) as illustrated in Equation 12.

Conversely, this means that each GARCH regime can be recursively updated; moreover, the GARCH regime only depends on the previous period's volatility and residual information. Additionally, the GARCH structure may be evaluated before the Markov-Switching filter.

## 4. Data description

This paper analyses the Euro FX market's stability and reactionfrom its introduction on 1st January 1999 to 31st December 2019. We obtain the dataset from the Bank for International Settlements (aka BIS) using the Nominal Broad Effective Exchange Rate (aka NBEER) index. The NBEER is an index of weighted averaged bilateral exchange rates from 27 economies. We observed the market on a 5-day week basis and filled any missing data with the previously known data, therefore using a total observation of 5,478 daily data.

## 5. Empirical evidence

The keys to the stability statistics and hencethe reaction of the markets in our test lay in the MS-GARCH model's coefficients and standard deviation of the observed datasets As suggested earlier; we use the Haas, Mittnik & Paolella, (2004) variant of the MS-GARCH model. In estimating the model, we used OxMetrics 8.0 with the standard defaults' options. The system was a Windows 10 on a ten core CPU with 32Gbytes of RAM computer.

We observed three critical periods in the European integration process: theEuro's introduction, the crises period, which started with the global financial crises and ended with the Eurozone sovereign debt crises, and finally Brexit. All three are critical periods on the road of European integration for different reasons. The introduction of the Euro, although a compromised concept with some glaring omissionfactors; yet the euphoria and optimism surrounding the introduction led to a strong belief in the integration process. The crises started with a denial that the global financial crises would impact the financial system in the EU and continued with a near-collapse of the Eurozone with the sovereign debt crises. However, it ended with possible further integration of the Eurozone. In a way, the real impact of Brexit is still on-going, but Brexit illustrated the potential for a partial disintegration of the EU led by forces of populist and nationalist uprising. The outcome was eagerly watched by other potential member states and political parties wishing to break out of the EU integration process; like Italy, the Netherland and France.

### 5.1. The introduction and aftermath of the Euro

As illustrated by Cohen, (2003), the euro was born to a much euphoria environment. Indeed many in the market and academic predicted the euro would challenge the US dollar for global FX supremacy; relatively few questioned the enthusiasm towards the euro such as Feldstein, (1997). Conversely, Papaioannou, Portes & Siourounis, (2006) found that the euro's

influence as the reference international reserve currency in the central banking environment was growing and accordingly "*punching above its weight*". However, as highlighted earlier, the EMU was a compromised integrative policy with glaring omissions.

Moreover, as hinted by Trichet, (2001) and Galati & Tsatsaronis, (2003), there were still some issues regarding the EMU that meant the full potential for financial market integration mightremain unrealised. Nevertheless, this did not prevent the Eurozone from enjoying a prolonged period of economic and financial upturn. Furthermore, the financial markets, such as the equity and to a lesser extent bond markets, were being integrated. According to Trichet, (2001), generally, the Eurozone financial markets grew in the aftermath of the introduction of the euro.

As illustrated previously and by Szyszka, (2013), this general upturn in the Eurozone economies gave rise to a blinded greed in some member states on all three macroeconomic levels: governments, market participants and consumers. Thus, highlighting extrapolating errors and short-termism behavioural traits, It seems that the advanced of the EMU and Euro created a false sense of stability and economic growth that all three levels of macroeconomics extrapolated further into the future. This falsified sense inevitably led to the underpricing of risk and overconfident, thus missing or misjudging certain warning signs.

As described in Table 2, the estimated model has a significant news coefficient, $\alpha$, for both high and low volatility regimes signifying the impact of news or information during this period. However, the high volatility regime's coefficient is substantially high, indicating that news or information had a massive effect on the high volatility regime. Not surprisingly then that the persistent coefficient, $\beta$, is insignificant on both regimes. Indeed, the statistics is hinting at a zero-volatility persistent on the high volatility regime. The probability statistics, P{0,0} and P{1,1}, of the regime not changing are significant. Moreover, the low volatility regime's probability is high, which seems to point at the high likelihood of a low volatility regime.

