UNIVERSITY OF THE WESTERN CAPE

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THE IMPACT OF NAMIBIA'S CURRENCY PEG ON ITS DOMESTIC INFLATION

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DECLARATION

I declare that *The Impact of Namibia's Currency Peg on its Domestic Inflation* is my own work, that it has not been submitted before for any degree or examination in any other university, and all the sources I have used or quoted have been indicated and acknowledged by complete references.

Signature_____

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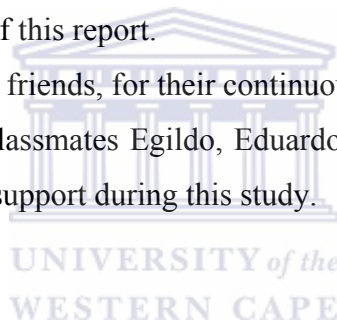** The Almighty God for giving me this opportunity to pursue my studies and particularly for this project.

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ABSTRACT

The Impact of Namibia's Currency Peg to the South African rand on its Domestic Inflation

This study analyses the impact of Namibia's currency peg on its domestic inflation. This is because theoretical argument suggests that currency peg (fixed exchange rate) provides nominal anchor for domestic price level, in particular when the domestic currency is pegged to a stable foreign currency. Following the method of hypothesis testing, data on Namibia and South Africa are used in this regard. Three main findings emerged from this study. Firstly, it was shown that the two inflation rates are positively correlated. Secondly, the study shows that there is no statistical significance difference between the inflation rates of the two countries. This gives an indication that the currency peg served as a nominal anchor, because as the SA inflation rate came down, so did the Namibian inflation rate. Thirdly, the study also shows that the growth of money stock in Namibia does not deviate from the growth of money stock in SA. This gives an indication that the authorities have maintained the peg through control of monetary growth.

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THE IMPACT OF NAMIBIA'S CURRENCY PEG ON ITS DOMESTIC INFLATION

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KEY WORDS

Exchange rate

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Namibia

Monetary policy

Reserve currency

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ABBREVIATIONS

BON – Bank of Namibia

CMA – Common Monetary Area

CPI – Consumer Price Index

MS – Money Supply

SA – South Africa

TIPS – Trade and Industrial Policy in Southern Africa

CHAPTER ONE: INTRODUCTION

Pegging the national currency to an international anchor currency may enhance the credibility of anti-inflation policy (Chow and Kim, 2003:332). It is generally accepted that it would be very difficult for a central bank to be effective in its pursuit of price stability if there should be the perception that it is not prepared to serve strong monetary medicine if that is what the economy requires. The perception that the central bank is prepared to make the tough or unpopular decisions is what gives it "credibility" in terms of its anti-inflation policy. A currency peg can be seen as something that strengthens such a perception of credibility. Then economic agents can be more certain about policy, in particular when the central bank chooses a target that is easily and clearly understood by the agents in the economy (Sperling, 2001:3). For developing countries, a hard peg might be the most suitable exchange rate regime towards achieving low inflation levels (Harrigan, 2006:206). Von Hagen and Zhou (2005:679) show that exchange rate regime choice is dictated by inflation rates, cumulative inflation differentials and international reserves sufficiency. Therefore, it implies that for developing countries, pegs or an exchange-rate anchor allows policy-makers in countries with a high tendency to inflation, to import credibility and low inflation (Adams, 2005:21).

At time of independence (1990), Namibia decided to remain within the Common Monetary Area[1] (CMA). In 1993 the Namibian dollar (Namibian currency) was introduced. It was then pegged to the South African rand on a one-to-one basis. The decision to remain in the CMA means monetary policy is abandoned, giving priority to maintain a fixed exchange rate against the rand (BON, 2000:23). Prior to the establishment of the Namibian dollar in 1993, a separate bilateral agreement between Namibia and South Africa on features of the peg was already in place in 1992 (Kalenga, 2001:3). One could state that the 1992 bilateral agreement was in anticipation of the peg in 1993, because the bilateral agreement also provides that "either contracting party has

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[1] This arrangement is formerly known as Rand Monetary Area, which consisted of Botswana, Lesotho, Swaziland and South Africa. Botswana moved out in 1976 and Namibia joined in 1990 after attaining her independence. The Common Monetary Area is now comprised of the following members Lesotho, Swaziland, Namibia and South Africa.

the right to issue its own national currency" (BON, 2000:23). In particular, Article 4, Section 1 of the Bilateral monetary agreement, states that, *"Against the aggregate amount of Namibian dollar currency issued by the Bank of Namibia, the Bank of Namibia shall maintain a reserve equivalent thereto in the form of Rand assets and freely usable foreign currencies in such proportion as the Bank of Namibia considers appropriate..."* (BON, 2000:23). This section means the need to fulfil the backing rules, which is why the 1993 peg was on par (Kalenga, 2001:3).

