# Trade Pattern Between CFA Franc Zone and Euro Countries Before and After the European Monetary Union


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# Abstract

The CFA Franc Zone in Northern Africa is a currency union where the currency has been pegged to the French Franc since 1945. After the formation of the European Monetary Union in 1999, the peg is now against the larger currency Euro and no longer against one single currency, the French Franc. *Has the new peg to the Euro had a positive effect on the CFA countries' trade flow with the Eurozone compared to before EMU, when the peg was against the French Franc?* The purpose of the thesis is to study how the trade pattern between the CFA Zone and the Eurozone has developed since the peg to the French Franc was changed to a peg to the Euro. I use the gravity model of trade for my estimates with a dummy for identifying the effect of the changed peg. My findings do not support my hypothesis. The stronger Euro peg has in fact lead to a decrease in the Sub-Saharan trade with the Eurozone, however, it has had a positive effect on trade between CFA countries and France. Evidence of increased trade flow between France and the Eurozone after the implementation of the Euro leads me to the assumption that France still relies on its strong post-colonial relationship with the CFA countries and acts as a middleman between the African countries and the Eurozone.

**Keywords**: Trade, CFA Franc Zone, EMU, Euro, Gravity Model, Currency Peg

# Résumé

La zone du franc CFA en Afrique subsaharienne est une union monétaire où la monnaie était rattachée au franc français depuis 1945. Après la formation de l'Union Monétaire Européenne en 1999, l'ancrage est désormais à l'euro, une plus grande devise, et non plus uniquement au franc français. Le nouveau rattachement à l'euro, a-t-il eu un effet positif sur les flux commerciaux de pays de la zone CFA avec la zone euro, comparé à avant l'UEM, lorsque l'ancrage était au franc français ? L'objectif de cette thèse est d'étudier comment la structure des échanges commerciaux entre la zone CFA et la zone euro a évolué depuis que l'ancrage au franc français a été modifié pour un ancrage à l'euro. J'utilise l'équation de gravité du commerce pour mes estimations, avec une variable factice pour identifier l'effet du changement d'ancrage. Mes résultats ne soutiennent pas mon hypothèse. Le renforcement de l'ancrage à l'euro a en fait entraîné une diminution des échanges commerciaux subsahariens avec la zone euro, mais il y a eu un effet positif sur les échanges entre les pays de la zone CFA et la France. Des preuves d'une augmentation des flux commerciaux entre la France et la zone euro après la mise en œuvre de l'euro, m'amènent à supposer que la France s'appuie toujours sur ses fortes relations post-coloniales avec les pays CFA et agit comme intermédiaire entre les pays africains et la zone euro.

**Mots clés**: Commerce, Franc CFA, UEM, Euro, Équation de gravité, Ancrage de devises

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# List of Abbreviations

BCEAO - Central Bank of West African States

BEAC - Bank of Central African States

CEMAC - Central African Economic and Monetary Union

CFA - Communauté Financière Africaine

ECO - A new proposed currency in west and central Africa

ECOWAS - Economic Community of West African States

EMU - European Monetary Union

EZ – Eurozone

FRF – French Franc

IMF - International Monetary Fund

WAEMU - West African Economic and Monetary Union

OCA - Optimum Currency Area

OLS – Ordinary Least Squares

PPML – Poisson Pseudo-Maximum Likelihood

UEM – Union Économique et Monétaire

# 1. Introduction

Fourteen countries in West and Central Africa with former colonial relationship to France have a common currency – the CFA Franc. The CFA Franc was created after the Second World War with a peg to the French Franc. France had extensive trade with its colonies and an important trade flow was France's import of raw material such as mineral, oil, gas and precious metals from the Sub-Saharan countries. The fixed exchange rate to the French Franc was intended to prevent French colonies from suffering from the weakening French currency and it gave France continued economic control over its colonies (African Business, 2012).

After the end of the colonial time, the strong ties between France and the former colonies have endured. The CFA Countries remain a large trading partner, and raw material and fuel as well as food products are still important trading goods. In 1999 the European Monetary Union was formed, and 11 countries adopted the Euro from start. Important drivers of the creation of the Euro were that the elimination of uncertainty of the exchange rate and the reduction of transaction costs stemming from having a common currency, would encourage bilateral trade (European Union, 2018).

Since the creation of the Euro in 1999, the CFA Franc has been pegged to the larger currency, Euro instead of to the French Franc. It would be interesting to see how strong this peg is in increasing certainty and reducing exchange rate transaction costs. Increased trade between the Eurozone and the Sub-Saharan countries would imply a strong peg between the CFA Franc and the Euro due to increased certainty of the expected currency risk. Also, the Eurozone is a much larger market than France, so should the new peg benefit trade, the trade potential would be significant.

The research question is therefore:

*Has the introduction of EMU and hence the new peg of the CFA Franc to the Euro spread trade to other Eurozone countries than France, implying reduced currency risk and uncertainty between the CFA countries and the Eurozone?*

If that is the case, it would support the theory that a peg to a currency union has a positive effect on trade by reducing uncertainty and transaction costs.

There is empirical evidence of positive trade effects on both a currency union (Rose, 2000); (Bangake and Eggoh, 2009) and on fixed exchange rate through a currency peg (Klein & Shambaugh, 2006). However, research is ambiguous and a recent study by Campbell and Chentsov show no evidence of the benefit of the Euro to bilateral trade within the European Union (Campbell & Chentsov, 2023). Martínez-Zarzoso conducted a study in 2019 to investigate if the implementation of the Euro had had effect on sectorial trade between the CFA countries and the Eurozone. She did not find significantly increased trade through a peg to the Euro on an aggregate level, but some increase in certain sectors (Martínez-Zarzoso, 2019).
It is interesting to revisit the research area of Martínez-Zarzoso, only including the CFA countries and the first eleven EMU countries and compare the effect on trade of the peg to the Euro and the impact of the currency union on the bilateral trade within the Union.

The model used for the study is an augmented version of the Gravity model, including variables relevant to this study. Apart from the variable in the basic model, GDP for the two countries and the distance between them, dummy variables for common language, colonial history, landlockedness and a variable for population size are introduced. A dummy variable to capture the effect of the change of peg from the French Franc to the Euro is also added. The dummy takes the value 1 when at least one currency is pegged to the Euro and zero otherwise. For the regression test, both OLS and PPML regressions are run. The PPML is a better fit to the data in cases where heteroscedasticity is present (Santos Silva and Tereyro, 2006). Several regressions are run to be able to better interpret the results and find relevant explanations to changes in trade pattern. One regression on CFA Zone against the Eurozone, one on CFA Zone against France and then France against the rest of the Eurozone. A separate regression on the CFA Zone against each individual country of the Eurozone is also performed.