**Table 2.** *Statistics for Stability Test using MS-GARCH of (Haas, Mittnik and Paolella, 2004)*

| Event | Euro | Crises | Brexit |
|---|---|---|---|
| **Observed Period** | 01/01/1999 - 07/06/2007 | 08/07/2007 - 23/06/2016 | 24/06/2020 - 31/12/2019 |
| | | **Mean Statistics** | |
| **a** | 0.598865 (1.626E-2) | 0.595143 (1.558E-2) | 0.600688 (2.660E-2) |
| **$b_{(r=0)}$** | 0.100822 (7.213E-3) | 0.150256 (1.338E-2) | 0.0648588 (9.682E-3) |
| **$b_{(r=1)}$** | 0.0135454 (1.009E-3) | 0.0145214 (1.006E-3) | 0.00838425 (8.867E-4) |
| | | **MS-GARCH Statistics** | |
| **$ς_{(r=0)}$** | 0.0907291 (1.329E-2) | 0.078508 (1.192E-2) | 0.0474232 (1.883E-2) |
| **$ς_{(r=1)}$** | 0.0114705 (8.616E-4) | 0.0149895 (8.684E-4) | 0.00676886 (7.929E-4) |
| **$α_{(r=0)}$** | 0.777673 (1.380E-1) | 0.160935 (7.228E-2) | 0.0489391 (2.004E-1) |
| **$α_{(r=1)}$** | 0.183682 (2.713E-2) | 0.452751 (4.365E-2) | 0.211467 (5.997E-2) |
| **$β_{(r=0)}$** | 0 (1.816E-1) | 0.640363 (8.376E-2) | 0.214238 (5.200E-1) |
| **$β_{(r=1)}$** | 0.413854 (3.793E-2) | 0.248812 (2.801E-2) | 0.42438 (6.100E-2) |
| **P{0\|0}** | 0.656355 (3.417E-2) | 0.578598 (4.423E-2) | 0.533096 (8.809E-2) |
| **P{1\|1}** | 0.851016 (1.305E-2) | 0.897037 (1.011E-2) | 0.870392 (2.325E-2) |
| | | **Description Statistics** | |
| **log-likelihood** | 3.218E+03 | 3.244E+03 | 2.026E+03 |
| **AIC** | -2.915E+00 | -2.739E+00 | -4.385E+00 |
| **Linearity** | 2.183E+03 | 4.318E+03 | 7.953E+02 |
| **Normality** | 4.775E+02 | 6.615E+02 | 2.068E+01 |
| **ARCH** | 7.595E-01 | 3.943E-02 | 1.036E+00 |
| **Autocorrelation** | 2.443E+02 | 2.669E+02 | 8.091E+01 |
| **Mean** | 0.123247 | 0.14575 | 0.0557982 |
| **Std Dev** | 0.145216 | 0.269079 | 0.0618362 |
| | | **Stability Statistics** | |
| **S-$stat_{(r-0)}$** | 3.6136314 | 1.7036038 | -2.5277055 |
| **S-$stat_{(r-1)}$** | 3.167849961 | 2.28033217 | 8.296238449 |
| **$Stabilty_{(r-0)}$** | Volatle | Stable | Volatle |
| **$Stabilty_{(r=1)}$** | Volatile | Volatile | Volatile |
| **R-stat** | 0.4457815 | -0.5767284 | -5.7685330 |
| **Reaction** | Overreaction | Underreactioon | Underreactioon |

Both stable statistics point to a highly volatile Euro FX market during this period as illustrated by the S-stats. Nevertheless, the evidence from the R-stat is that the market is only slightly overreactive. Thus, pointing to the reaction to information or news generally being within the bounds of rationality in the Euro FX market during this period.