The two dominant features of the bilateral agreement are: (1) a commitment by the Bank of Namibia (BON) to convert domestic currency into foreign reserves (SA rand) at a fixed exchange rate, and (2) an explicit requirement that the BON monetary liabilities be backed by the reserve currency (the rand) or other foreign assets (Kalenga, 2001:3). For Namibia, even after the introduction of the Namibian dollar, the rand remained legal tender in Namibia. A fixed parity (one-to-one) between the Namibian dollar, with respect to the rand, had been maintained, backed 100% by foreign exchange reserves. However, the fixed parity is not irrevocable (Tjirongo, 1995:23).

As stated earlier, pegging the exchange rate provides a nominal anchor that can help in controlling domestic inflation (Mishkin, 1998:82). In this instance, the historical trade relations and close ties between the Namibian and SA economies, led to the decision that the SA rand provides a stable anchor for low inflation in Namibia (Kalenga, 2001:3). Although a currency peg can be used as anti-inflationary policy, recent price trends in Namibia prompt one to ask whether the pegged exchange rate was effective as a "nominal anchor" to curtail inflation. This is the issue of concern in this paper.

In light of the above the limitation of the research is not to develop a model for the determination of the equilibrium exchange rate, nor is it to develop a model that tests for the relative contributions of various economic factors to the nominal exchange rate of Namibia. The exchange rate is in any case pegged to the rand. Therefore, the limited objective of the research is to determine how effective the pegged exchange rate was over the past 15 years as a nominal anchor, i.e. as a means of containing domestic inflation in

Namibia to similar rates as found in South Africa. The significance of the research is that it will contribute towards filling a gap in the literature, namely whether the pegged exchange rate has served as an effective nominal anchor. Given the absence of work in this area any light thrown on this question will contribute towards our understanding of the impact of the currency peg on Namibia's domestic inflation.

In investigating the question stated above, the study is divided into five chapters. Following this chapter is the literature review aimed at providing an understanding of currency peg. Of particular interest is the debate on the use of a currency peg as an anti-inflationary policy in fighting inflation: a nominal occurrence. Chapter 3 presents the data sources and appropriate econometric techniques to be used to analyze the data in addressing the question posed earlier. Chapter 4 discusses analyses of exchange rate policy and inflation in Namibia. This is aimed at giving an indication of the inflation trends in the Namibian economy in the pre-pegging and post-pegging periods. The chapter further analyses the post-pegging era in the context of macro-economic conditions, taking into account factors such as fiscal policy, monetary policy and balance of payment flows. This is to test the hypothesis that the Namibian dollar peg to the South African rand was effective in curtailing inflation in Namibia. Chapter 5 concludes the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review on currency pegs and inflation. Section 2.2 briefly explains the meaning of a currency peg, different types of pegs and how it operates. This is to assist in understanding the concept of a currency peg. Section 2.3 presents merits and limitations of a currency peg particularly those pertaining to inflation. This is to show that low inflation is among the benefits of pegging. In other words, to back it up with theoretical arguments, that a currency peg can curtail inflation (i.e. serve as a nominal anchor). A review of related empirical literature aimed at testing the theoretical propositions is discussed in this section. Of particular interest is the affirmation and consistency of propositions that a currency peg served as a nominal anchor in controlling inflation. Section 2.4 sums up the main points in the chapter.