The main results of the study are that the new peg to the Euro instead of the French Franc does not directly benefit trade between the Sub-Saharan countries and the Eurozone. On an aggregate level, I even find evidence of a decrease in trade. However, trade with France has

increased and so has trade between France and the Eurozone. A possible explanation is that the historical ties between France and the former colonies are still so strong, so France will act as a trade channel between the CFA Franc countries and the rest of Europe. The results show that intra-Eurozone trade has significantly increased overall, implying that a currency union is stronger than a currency peg to the same union and is therefore more likely to increase trade in the region.

The paper begins with a background description of the monetary integration in the Western Africa and the post-colonial relationship to France and the French Franc. It is described how the monetary integration after the creation of the Euro is transferred from France the EMU. Thereafter, other similar studies are presented, where the authors have estimated the effect on trade of a currency union or of a currency peg. Then follows a description of the theory of reduced uncertainty and transaction costs in relation to currency risk and how that can affect trade, followed by the hypothesis of the study. After that there is a section where the empirical method is defined, describing the Gravity model and how it is adjusted for the purpose of this study. In the following chapter the results are presented together with possible implications, and finally the findings are summarized in a conclusion chapter.

# 2. Monetary Integration in West and Central Africa

## 2.1 The history of economic integration in Western and Central Africa

The CFA Franc is a common name for two West African currencies, namely the West African CFA and the Central African CFA. CFA stands for "Communauté Financière Africaine" (African Financial Community). It was formed in 1945 to prevent French colonies from suffering from the weakening French Franc and it gave France continued economic control over its colonies (African Business, 2012).

Some countries such as Tunisia, Algeria, Guinea, Morocco, left the Franc Zone after becoming independent, but 14 countries do still use the CFA Franc. Eight countries belong to the West African CFA forming the West African Economic and Monetary Union (WAEMU) including the countries Benin, Burkina Faso, Guinea-Bissau, Ivory Coast, Mali, Niger, Senegal and Togo and six countries belong to the Central African CFA forming the Central African Economic and Monetary Union (CEMAC) including the countries Cameroon, Central African Republic, Chad, Equatorial Guinea, Gabon and Republic of Congo. Two of the countries (Equatorial Guinea and Guinea-Bissau) have not been French colonies, but since the countries are small, and have the CFA Zone countries as their main trading parties, they also use the CFA Franc. Equatorial Guinea has been a Spanish colony and Guinea-Bissau a Portuguese colony.

There were four main conditions put in place for the CFA Franc between France and the CFA members (French Embassy in Chad, 2023).

- The CFA Franc was fixed to the French Franc at a rate of 1 FRF to 50 FCFA.
- The French Central Bank guaranteed full and unlimited convertibility of the FCFA.
- In exchange for the guarantee of full convertibility of the currency, the CFA Zone central banks had to deposit 50% of their assets with the French Treasury. The current account was remunerated, and the interest rate was paid back yearly to the African central banks.
- Free movement of current and capital transactions within each region.

The African countries reserves were, and still are, centralized with two central banks, one for the West African Zone, the Central Bank of West African States (BCEAO), and one for the Central African Zone, the Bank of Central African States (BEAC). In addition to the main four conditions, the African Central Banks first had to encourage the indebted countries of the zone to negotiate payment terms to their creditors before asking to benefit from the coverage of the French monetary umbrella. The French Central Bank was involved in the daily operations and government of the central banks such as drafting their annual reports, representation on the Central Banks' boards and interaction with the finance ministers and governors of the CFA Franc Zone countries (Banque de France, 2015).

The CFA Franc has between 1960 and 1994 been worth 0,02 French Francs. Before that, there were periods when the CFA Franc did not follow all devaluations of the French Franc. In 1994, the CFA Franc was devalued by 50% against the French Franc as an action to help the West and Central African countries to increase competitiveness. After the 1994 devaluation, convergence criteria were enforced on the West and Central African regions, encouraging the countries to keep low inflation, low public debt, and restrictive budget deficit.

Also, ahead of the devaluation, IMF played a role in outlining other policy steps that would help the African countries with their economic recovery, such as how to implement tariffs and tax reform, where to allocate public expenditure and granting IMF loans to relief the economic burden for the poorest countries (IMF, 2024).

Throughout the years, there has been criticism against what the purpose for France was to create the CFA Zone and whether pegging the local African currency to the French Franc – and later to the Euro - would really benefit the West and Central African countries. The critical voices mean that the peg to the strong French Franc made the countries lose competitiveness towards other countries in Africa making export to them more costly and that the currency union with France was a way of keeping the colonialism, by securing export to France of important goods (Forex Africa, 2014).

Even among leaders in the African regions, opinions about the benefit to the region from the CFA Franc diverge. In 2015, Chad's president Idriss Debby said that the CFA was preventing development in African countries, whereas Ivory Coast President Alassane Ouattara meant the CFA Franc, on the contrary, would secure economic stability in the region and benefit the

countries development compared to other African countries in the region by facilitating trade with Europe (Signé, 2019).

The colonial history has not only resulted in the monetary relationship between France and the West and Central African countries, but it has also led to non-monetary integrations. France has since long had a large company representation of many of its flag-ship companies in the Sub-Saharan African countries. The multi-energy company TotalEneriges for example has been operating a network of service stations in Burkina Faso since 1954 and in Mali since 1976 (Cessac, 2023).

Another area of French influence is the military. France has had a military presence in the African region since the end of the colonial time and are still present today with permanent bases and are active in external operations (Sundberg, 2019).

Apart from direct relationships to France, the Sub-Saharan countries are also part of regional economic and political communities. The West African CFA countries belong to ECOWAS, the Economic Community of West African States together with seven other West-African countries. ECOWAS is guided by its fundamental principles, including for example equality, solidarity, non-aggression, economic and social justice. The purpose is to promote a regional self-sufficient trade block. (ECOWAS, 2024)

Earlier this year, Mali, Burkina Faso and Niger were suspended from ECOWAS due to military tension in the countries. (Africanews, 2024)

Even though ECOWAS is a local West-African organisation with strong regional trade integration, France has a large impact through its connection to the CFA countries.