5.2. The global financial and Eurozone crises

In essence, as illustrated earlier and by Schimmelfennig, (2017), Genschel & Jachtenfuchs, (2018) and Hooghe & Marks, (2019); both crises had their roots in the incomplete and compromised integration process of the EMU and Euro. As hinted by Jones, Kelemen & Meunier, (2016), the lack of a genuinely integrative Eurozone broad regulation for an increasing European banking system and financial market played a significant part in the global financial crisis in the Eurozone. Moreover, as pointed by Jones, Kelemen & Meunier, (2016), another issue was the lack of an integrated fiscal and macroeconomic adjustment policies to deal with a Eurozone macroeconomic recession and crisis. Further, as highlighted by Genschel & Jachtenfuchs, (2018), the lack of tools and restricted mandate for the ECB to act in the crises. These issues meant added to the fact that many in the European Union were in denial about the global financial crisis and thought that it was an American problem meant the actions of the EU were often too late and in the words of Moravcsik & Schimmelfennig, (2012) characterised by the "chicken game".

As illustrated previously and by Szyszka, (2013), there are several behavioural traits in explaining the crises. The first is the human/macroeconomic time-horizon conflict Kahneman & Tversky, (1979). Humans act on short time-horizons focusing on the immediate fear of losses; while macroeconomics works on longer time horizons. The second is the underpricing/underestimation of risk, which hints at greed by governments and market participants. The third trait is the Euro heuristics as explained earlier and derived by Szyszka, (2013), this is the tendency to group all EMU member states under the same label. A key factor influencing the euro crises was the rather belated actions of market participants, particularly the European banks, in reassessing their portfolios and balance sheets. The explanation is that it is hard to accept bad news, and hence bad news travels slowly. As Kahneman & Tversky, (1979) argue that market participants tend to avoid or postpone losses.

Table 2 is hinting at a significant news coefficient on both regimes during the crises period. Conversely, the low volatility regime's news coefficient was the higher of the two regimes during the crises hinting at approximately three times the impact. Although both persistent coefficients are insignificant, yet the high volatility regime is persistent, it is the highest of the three sub-periods. The probability statistics illustrate the regimes' differences with the low volatility regime being more significant than the high volatility regime.

There is a difference in the Euro FX market's stability status with the high volatility regime hinting a stable market while the low volatility regime isindicatinga volatile market. Moreover, the crises period highlighted a slight underreaction as implied by the R-stat, meaning that the reaction to news or information during the crises was within the bounds of rationality. Remember that the Euro did not suffer any

significant impact or runs on it during the crises, unlike the other markets within the Eurozone.

### 5.3. The Brexit impact

As stated by Schimmelfennig, (2018a) and Schimmelfennig, (2018b), the issues at the heart of Brexit were politicisation and bargaining. The politicisation of Brexit helped shift the emphasis froma few interest groups to the mass population where political identity plays a more significant role. Given the increasing eurosceptic population due to the loss of national identity and depth of integration, politicisation was an influencing factor. As illustrated by Schimmelfennig, (2018b), the critical factor in the intergovernmental bargaining with the two sides' initial position. The EU wanted to protect the integrity of the EU and euro while discouraging any further disintegration. The UK wanted to leave the EU while protecting their services and goods trades with the EU. Eventually, the UK and EU agreed to a withdrawal agreement on 22nd October 2019 approximately 40 months after the UK voted to withdraw from the EU. The EU and UK still have to agree on the nature of a trade relationship which as things stand, if a deal is not reached by 31st December 2020 then the UK could still leave in 2021 without a trade deal. Remember as highlighted by Fakhry, (2019a), the economic impact of Brexit is likely to be more significant on the UK than the EU and Eurozone. However, just how much of an impact is open to debate and depends on the economic deal, if any, within 2021.

The critical factor to remember during Brexit is the impact of information or lack thereof; two behavioural traits can influence this. The first is, as pointed by Ellsberg, (1961), the ambiguity bias which states that market participants tend to exhibit increasing ambiguity aversion when the quality or confidence levels of the information is unknown. The second is the availability bias which dictates that market participants tend to react differently to the lack of information or comparable event. The lack of information about Brexit may have triggered an association with the euro crises, as explained previously. Furthermore, as hinted by Zweig, (2010), humans fear any social signal; thus meaning market participants perception of any political communication or news regarding Brexit or the process was negative. There is another factor as suggested by Zweig, (2010), since Brexit was emotionally charged on all sides, thus triggering a snowball effect into the financial market. The final factor is horizontal extrapolation by market participants based on the fear that the UK could signal other countries to exit the EU and particularly the Eurozone with noises from Italy, France and Holland. Therefore, causing a domino effect ending with the euro being abandoned.