2.2 The Pegged Exchange Rate

A pegged exchange rate is one in which the exchange rate of the home currency is fixed to an anchor currency (Tiwari, 2003:2). It is artificially maintained by the government (Abel and Bernanke, 2005:496). This definition has been extended by Bleaney and Fielding (1999: 14), who stated that pegging can either be to a single currency or to a basket of currencies. Wessels (2007:708) further demonstrates that currency pegs can be set at different levels because there are different levels of inflexibility. This includes conventional fixed pegs, crawling pegs, horizontal bands, crawling bands or hard (fixed) peg exchange rate such as currency board and dollarisation (El-Mefleh, 2004:50 and Fischer, 2001:3).

Since these pegged exchange rate arrangements differ in terms of varying levels of flexibility, different countries adopt currency pegs deemed reasonable to correspond with their economic conditions (Fischer, 2001:21). Frankel (2000) cited by Fischer (2001:21) relates to this statement by arguing that; "reflecting wide differences in levels of

economic and financial development and in other aspects of their economic situations, no single exchange rate regime is most appropriate for all such countries, and the regime that is appropriate for a particular country may change over time". Experience has shown that pegged exchange rate arrangements target different objectives. For this study, the focus is on using a pegged exchange rate as nominal anchor, as a policy objective of a currency peg.

2.3 Currency Peg as a Nominal Anchor

According to Mishkin (1998:82-83), fixing the value of the domestic currency relative to that of a more stable currency, which is exactly what an exchange-rate peg involves, provides a stable nominal anchor for the economy. Giucci and Trebesch (2004:3) extended this argument by adding that pegging would provide a nominal and credible anchor for the economy. However, Von Hagen and Zhou (2005:687) are of an opinion that a pegged (fixed) exchange rate could provide a nominal anchor for domestic prices, should credible monetary institutions be non-existent. This suggests that for countries where credible monetary institutions exist, a nominal anchor would not be necessary. In light of the preceding statement, Barro and Gordon (1983) cited in Von Hagen and Zhou (2005:686), argued to the contrary that, "countries whose monetary authorities suffer from low credibility of low-inflation policies can import central bank credibility by adopting a fixed exchange rate with a more stable currency".

Flood and Mussa (1994:1) also emphasized this point, but differently, by arguing that a nominal anchor could be provided because a pegged exchange rate arrangement means that a country pegging its currency or "joining in a fixed parity arrangement" uses a currency peg as a nominal anchor.

Gould (1999:7) argued contrary to Von Hagen and Zhou (2005:686) and Flood and Mussa (1994:1) that countries lacking low credibility of low inflation policies cannot use a pegged exchange rate as a nominal anchor, because a pegged rate requires a high level

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of international reserves, which those countries might not have. However, Gould's argument was not left unchallenged. Tiwari (2003:24), for example, indicates that, for as long as the country makes an institutional commitment under a pegged exchange rate arrangement, a currency peg is practicable. Harrigan (2006:208) extended Tiwari's argument by indicating that, irrespective of the level of international reserves or previous unstable inflation, a currency peg can be used as a nominal anchor. This suggests a pegged exchange rate is a workable exchange rate arrangement.

Chow and Kim (2003:333) articulated Tiwari's and Harrigan's arguments by stating that using a currency peg as nominal anchor serves as a stabilization policy for domestic prices in the economy. They argued that a nominal anchor would serve the purpose of price stabilization, irrespective of the economic status. Ghosh et al (1996:6) also support this argument by indicating that countries with low credibility can use a currency peg as an anti-inflationary policy. This is because a pegged exchange rate is often meant to import credibility into countries with a high inflation rate to effectively achieve a lower inflation rate (Mishkin, 1998:82).
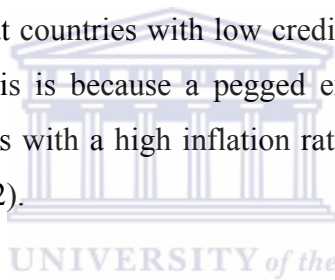
Alper and Ucer (1998:16) support Chow and Kim (2003:333) in stating that a pegged exchange rate arrangement can serve as nominal anchor, but cautioned that it would only be effective in the context of a credible program, given the well-known risks associated with "incredible" exchange rate based programs. This suggests that the effectiveness of a currency peg in bringing down inflation is subject to the strong commitment to maintain the peg (BON, 2000:24). For instance, a commitment to maintain the peg involves an obligation of the central bank to limit money creation to levels comparable to those of the country to whose its domestic currency is pegged (Mishkin, 2001:2). The pegged exchange rate becomes useful because money creation is associated with domestic inflation pressures. For example, governments' budgetary pressures are often associated with expansionary monetary policies (Keller and Richardson, 2003:13-14; and Hoffmann, 2007:425). Under a pegged exchange rate, excessive expansionary monetary policies are restrained. It is for this reason that a fixed nominal exchange rate is called an anchor

because it serves as a "commitment technology allowing the government to resist excessive expansionary policies" (Harrigan, 2006:208).