## 2.2 From Relation to France to Relation to EMU

In April 1989, Jacques Delors, the president of the European Commission presented the so called “Delorsreport” that outlined the plan for a common European currency. The report was a result of work performed by a group headed by Delors and consisting of the European Community’s National Central Bank Governors, the president of the BIS – the Bank of International Settlement, the President of Banco de Exterior de Espania. The report outlined a 3-stage plan towards a common European currency (ECB, 2024).

The European Central Bank summarizes these steps as follows:

*Table 1*: 3-Stage plan towards a common European Currency

| Stage | Year | Preparation Activity |
|---|---|---|
| Stage 1 | July 1st 1990 | -Freedom of capital movements<br>-Increased co-operation between central banks<br>-Free use of the ECU (forerunner of the EUR)<br>-Improvement of economic convergence |
| Stage 2 | Jan 1st 1994 | -Establishment of the European Monetary Institute (EMI)<br>-Ban on the granting of central bank credit<br>-Increased co-ordination of monetary policies<br>-Strengthening of economic convergence<br>-Start of process leading to the independence of the national central banks |
| Stage 3 | Jan 1st 1999 | -Irrevocable fixing of conversion rates<br>-Introduction of the Euro<br>-Conduct of the single monetary policy by the European System of Central Banks<br>-Entry into effect of the intra-EU exchange rate mechanism (ERM II)<br>-Entry into force of the stability and growth pact |

(ECB, 2024)

In the second stage, it was decided on May 2nd, 1998, that 11 countries fulfilled the convergence criteria and could proceed into stage three. These 11 countries were Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain and on the 1st of January 1999 they all converted their local currency into the Euro, and this date was the starting point of stage three (Delors Report, 1989).

Major drivers and expected benefit from the EMU:

- Reduction of uncertainty by eliminating the currency exchange risk between the member countries. This would benefit investors and encourage bilateral trade in the Union.
- Increased price stability that would help keeping control over inflation in the member countries.
- Reduction of transaction costs for cross-border trades by removing currency exchange risk .The increased price transparency would benefit competition and make allocation of resources more efficient.
- Increased economic stability through the Union's economic and fiscal rules, including the Stability and Growth Pact.
- Creation of a large currency would unify Europe and make the European Union a more powerful trading partner to other large economies like the USA and China (European Union, 2018).

Many countries in the European Union were still outside the EMU, and several of them have EMU countries as major trading parties. Harry Flam and Håkan Nordström found in a study from 2006 that also countries in the European Union that kept their local currency benefit from the EMU. The UK, Sweden and Denmark showed an increase in trade with EMU countries. (Flam & Nordström, 2006)

After the formation of the European Monetary Union in 1999 where France was one of the countries that joined from start, the monetary policy of the Central and Western African Franc countries from this date was now set by the European Central Bank. The FCFA was pegged to the Euro at the exchange rate 100 FCFA worth 0,152449 EUR. The aid from IMF to the poorest countries within the CFA Franc region was replaced by the Poverty Reduction and Growth Facility (IMF, 2024).

Despite the transfer of the monetary policy influence from Banque de France to the ECB, French influence on the CFA Franc Zone did not change a lot. Involvement from French authorities with representation on the board of the CFA Central banks remained until 2019, and ECB continued to channel communication with the CFA Zone central banks through France.

However, the currency peg has now shifted from France as an anchor to the Euro. This means that the CFA Countries have a potential trade integration with eleven countries instead of one, and that is only at the starting point of EMU. In 2024 the number of member states has increased to 20. The size of the currency union to which the CFA Franc is now pegged should secure more stability and also benefit the African region in their trade with other major trading partners such as the USA and China.

## 2.3 Current Monetary Integration

Even after the formation of the European Union, the CFA Franc countries have had to deposit half of their foreign exchange reserve within the French Treasury where France guaranteed full convertibility of CFA Franc into EUR. This has been debated both in Europe and in Africa, arguing that France still has post-colonial influence over the CFA countries (Konkobo, 2017).

From 2015, the convergence criteria that were enforced on the Central and West African regions were quantified to keeping inflation below 3%, public debt should not exceed 70% of GDP and an overall budget deficit below or equal to 3% of GDP for WAEMU and 0% of GDP for CEMAC (Banque de France, 2015).

After protests from the West African region and criticism from other EU countries it was decided in 2019 that countries in the West African CFA Zone were no longer to make this deposit to Bank de France. This was the starting point of reduced dependency from France on the CFA Franc Zone.

There is currently a plan to replace the West African CFA Franc with a new currency, the ECO, but still having a fixed exchange rate to the Euro. However, it is not yet decided whether there will just be a formal name change from CFA Franc or if the currency will be constructed from a basket of currencies better reflecting the countries current major trading parties, also including USA and China (Africanews, 2020).

The French Military presence in the region is prevailing today as well as the well- established French business integrations. Today France still has large companies or subsidiaries in many of the African countries. In 2023, there were 200 French companies in Mali, 45 in Burkina Faso and 26 in Niger (Cessac, 2023).

To summarize, the French connection to the CFA Zone is still strong and the colonial history and economic incentives for France to keep a tight band to the former colonies to facilitate import of commodities, imply that the only factor that has changed after the implementation of the EMU is the change of the peg from the French Franc to the Euro. This leads me to my research question:

*Has the introduction of EMU and hence the new peg of the CFA Franc to the Euro spread trade to other Eurozone countries than France, implying reduced currency risk and uncertainty between the CFA countries and the Eurozone?*

# 3. Prior Research

In a study from 2000, Andrew K. Rose estimates the effect that a common currency or belonging to a currency union has on bilateral trade. The timing of the study was particularly interesting, being done on the doorstep of the creation of the European Union, since the result could predict how trade within the Eurozone would develop in the years to come. He used an augmented gravity model with several variables that could explain trade apart from GDP and Distance between countries, such as colonialism, language, trade agreements, belonging to a common nation and a few more. To identify the effect of a common currency or absence of exchange rate risk, he introduced a dummy variable for whether the countries have the same currency (or belong to a currency union) and a variable for exchange rate volatility between countries (Rose, 2000).

The study was done on 189 countries and 16 currency unions or single currency areas and observations were performed in five different years from 1970 to 1990.