Table 2 seems to be hinting at a split in the impact of news or information during the Brexit period. The high volatility regime is hinting at a near-zero impact on the Euro FX market, while the low volatility regime points at a significant impact. Thus, mainly due to the impact of news and information from Brexit falling mostly on the UK Sterling FX

market. Both persistent volatility coefficients are insignificant, even though the low volatility regime is nearly double the high volatility regime's persistence. The probabilities are slightly lower than the crises period range, hinting at the low volatility regime being more highly likely.

The stability stats of both regimes are indicating a highly volatile market during the Brexit negotiation period. However, the low volatility regime seems to be more highly volatile. Moreover, the R-stats seem to be indicating a significant high underreaction in the Euro FX market. The crucial clue is the euro, remember as stated previously, the significant impact of Brexit fell on the UK Sterling FX market.

## 6. Conclusion

In summarising, this research combines the three European integration theories with behavioural finance to give a full picture of the Eurozone crises and Brexit. In order to understand the whole picture influencing any event and not just the EUcrises, it is necessary to include the action of both the governing organisation, in this case, the EU, and the market participants. Only when taking account of this factor, a full grasp of the feedback effect between the actions or inaction of both the EU and market participants can be appreciated. The issues were two folds:

- the EU was too reactive and sensitive to the markets, and thus their actions did not resolve the problems at the heart of the crises
- the techniques used by market participants bore the wholemark of the opposite scale behaviours: greed and fear

Further, market participants extrapolated information vertically thru time horizons and horizontally thru markets orEU member states which led to false information resulting in bad investments decisions. At the heart of the issues with both the EU and market participants was the euro heuristic which, as identified by Szyszka, (2013), is the willingness by market participants to put all Eurozone members states in the same boat marked euro. Likewise, the euro heuristic influenced the EU actions, where a misconception grew with the euro regarding the stability and strength of the Eurozone economy. This factor led to the EU underreacting on the global financial and Eurozone sovereign debt crises

We also introduced a newmodel of testing any market's stability using the variance bound test of Fakhry & Richter, (2015) underpinned by a Markov Switching GARCH. We used the MS-GARCH model of Haas, Mittnik & Paolella, (2004); however, any MS-GARCH model would work with our new market stability test. The test modelled the critical behavioural factors influencing the reaction of market participants: underreactions and overreactions. The results seem to point to a slight overreaction in the Euro FX market to the introduction of the euro. However, during the crises period and, particularly the Brexit period, the result suggests an underreaction.

Furthermore, whereas with the crises period, there was a slight underreaction, the Brexit period seem to hint at a significant underreaction.

Given the impression of the euro within these different observational periods, the results seem to be a full reflection of the times. However, further research is required on other markets to test whether our model does truly convey market participants' reaction during uncertain events such as the recent crises or Brexit. A possible second route for further research is the MS-EGARCH model derived by Henry, (2009) to analyse the asymmetrical effect on the stability and reaction.

In concluding, it is hard to overestimate the feedback effect in the reactions of the market participant and EU during the recent crises and to a lesser extent Brexit. The lack of a uniformed plan and miscommunication from the EU during the crises or the British government during Brexit gave rise to unstable markets. Since market participants are homo sapiens and not homo economicus or Econ, hence as elegantly put by Bernard Baruch and Bertrand Russell:

> *"What is important in market fluctuations are not the events themselves but the humans' reactions to those events."*
>
> *"Neither man nor a crowd nor a nation can be trusted to act humanly or think slowly under the influence of fear."*

The second quote can be extended to explain the EU's reactions during the crises and, to a certain extent, Brexit.

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