A strong commitment also empowers a pegged exchange rate arrangement to provide a platform for the conduct of monetary policy that helps mitigate any inconsistencies resulting from discretionary policies (Todorovic and Djordjevic, 2007:32). Mishkin (1998:84) shares similar sentiments and illustrates the point that a pegged-exchange rate as nominal anchor can be thought of as a constraint on discretionary policy, that helps weaken the policy inconsistency problem. For example, it restrains monetary authorities from pursuing discretionary policies that are in favour of a successful short run outcome, but result in a poor long-run outcome such as high inflation (Mishkin, 1998:3). The preceding argument suggests that pegging does not automatically result in a low inflation rate, unless the authorities are committed to such an extent that they are not pursuing an excessive expansionary policy. It follows that, although the authorities in the domestic economy are committed, the pegged country suffers from an unstable inflation if the reserve country follows a negligent inflation policy (Harrigan, 2006:208).

The commitment by authorities to a pegged exchange rate arrangement conveys credible signals about predictions of expected inflation (Velasco, 2000:3). It follows that under a pegged exchange rate arrangement, the prediction of inflation is so simple and clear that it is easily understood by the public (Giucci and Trebesch, 2004:3). Latter (2001:36) supports this argument by arguing that when economic agents understand the system; it enhances the credibility of the peg. That is why a currency peg as nominal anchor facilitates the convergence of policy targets in the domestic economy to the levels prevailing in the country of anchor, i.e. low inflation (Krueger, 1997:2).

Todorovic and Djordjevic (2007:32) report a number of industrialised countries and emerging market countries that successfully used a pegged exchange rate as nominal anchor to control inflation. The industrialised countries include countries such as France and the United Kingdom that successfully used this strategy to lower inflation by tying the value of their currencies to the German mark. Emerging market countries such as

Argentina, on the other hand, which in 1991 established a currency board arrangement, required the central bank to exchange US dollars for new pesos at a fixed exchange rate of one-to-one.

A pegged exchange rate has been successfully used to control inflation, but experiences with such an arrangement exhibit a number of constraints for domestic policymakers. The pegged exchange rate arrangement is "inherently fragile, for instance an attack on a pegged exchange rate can force the abandonment of the peg by stripping away the country's foreign reserves" (McDonough, 1996, http://www.newyorkfed.org/newsevents/speeches/1996/sp961002.html). Another situation in which a pegged exchange rate might be constraining in controlling inflation, can be when the domestic conditions and exchange rate commitment diverge; for example, an open economy that is exposed to global capital markets are prone to speculative attacks (Giucci and Trebesch, 2004:3).

It follows that if a pegged exchange rate arrangement shows a point of weakness, authorities are compelled to convince the public that they are willing and able to defend the fixed exchange rate (Velasco, 1999:3). One way in which the currency peg can be defended convincingly is by effecting commitment to both monetary and fiscal stability (i.e. not excessively expansionary policies), without which a fixed exchange rate cannot be sustained (McDonough, 1996, ditto). The commitment to monetary and fiscal stability is relatively effective when the country that is pegged, has an economy closely tied to the country to which it is pegging (Caramazza and Aziz, 1998:8). Therefore, this approach could be "worthwhile if a country is unable, for whatever reason, to make a credible commitment to price stability on a domestic basis alone" (McDonough, 1996, ditto). Nevertheless, in either situation, a country should choose a low-inflation anchor country to which it can peg its currency (Montiel, 2003:336). Alper and Ucer (1998:16) advance this argument by saying that a serious disinflation effort would need to use the nominal exchange rate as the anchor in a pegged exchange rate arrangement.