The result of the study showed large significance of currency union as explanation to bilateral trade. The author drew the conclusion that two countries that share the same currency or belong to the same currency union would trade three times as much as if they would have different currencies (Rose, 2000).

In a study from 2009, Bangake and Eggoh analyse the currency union's effect on trade within a region. In their study, they are looking within the CFA Zone and between African countries in general, to study the currency union's effect on trade and compare that to the trade effect between counties that only have regional agreements based on preferential trade (ECOWAS, COMESA and SADC).

The study is done using bilateral trade data for 35 African countries and the period of study is 1980 to 2005. The analysis is done using Click and Rose (2002) Gravity model, that takes several parameters into account, such as common language, shared border, part of the same trade agreement, former colony, and having a common currency (Bangake and Eggoh, 2009).

The results strongly support the authors' hypothesis that a currency union has a positive effect on bilateral trade within the union. The results show that countries in the CFA zone, who share a common currency, have significantly higher levels of bilateral trade than countries only having trade agreements.

While Bangake and Eggoh aimed at studying trade effect of CFA Zone currency within the African region, Martínez-Zarzoso looks to investigate how the reduced exchange rate risk between the CFA Zone and the Eurozone has affected trade after the creation of the European Monetary Union and hence pegging the CFA Franc to the Euro. The analysis is looking to show the effect on different sectors, and separately on export and import (Martínez-Zarzoso, 2019).

She includes 175 countries in the study and 69 different sectors of goods over the period 1995 to 2016.

Like Bangake and Eggoh. (2009), Martínez-Zarzoso uses an augmented version of the Gravity Trade Model adding variables for currency, language, former colony, and trade agreements. In addition, dummy variables for CFA Zone and France to identify sector specific explanations are introduced.

The findings were that total trade between Eurozone countries and the CFA Zone did not increase to the level of trade that France had before the introduction of the Euro, but significant increase in trade could be found in certain sectors. Also, the author found it worth mentioning that some sectors showed an important increase in export from the CFA Zone to the Eurozone, especially for agriculture goods, and homogeneous goods.

An increase of trade within the Eurozone was shown and between the CFA Zone and France. Martínez-Zarzoso discuss if an explanation could be that France is playing the role of a trade hub, after the introduction of the Euro, and that other EU countries channel trade with the CFA Zone countries through France since France has already an established trade pattern with the African countries, not only due to the absence of exchange rate risk (Martínez-Zarzoso, 2019).

In a study from 2017, Alessandro Saia estimates the cost of the UK staying out of the euro. As research method, he uses the synthetic control method, unlike the more commonly used method for similar studies, the gravity model. In the absence of data for the UK before and after a hypothetical entrance in the EMU, he predicted the outcome of a UK EMU membership by creating a control group. His estimates show that the trade level would have been 16% higher between the UK and the Eurozone, had the UK adopted the Euro. With the same method, he also estimated what the level of trade would have been between the non-EMU countries of the European Union and the UK and found that even here, trade would have been significantly higher, and finally he also studied the effect of trade within the Eurozone after the creation of the EMU. He found that the currency union had boosted trade between countries within the Eurozone by 19% to 50% (Saia, 2017).

Twenty-four years after the first eleven countries' adoption of the Euro, Douglas Campbell and Aleksandr Chentsov were interested in revisiting the question of the impact of a currency union on trade within the union. Despite the topic having been studied many times already, the authors found it relevant to review it in the light of recent political discussions of countries wanting to enter or to exit the European Monetary Union. They use several of the methods used in other studies, such as estimations with PPML, synthetic control groups, plotting pre- and post-treatment trends. They introduce controls for geopolitical factors that are likely to be correlated with currency union in order to isolate the actual common currency effect. Unlike most of the studies so far, this study did not show significant increase in trade explained by the currency union. Their interpretation of the result was the positive effect found in other studies could be explained by omitted variables such as political alliances, other aspects of trade, tariffs, quotas or other factors that exist in a currency union but that are not specifically a common currency (Campbell & Chentsov, 2023).

In a study from 2006, Michael Klein and Jay Shambaugh address the question on the difference in the effect on trade of a currency union and a currency peg. They study the period from 1973 to 1999 using the gravity model of trade, including both a dummy for currency union and one for currency peg. They also add a variable for exchange rate volatility. They find significant evidence of the impact on trade between a country with a peg and the anchor currency country. One observation from the authors is that with a currency peg, the level of stability is relevant. A currency peg that fluctuates within a band or is subject to repeated devaluations is not as trustworthy as a fixed peg and does therefore not show evidence of benefitting trade. (Klein & Shambaugh, 2006)

# 4. Theoretical Framework

## 4.1 Theory of Transaction Cost and Uncertainty

As described in the literature section, many studies have been conducted to estimate the effect on trade of a currency union or of the elimination of currency risk through fixed exchange rates. The authors often refer to the Optimum Currency Area (OCA) as the explanatory theory behind these effects. However, as I describe below, this theory is based on empirical evidence of how trade patterns change with a currency union, but the actual reason for this outcome is explained by The Commission of the European Community (1990) as two mechanisms that will cause this change;

- Elimination of transaction costs associated with foreign exchange transactions.
- Removal of uncertainty associated with exchange rate risk.

The European Community performed this study in 1990 to evaluate the potential benefit of the creation of the European Union. Different examples of exchange rate variability are presented, both within the European Union and for EU currencies against the US dollar. It is emphasized that, regarding the cost of uncertainty, it is the unexpected variation that is significant. Also, the variabilities are only judged to be harmful if they are not acting as an adjustment mechanism to other economic conditions (European Community, 1990).

Transaction costs are the direct or indirect costs of executing a foreign exchange transaction. In order for a company to reduce uncertainty of the cost for import or export, it can engage in transactions in financial instrument such as forwards and options to hedge the currency exchange risk. Not all currencies have a liquid forward market. A hedge is not always perfect. And even if a company has complete information on future import or export flow in time and amounts, all currencies do not have a liquid forward market. EC 1990 gives the example of issues with hedging a long- term contracts such as Airplanes transactions. The forward market liquidity vary across currency pairs and maturity and the banks are likely to compensate this with a liquidity premium that adds to the transaction cost (Sveriges Riksbank, 2022). This will be the case both for spot and forward prices. If there is uncertainty of the transaction amount or timing, a forward contract can become even more expensive for the actor. If the expected trade does not take place, since a forward contract is binding, the forward transaction must be reversed if not used, with the risk of a currency exchange loss. With more uncertainty, foreign exchange options are an alternative to forwards, but these are

generally more expensive, adding to the transaction cost. If currency exchange is required, which is the case between countries with different currencies, there will also be indirect costs such as administrative or personnel costs for the foreign exchange transaction (European Community, 1990).