2.3.1 Empirical Literature

Hamann (2001:134) critically looked at the stylized facts of exchange-rate-based stabilization and other stabilization plans where the exchange rate was not the anchor. The study assessed which of the stabilization policies (exchange rate targeting, monetary targeting and inflation targeting) provides the best nominal anchor. The results show that exchange rate targeting (i.e. a pegged exchange rate arrangement) provide a more effective nominal anchor compared with other targets such as monetary and inflation targeting.

Guomundsson et al (2001:41) analysed the appropriate exchange rate arrangement for Iceland, given its structural characteristics. They further looked at the rationale for the choice of currency peg and how successful it has been in achieving the goal of low inflation. The study finds that a pegged exchange rate has served the Icelandic economy very well. In fact, the pegged exchange rate arrangement enhanced the credibility of the goal of low inflation. The study finds that the currency peg played a major role in the disinflation process.

Domac et al (2001:6) examined whether a country's exchange rate regime has an impact on inflation and growth performance in transition economies. The results show that the exchange rate regime does affect inflation performance. In particular, transition countries with intermediate exchange-rate arrangements might reduce inflation if they were to adopt a fixed regime. A series of tests showed that a pegged exchange rate arrangement succeeded in bringing inflation down. The authors drew a specific conclusion that the pegged exchange rate anchor as a nominal anchor in reducing inflation has been more effective than a monetary target.

Ghosh et al (1997:3) looked at the influence of exchange rate regimes on macroeconomic performance, using "most comprehensive multi-country studies". This study also employed a "comprehensive econometric framework and undertake several sensitivity and robustness tests". The results from this study suggest that the inflation rate is

significantly lower under pegged exchange rates than under more flexible arrangements - even after controlling for the effects of money growth and interest rate.

Edwards (1993:39) studied whether the exchange rate regime has an impact on inflationary performance by introducing financial discipline. Using a sample from 52 countries over the period 1980-89, the results showed that countries with a fixed exchange rate (including pegged exchange rate) had lower inflation rates during the 1980s compared to countries with flexible arrangements.

Whereas the studies discussed above all tended to support the view that a currency peg can be an effective nominal anchor, this need not always be the case. Quirk (1996: 43) already came to the conclusion more than a decade ago that various ambiguities in exchange rate regimes "… contribute to the difficulty of measuring and comparing the effects of fixed and flexible exchange rate regimes on inflation performance. The various studies and approaches summarised below do not suggest definitive conclusions on the overall strengths of the two forms of regimes." This cautions us not to draw general conclusions from the study of the impact of a currency peg on inflation in some specific countries. Rather, an empirical investigation of the effect of a currency peg must be undertaken for each specific country. This research paper does so for Namibia.

2.4 Conclusion

This chapter reviewed related literature on currency pegs and inflation. The chapter began by defining a pegged exchange rate as a regime in which a domestic currency's value is set equal to the value of another (foreign) currency or basket of currencies, artificially maintained by the government. Different levels of inflexibility of pegged exchange rate pegging were also discussed, whereby it was stated that they provide both a nominal and credible anchor for the economy. It was also shown that a credible peg implies commitment, which in itself conveys credible signals about predictions of expected inflation, i.e. lower domestic inflation due to low inflation expectations. The empirical

evidence referenced above has shown the potential of using a currency peg as a nominal anchor for curtailing inflation in both industrialized and emerging market countries. Thus, it demonstrates that a pegged exchange rate arrangement can be used as a nominal anchor to curtail inflation. Unfortunately, this does not allow us to draw the conclusion that the success of a currency peg is assured. Rather, as was suggested in the preceding section, any conclusion about the effectiveness of a currency peg must be based on empirical investigation for each country on its own. It is in this respect that this research paper hopes to make a modest contribution in the case of Namibia. Its simple objective is to test empirically the effectiveness of the currency peg for Namibia to keep inflation in Namibia at least comparable with that of South Africa.

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CHAPTER THREE: DATA AND METHODOLOGY

3.1 Introduction

This chapter provides details of the analytical framework applied in this study. A very brief review of various methodologies used in previous studies is presented in section 3.2. This is to contextualize the approach to this study. The discussion of this section is extended by presenting the methodology to be followed in this study, in particular, a specific analytical framework. Section 3.3 presents the data sources.