## 4.2 Theory of Optimum Currency Area

The theory of Optimum Currency Area is a theory that investigates the potential benefit a currency union could have on trade based on certain criteria. The end goal of this theory is to maximize economic efficiency. The benefit of shared currency / currency unions should outweigh the national costs of changing currency and potential drawbacks on the national currency market.

The study area for this paper is not the trade effect of a currency union, but the trade effect of a currency changing its peg from a single currency to a currency union. For that case, the theory of uncertainty and transaction cost is more relevant, however, the study will touch the effect on trade the EMU has had within the union since those trade pattern can have an indirect impact on the new trade patterns of the CFA countries.

This theory was first introduced by Canadian economist Robert Mundell in 1961. His main condition for this theory was the importance of labour and capital mobility across the regions that were to be in the same currency union. This criteria is crucial for countries in the same currency union, because it can move its labour and capital easily to where it is needed and thereby facilitate productivity which can contribute to a more efficient trade flow. However, if a country has a floating exchange rate and thereby is not part of a currency union, the floating exchange rate can serve as a compensation mechanism when the relative price is fluctuating. (Mundell, 1961)

In conclusion, certainty is preferred to uncertainty, stability to instability and that is also applicable when it comes to bilateral trade and currency exchange risk.

*Based on the theory of transaction cost and uncertainty and Optimum Currency Areas, the hypothesis of my study is that when currency exchange risk is reduced between EMU-*

*countries and the CFA Countries after the introduction of a common currency for 11 countries in the European Union, trade between the CFA Zone and the EZ countries should increase since their currency is pegged to the Euro instead of only to the French Franc.*
*The new much larger market opening up to the CFA Zone could possibly redistribute the Sub-Saharan trade flow, showing a decrease in trade with France in favour of the rest of the Eurozone.*

# 5. Empirical Strategy

## 5.1 Empirical Model - Gravity Model of Trade

The gravity model originates from physician Isaac Newton's Laws of Gravity. He stated that the gravitational force between two products was in direct proportion to their masses and decreased in proportion to the squared root of the distance between the two entities:

$$F = G \times \frac{m_1 m_2}{r^2}$$

The gravity model of trade is an economic model with its base in Newton's theory, used to estimate trade flows between countries. It was introduced by economist Walter Isard in 1954 (Isard, 1954). However, it was not until the Dutch economist Jan Tinbergen reformulated the model in the 1960s that it got popularized. Tinbergen was the first to conduct empirical adaptations of the model (Tinbergen, 1962). However, Tinbergen got criticised for having created a model solely on empirical studies without theoretical ground. Another reason for the negative treatment of the model was its simple format. With merely distance and GDP as factors for explaining trade flow it didn't take other important variables such as cultural and political factors into account.

The basic equation of the model:

$$F_{i,j} = G \times \frac{GDP_i GDP_j}{D_{i,j}}$$

F is the trade flow between country i and j, G is the gravity constant. The numerator consists of the economic mass of the countries i and j, often measured in GDP. Larger economies produce more goods, and that results in larger proportions of exported and imported goods

overall. D is the distance between country i and j. If two countries are close to each other, it will facilitate transportation and hence benefit trade.

During the 1970s and onwards the model got more empirical validation and several factor variables were added, such as population, shared borders, and common language. In 1989, American economist Jeffery H. Bergstrand tried to tie the model to economic theory. He incorporated the work of the Heckscher-Ohlin model and the theory of monopolistic competition (Bergstrand, 1989).

Anderson and van Wincoop (2003) conducted a re-adaptation of the Gravity model. The key discovery made by Anderson and van Wincoop was the introduction of Multilateral Resistance Terms (MTR). The model was able to capture trade effects from a country's entire trade environment and not only between the two studied countries (Anderson and van Wincoop, 2003).

The Gravity model is a flexible model that can be modified depending on what countries and what trade patterns that are being analyzed. It can also be logarithmized to be able to do a linear OLS estimation.

$$ln\, F_{i,j} = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnD_{i,j} + \epsilon_{i,j}$$

## 5.2 Model Specifications

### 5.2.1 Gravity Model

In this study, parts of Glick and Rose (2002) adaptation of the gravity model are used. They adapted the gravity model to capture the effect of currency unions on international trade, adding a number of variables that could have an impact on trade (Glick and Rose, 2002).

I include variables that might have an effect on trade between countries, and that are relevant for the studied countries, such as a common language, if the countries were in a colonial relationship, if the country is landlocked, and the size of the populations. For the purpose of the study, a dummy variable – Curr - is added. It will take the value 1 if at least one country

is in a currency union, and zero otherwise. This means that it will take the value 1 after 1999 for all currency pairs where at least one is in the EMU. Tests on different samples are performed, testing for different effects.

To test the effect of a new peg against a new stronger currency- the Euro - a test on the CFA countries against the Eurozone is run. This test is performed both with the entire Eurozone sample and with a sample excluding France.

To estimate the effect on trade between the CFA countries and France of the change of peg, a separate regression with only France and the CFA countries is done.

For comparison, and to gather more information for the interpretation, a regression on France against the Eurozone is included in the study. The currency dummy will then become a euro-dummy taking the value 1 after 1999 to test the effect on France on intra-Eurozone trade of implementation of the currency union.

### 5.2.2 OLS and PPML

Two estimates are run, one using OLS and one using PPML.

Ordinary Least Squares (OLS) is a regression estimator that uses a linear relationship between one dependent variable and several independent variables. The assumptions for an OLS regression are that the relationship between the dependent and the independent variables is linear, the variance in the errors is constant across all values (homoscedasticity), the errors are independent and normally distributed.

Poisson Pseudo-Maximum Likelihood (PPML) is another regression estimator. It uses count data, that is when the dependent variable takes non-negative integers. This estimate is more suitable if values that would be logarithmized in the OLS model take the value zero, since the logarithm of zero is undefined (Krisztin & Fischer, 2015). It is also a better fit to the data in cases where heteroscedasticity is present (Santos Silva and Tereyro, 2006).