3.2 Review of Methodologies

The review of methodologies draws from the empirical studies presented as empirical literature in the preceding chapter. These studies tested whether using a pegged exchange rate as a nominal anchor is effective in curtailing inflation. This section outlines the methodology that was adopted to analyse the success of the currency peg.

In their work Guomundsson et al (2001:16) studied the appropriate exchange rate arrangement for Iceland, the rationale for the choice of currency peg and how successful it has been in achieving the goal of low inflation. The study used the annual inflation data in comparing Iceland's inflation rate in the pre-pegging and post-pegging period to that of the trading partner countries. The inflation rate data were tested for time series properties to determine if they are robust; in particular they were tested for stationarity and were found not to be stationary. These data were then transformed into their first differences in order to test the inflation rate differentials between Iceland and its trading partners for significance using the t-test. It turned out that inflation in Iceland remained lower than inflation in the partner countries. The authors then proceeded with the testing of correlation between exchange rate and inflation performance. This strengthened the claim that the pegged exchange rate was an effective anchor for inflation in Iceland because inflation in Iceland was reduced. This methodology could be appropriate for this study in two aspects. First, the annual inflation data used in their study are comparable to the data

to be used in this study. Secondly, these authors have addressed the question of how successful the peg has been in achieving the goal of low inflation in Iceland, which is similar to the question this study is examining for Namibia.

In his work, Edwards (1993:36-39) studied whether the pegged exchange rate introduces financial discipline and thus impacts on inflation performance in the Latin American countries with a fixed exchange rate regime. The author used quarterly data to calculate the quarterly mean (average) and standard deviations of the four Latin American countries and compared the results to that of the US. The inflation data used for those countries were not corrected or treated for any statistical properties. However, the quarterly inflation data were tested for time series properties of stationarity and they were found not to be stationary. These data were then transformed into their first differences to become stationary using the Augmented Dickey-Fuller unit root-test and the Ljung Box Statistics. The author used the quarterly inflation data to test the null hypothesis that inflation in the four Latin American countries does not deviate significantly from that of the United States, using the F- test. Unlike Edwards's study, this study will not estimate an inflation model. Edwards's study did estimate a model because of the interest in other variables that affected the behaviour of the inflation rate differential between the US and the four Latin American countries. Thereafter a Chi-square test was used to test the null hypothesis that the coefficients of inflation of the four Latin American countries are not significantly different from that of the U.S. The Chi-square statistic was also used to test whether the pegged exchange rate has an impact on the stability of inflation experienced by the four Latin Americans.

The work of Ghosh et al (1997:15) also studied the influence of exchange rate regimes on macroeconomic performance, employing a comprehensive econometric technique, sensitivity and robustness tests. The study involves a data set which covered nine exchange rate regimes for one hundred and forty countries over the period of thirty years (1960-1990). It was not stated if the data were corrected for any statistical properties such as stationarity. The authors proceeded with the calculation of the average (mean) inflation in these countries in order to compare inflation performance there. Since the nature of the

data is similar, the same procedure can be followed in this paper. The authors estimated two separate models, where inflation was regressed on two exchange rate regimes: the pegged and the intermediate exchange rate regimes. This is not applicable to this study because this study is not interested in comparing two exchange rate regimes. However, the t-statistic test used to test for correlation of significance for pegged exchange rate and low inflation is applicable. The coefficients of the exchange rate dummies were compared to determine which one is associated with lower inflation, and the pegged exchange rate turned out to be the strongest associated with lower inflation. This was to determine whether the peg was an effective anchor. A causal relationship between inflation and pegged exchange rate regime, following a two-stage least squares method, was tested. Although the modelling of causality test is relevant to this study the data to be used are not sufficient enough to carry out this kind of test. Therefore, the t-test will be conducted to test whether there is a statistically significant correlation between the inflation rates in the Namibia and South Africa.