Estimation with OLS:

$$ln\ T_{o,d} = \beta_0 + \beta_1 ln\ GDP_{o,t} + \beta_2 lnGDP_{d,t} + \beta_3 lnD_{o,d} + \beta_4 lnPop_{o,t} + \beta_5 lnPop_{d,t} + \beta_6 Comlang_{o,d} + \beta_7 Col45_{o,d} + \beta_8 LL_{o,d} + \beta_9 CU_{o,d,t} + \epsilon_{o,d,t}$$

where $ln\ T_{o,d}$ represents the trade flow between the two countries. $lnGDP_{d,t}$ represents the gross domestic product (GDP) of the country part of the Eurozone and $lnGDP_{o,t}$ represents the GDP of the CFA Franc Zone country. The distance between the two countries is presented as $lnD_{o,d}$ followed by the population of the two countries, $lnPop_{o,t}$ and $lnPop_{d,t}$.

Factors that might be of importance to detect trade patterns between countries are common cultural ties, as for example the absence of a language barrier. Therefore the variable *Comlang* is added, which indicates if the countries share a common official or primary language.

Most countries in Africa were colonized by European countries in the mid-1900s, and even if they are not in a present colonial relationship, their common history could still have an impact on trade that is interesting to capture. Therefore, I added the variable *Col45*, indicating a colonial relationship between the countries post the year 1945.

Another factor that is favourable for trade is if a country has a ports. In the early days the main method of transporting goods was by boat, and being landlocked does not give that possibility, so I add a variable that controls for the country's landlockedness - *LL*.

The variables *Comlang* , *Col45* , *LL* and *CU* are all so called dummy variables. A dummy variable takes the value 1 if the statement is true, otherwise it takes the value 0 meaning that its coefficient does not affect the dependent variable. The variable $\epsilon$ is an error term, capturing unexplained factors.

Estimation with PPML:

$$T_{o,d} = \beta_0 + \beta_1 ln\ GDP_{o,t} + \beta_2 lnGDP_{d,t} + \beta_3 lnD_{o,d} + \beta_4 lnPop_{o,t} + \beta_5 lnPop_{d,t} + \beta_6 Comlang_{o,d} + \beta_7 Col45_{o,d} + \beta_8 LL_{o,d} + \beta_9 CU_{o,d,t} + \epsilon_{o,d,t}$$

There is a risk that some bilateral trade data will take the value zero, either because there is no trade between the countries, or due to missing data. A zero-trade value can be correct and something therefore relevant to include in the study. To overcome this problem, as well as possible problems of heteroscedasticity, I decided to rely more on the results from the PPML regression estimates. However, the results from the OLS regression are included in the tables for comparison.

## 5.3 Data and Sample

The data sample is a gravity dataset from the French research center CEPII that gathers data for both public and private policy makers. Initially the dataset contained gravity data on all countries of the world, with around 85 different variables. However, given that I only look at data on the CFA Franc Zone and Eurozone I had to drop all countries except the 25 countries of interest for the study. I include the variables stated above that match the gravity model defined, and I add a currency peg and a landlockedness dummy myself.

As described in the empirical strategy, different samples for different regression are used. CFA to France, CFA to Eurozone excluding France, CFA to Eurozone including France and France to the Eurozone.

The dependent variable tradeflow_baci is provided by the international trade database BACI. They provide bilateral trade data for over 200 countries for 5000 different products. (CEPII, 2024). The Distance variable is the simple distance between the most populated city in the respective countries, measured in kilometers. The population variable is the total population of the country, in thousands. The economic indicator variable measures the GDP of the country in thousands of US Dollars. Detailed definitions of all variables are found in *Appendix 2.*

A full list of the countries included in my sample can be found in *Appendix 1*. For the Eurozone, I have chosen only the 11 countries that adopted the Euro from start. The reason being that I wanted to study as long a period of time as possible after the creation of EMU since it can take some adaption time to change trade pattern.

# 6 . Empirical Results

In this section, the results from the regressions on different samples are presented and the results are interpreted.

## 6.1 CFA – Eurozone

*Table 2*: Effects of a peg to the Euro on CFA trade with the Eurozone

| Dependent variable: ln_tradeflow_baci , tradeflow_baci | | |
|---|---|---|
| Independent variable | OLS Coefficient (P-value) | PPML Coefficient (P-value) |
| ln_gdp_d | -2.245005 (0.000) | -0.9459978 (0.000) |
| ln_gdp_o | 1.410397 (0.000) | 1.162534 (0.000) |
| ln_pop_d | 3.563187 (0.000) | 1.511502 (0.000) |
| ln_pop_o | 0.1478545 (0.016) | -0.1719767 (0.000) |
| ln_dist | 0.5899366 (0.013) | 0.7294296 (0.002) |
| dummy_comlang | 2.253648 (0.000) | 0.4142676 (0.003) |
| dummy_col45 | -0.568759 (0.000) | 0.3611845 (0.021) |
| dummy_LL | -1.152592 (0.000) | -1.262497 (0.000) |
| dummy_Curr | -0.447044 (0.000) | -0.1636691 (0.202) |

The regression for the estimates in Table 2 are run on a sample of the CFA countries and all 11 Eurozone countries. The coefficients for the Currency dummy for both OLS and PPML estimates are negative which indicates a negative impact on trade between the Eurozone and

the CFA countries with a peg to the Euro instead of a peg to the French Franc. However, only the OLS result is significant, and since there is risk of heteroscedasticity, the PPML result is more reliable, saying that there is no significant evidence of the change in trade stemming from the change of peg.

The GDP coefficient for the Eurozone is negative and highly significant suggesting a negative impact on trade from CFA countries. This could indicate that more wealthy Eurozone countries rely less on trade with Sub-Saharan countries due to more trade intra-Europe or with other continents. The results show however that the size of GDP for the CFA countries is relevant for trade with the Eurozone, which is in line with the early findings using the Gravity model (Isard, 1954).

The coefficients for population suggest that the size of the CFA population is more significant for trade between CFA and the Eurozone than for the Eurozone population. The Eurozone's population coefficient is large and highly significant which probably means that a large population has a demand for more goods, benefitting import from Eurozone countries. For the CFA countries the coefficient is negative but not that large, meaning that trade is slightly negatively impacted by a larger population. An explanation can be that countries with a larger population are more self-sufficient.

Contradictory to the theory, distance shows a significant positive impact on trade. The reason is not obvious. It could mean the Eurozone countries demand specific goods like raw material or food products from certain regions, or simply that distance is less of an obstacle in a shrinking world where air bound transport has replaced boats.

Both having a common language and a history of colonial relationship show a positive effect on trade that is significant. For this sample of countries, France, Spain and Portugal have former colonies among the CFA countries, and France, Belgium and Luxembourg share the French language with the CFA Zone. This is an interesting result, suggesting that these factors are more important for trade decisions than many other factors.

## 6.2 CFA – Eurozone Individual Countries

*Table 3*: Effects of a peg to the Euro on CFA trade with individual EZ-countries

| From CFA to: | OLS<br>Coeff. for dummy_Curr<br>(P-value) | PPML<br>Coeff. for dummy_Curr<br>(P-value) |
|---|---|---|
| Austria | -1.118052<br>(0.002) | -0.7164924<br>(0.005) |
| Belgium | 0.2835754<br>(0.405) | -0.672551<br>(0.047) |
| Germany | -0.4527831<br>(0.081) | -0.4699377<br>(0.011) |
| Spain | 0.3481694<br>(0.184) | 0.4310042<br>(0.037) |
| Finland | -0.156932<br>(0.741) | 0.0615103<br>(0.864) |
| France | 0.4620209<br>(0.008) | 0.5731432<br>(0.001) |
| Ireland | 0.6654232<br>(0.171) | 0.0413768<br>(0.901) |
| Italy | -0.4166453<br>(0.054) | -0.1699492<br>(0.476) |
| Luxembourg | 0(omitted) | 0(omitted) |
| Netherlands | 0.4311602<br>(0.183) | 1.03529<br>(0.000) |
| Portugal | -0.8368241<br>(0.010) | -0.4078767<br>(0.226) |

After the aggregate result between the CFA Zone and the Eurozone, I found it interesting to look at CFA trade with individual countries. In the table above, I only show the currency variable since that is the one subject to the main research question. After the creation of the Euro in 1999, for three Eurozone countries, the new currency peg of the CFA Franc to the

Euro has had a positive impact on trade with the CFA countries: France, The Netherlands and Spain. Belgium, Germany and Italy show a significant decrease, and for the rest of the countries, the results are not significant.

To further try to interpret these results, I have looked at the bilateral trade between Spain and Equatorial Guinea (GNQ). GNQ, as describe in section 2.1, is a former Spanish colony but member of the CFA Zone. I have run a separate regression between these two countries, (See Appendix 3) and found a positive significant currency peg variable. A possible interpretation is that a strong currency peg is not enough to change trade pattern. Other ties between the countries such as a colonial history may also be required.

The Netherlands have not had any colonies in the CFA countries after 1945, but they have a long trade history with the region. A currency coefficient of 1,03 with a high degree of significance, indicates that the Euro peg has benefitted trade between the Netherlands and CFA. Similar to my study, (Martínez-Zarzoso, 2019) did not see a significant impact on trade on an aggregate level from the Euro implementation, however she broke down her results into different sectors and found significant increase in some sectors. The explanation for Netherlands' case could be that they are particularly interested in goods from a certain sector in the CFA region.

## 6.3 CFA – Eurozone Excluding France

Here I study the trade patterns between CFA Franc Zone countries and the Eurozone countries without France. This will show the impact of a peg to the Euro after 1999 on the trade pattern between the CFA Zone and the Eurozone. By excluding France, we will be able to see the impact of the new peg on other Eurozone countries than France on an aggregate level.

*Table 4*: Effects of a peg to the Euro on CFA trade with the Eurozone excluding France

| Dependent variable: ln_tradeflow_baci , tradeflow_baci | | |
|---|---|---|
| Independent variable | OLS<br>Coefficient<br>(P-value) | PPML<br>Coefficient<br>(P-value) |
| ln_gdp_d | -2.136935<br>(0.000) | -0.7650821<br>(0.000) |
| ln_gdp_o | 1.380591<br>(0.000) | 1.130516<br>(0.000) |
| ln_pop_d | 3.492357<br>(0.000) | 1.311639<br>(0.000) |
| ln_pop_o | 0.1916663<br>(0.005) | -0.0505912<br>(0.319) |
| ln_dist | 0.5992935<br>(0.020) | 0.9678675<br>(0.000) |
| dummy_comlang | 2.275933<br>(0.000) | 0.1871908<br>(0.146) |
| dummy_col45 | 0.1984671<br>(0.484) | 1.540842<br>(0.000) |
| dummy_LL | -1.266019<br>(0.000) | -1.72578<br>(0.000) |
| dummy_Curr | -0.439988<br>(0.001) | -0.2440379<br>(0.075) |

Not surprising, the currency dummy with this sample has a larger negative coefficient than for the sample including France, even if, for the PPML estimate, it is only significant on a 10% level. The result suggests that the creation of the Euro has had a negative effect on trade flow between the CFA countries and the Eurozone, which is the opposite of the hypothesis of my study. This finding is interesting and suggests that a peg to a larger and stronger currency like the Euro is not significant for trade decision. Since the result even shows a decrease in trade, this could mean that there is uncertainty of the stability of the peg. If there is not

enough credibility for a peg to stay fixed, the uncertainty will according to theory have a negative impact on trade (European Community, 1990).

Another explanation could be that there is no real causality, but that since the change of peg to the Euro coincides in time with the creation of the Euro and the EMU, the Eurozone countries have instead increased their trade with each other. This supports empirical findings from several studies since the creation of the EMU, that a currency union is beneficial for trade within the union (Rose, 2000), (Bangake and Eggoh, 2009), (Saia, 2017).

## 6.4 CFA – France

In the following regression, I include only France and the CFA countries. This will test the effect on change of the change of peg from French Franc to a new stronger and larger currency, the Euro. The currency dummy variable will change from 0 to 1 when the year is 1999 and onwards, after the euro was implemented.

*Table 5*: Effects on trade between CFA and France of a change of peg from Franc to Euro.

| Dependent variable: ln_tradeflow_baci , tradeflow_baci | | |
|---|---|---|
| Independent variable | OLS<br>Coefficient<br>(P-value) | PPML<br>Coefficient<br>(P-value) |
| ln_gdp_d | 0.2773952<br>(0.624) | 1.198287<br>(0.002) |
| ln_gdp_o | 1.43365<br>(0.000) | 1.456099<br>(0.000) |
| ln_pop_d | -20.50877<br>(0.000) | -27.29184<br>(0.000) |
| ln_pop_o | -0.1025877<br>(0.224) | 0.000506<br>(0.999) |
| ln_dist | 2.302583<br>(0.000) | 1.973338<br>(0.004) |
| dummy_comlang | 3.552637<br>(0.000) | 2.986378<br>(0.000) |
| dummy_col45 | -0.013404<br>(0.976) | -0.7191192<br>(0.002) |
| dummy_LL | -0.0547449<br>(0.767) | 0.1157679<br>(0.464) |
| dummy_Curr | 0.4620209<br>(0.008) | 0.5731432<br>(0.001) |

The Currency coefficient is 0,57 and shows at a 1% significance level an increase in trade between France and the CFA countries after the change of peg from the French Franc as anchor to the Euro. It is interesting that the already high level of trade benefits even more from the new peg. Since the pattern is rather the opposite or not clear at all between the CFA countries and the rest of the Eurozone, I run a regression between France and the Eurozone, to try to find an explanation. In this case, the test will tell what the impact of the currency union has on trade between France and the rest of the Eurozone.

## 6.5 France – Eurozone

The sample for this test is France and the rest of the Eurozone. In this case, I will set the currency dummy to 1 if the countries are in a currency union and 0 otherwise. This will mean that the dummy is 0 before 1999 and 1 from 1999.

*Table 6*: Effects of the Currency union on Frances's trade with within the Eurozone

| Dependent variable: ln_tradeflow_baci , tradeflow_baci | | |
|---|---|---|
| Independent variable | OLS Coefficient (P-value) | PPML Coefficient (P-value) |
| ln_gdp_d | -0.1047751 (0.028) | -0.3798242 (0.000) |
| ln_gdp_o | 1.028468 (0.000) | 1.368758 (0.000) |
| ln_pop_d | 1.029895 (0.000) | 1.40434 (0.000) |
| ln_pop_o | -2.735775 (0.007) | -2.475864 (0.002) |
| ln_dist | -1.06893 (0.000) | -1.074967 (0.000) |
| dummy_Curr | 0.1841174 (0.004) | 0.101902 (0.024) |

This result shows that France trades more with the other Eurozone countries after the implementation of the Euro. This together with the result from the regression between France and the CFA countries could imply that the French ties are still so strong to the African

countries that reduced currency exchange risk between the CFA countries and the Eurozone is not enough to boost trade. An explanation could be that France channels trade between other Eurozone countries and the CFA Zone and acts as a middleman. This supports the findings of (Martínez-Zarzoso, 2019) who found evidence of increased export from the CFA Zone to France and from France to other Eurozone counties for certain sectors.

This indicates that being in a currency union is beneficial for trade, but the hypothesis of my study is rejected. My assumption was that after the implementation of the Euro, trade between the CFA countries and the Eurozone would increase since the CFA Franc is now pegged to the Euro, but that development is not proved in my study.

# 7. Summary and Conclusions

The aim of this thesis was to answer the question "*Has the introduction of EMU and hence the new peg of the CFA Franc to the Euro spread trade to other Eurozone countries than France, implying reduced currency risk and uncertainty between the CFA countries and the Eurozone?"*

I did not find evidence for this hypothesis. To summarize, the results show that the implementation of the Euro-peg has actually had a negative impact on trade between the CFA countries and the Eurozone. This is surprising, since not only is the peg against a strong and large currency that you would think implied certainty, also the CFA countries changed from having a currency pegged to one single country, to a currency being pegged against 11 countries. It could be expected that this would open for trade with a much larger market. However, the Eurozone countries have increased trade with France, and the CFA countries and France showed increased trade after the implementation of the new peg. This could be a sign that the historical ties and the integration between France and the CFA countries are still so strong that France takes the role as a trade channel between the CFA countries and the rest of the Eurozone.

Another conclusion that I draw from the study is that a strong currency peg is not enough to change trade decision between countries. It seems like other connections between the countries in combination with a pegged currency are necessary. Two of the three countries

with a colonial history, France and Spain show significant increase in trade with the CFA Zone after the implementation of a Euro-peg.

There is currently political pressure both from some leaders of the CFA countries and from the ECOWAS community for France to further reduce its involvement in the CFA Zone, and ECOWAS works in the direction of increasing the Sub-Saharan economic independence (ECOWAS, 2024). It would therefore be interesting to revisit this research question in 5 to 10 years to see if France's dominance as Eurozone trading partner to the CFA countries is reduced. That would further support my second finding, that other factors than a strong currency peg need to be present to benefit trade.

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# Appendix

*Appendix 1*: List of Countries Included in the Study

| Eurozone | West African CFA Countries | Central African CFA Countries |
|---|---|---|
| Austria | Benin | Cameroon |
| Belgium | Burkina Faso | Central African Republic |
| Germany | Guinea-Bissau | Chad |
| Finland | Ivory Coast | Equatorial Guinea |
| France | Mali | Gabon |
| Ireland | Niger | Republic of Congo |
| Italy | Senegal | |
| Luxembourg | Togo | |
| Netherlands | | |
| Portugal | | |
| Spain | | |

*Appendix 2*: List of Variables

| Variable name | Description |
|---|---|
| tradeflow_baci | Trade flow, 1000 current USD. (Source: BACI) |
| gdp_d | GDP, in current thousands of USD (source WDI/Barbieri) |
| gdp_o | GDP, in current thousands of USD (source WDI/Barbieri) |
| pop_d | Population, in thousands (source WDI/Maddison) |
| pop_o | Population, in thousands (source WDI/Maddison) |
| dist | distance between the most populated city of each country, in km |
| comlang_off | Dummy: 1 if countries share common official or primary language |
| col45 | Dummy: 1 if country was in colonial relationship post 1945 |
| LL | Dummy: 1 if the country is landlocked |
| Curr | Dummy for currency peg |

*Appendix 3*: Effects of EUR peg on trade between GNQ and Spain

| Independent variable | PPML Coefficient (P-value) |
|---|---|
| ln_gdp_d | 0,7032319 |
| | (0.501) |
| ln_gdp_o | 0,5665868 |
| | (0.077) |
| ln_pop_d | -3,38303 |
| | (0.652) |
| ln_pop_o | -1,368125 |
| | (0.000) |
| dummy_Curr | 1,004044 |
| | (0.029) |