On the other hand, in their study, Domac et al (2001:24) also studied whether a country's exchange rate has an impact on inflation and growth performance in transition economies. Using annual data of various macroeconomic indicators, of which inflation is among those selected, their mean (average) was computed. In particular, inflation under the pegged exchange rate regime was compared with other regimes. The authors tested the null hypothesis for no significant difference between the inflation rates. That is whether inflation in the country pegged, deviated significantly using the t-statistic test. This was to determine whether the pegged exchange rate regime was an effective nominal anchor for inflation in transition economies. They further tested for correlation between exchange rate regimes and inflation performances. This was to determine the strength of the relationship between the two variables. This methodology will not be followed in this study because the authors used a multi-country study base. In addition, the authors were also interested in other factors that influence inflation. Therefore, an inflation equation was estimated, using a 2-stage least square method. This is because of the possibility of countries having switched exchange rate regimes. A switching regression model was estimated, using a two-step Heckman procedure. The first step of the Heckman procedure

is the ordered probit, which was used to estimate an equation for the choice of the exchange rate regime. The second step of the Heckman procedure is the switching regression technique, which was used to investigate whether the exchange rate regime has a bearing on inflation and growth performance in transition economies. The switching regression was employed to avoid the Lucas critique, "which postulates that when there is a policy switch the coefficients associated with policy variables should change" (Domac et al, 2001:31-32). This approach is not applicable to this paper as this study is not about change of exchange rate regimes and inflation.

It emerges that different methodologies were followed in establishing whether a pegged exchange rate as an anchor has been effective in curtailing inflation (see Guomundsson et al, 2001:16; Domac et al, 2001:24; Ghosh et al, 1997:15 and Edwards, 1993:36-39). This includes both descriptive statistics and hypothesis tests.

Based on various methods discussed above, this paper follows the studies that employed hypothesis testing, to determine whether a pegged exchange rate arrangement has been an effective nominal anchor. For this study the t-statistic (used by Domac et al (2001:24); and Edwards (1993:36-39)) will be used to test the hypothesis that there is no significant difference between the inflation rates of Namibia and SA. The nature (characteristics) of the data used in these studies is comparable with that for Namibia. The research question examined by these studies is similar to the research question of this paper: whether pegged exchange rate is an effective nominal anchor for lower inflation. The t-statistic will be used to test whether there is a statistical difference between the inflation rates of the two countries. The same test will also be conducted for growth in money stock; that is, whether growth in money stock in Namibia deviates from that of SA.

These studies investigated a question which is similar to the one addressed in this paper, which is to determine whether a currency peg is an effective nominal anchor. The data used in the previous studies, is comparable to the Namibia data available. To test this hypothesis an ordinary least squares linear regression analysis will be performed to determine the correlation coefficient between the South African inflation rate (as

independent variable) and the Namibian inflation rate. The correlation coefficient will be tested for significance using the t-test. This is because of the small sample. Domac et al (2001:24), Edwards (1993:36-39) and Ghosh et al (1997:15) also followed the same procedure for small samples. It is assumed that their finding of normality also applies to the Namibian data.

In addition to the correlation between the two inflation rates this study also follows the same methodology of determining the correlation coefficient with ordinary least squares regression to the money stock growth rates between the two countries. For the same reasons the t-test will then be used to test for significance.

3.3 Data Sources

This section presents a list of variables, their data sources and data series. Next to each variable are the data sources and the period for which the data are available.

The focus of this study is to determine whether the pegged exchange rate has been an effective nominal anchor for Namibia's prices. In the previous section Domac et al (2001:24) studied the impact of exchange rate arrangement on inflation performance, using annual inflation data as a basis for hypothesis testing, using the t-statistic. They were happy to use official inflation data in their study, and raised no potential difficulty with the use of such data. This study therefore also uses annual percentage changes in the CPI data for Namibia and SA, as a measure of the inflation rate. The CPI data for Namibia can be obtained from BON Annual Reports 1990-1991, 1996, 1999 -2002 and 2004-2006, [Period: 1980-2006] and for South Africa from the South African Reserve Bank Website, [Period: 1980-2006].

The pegged exchange rate arrangement between the two countries has to be supported with monetary policy. In their study, Ghosh et al (1997:15) used the t-test on annual data of broad money growth. This study therefore also uses annual data, which is the percentage change of money stock. The money stock data for Namibia can be obtained

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from BON Annual Reports 1996, 1999-2002 and 2004-2006, [Period: 1993-2006] and for South Africa from the South African Reserve Bank Website, [Period: 1993-2006]. Alternatively, one could use a t-test to test for no significant difference in the growth of money stock between the two countries, as used in Edwards (1993:36-39).

CHAPTER FOUR: AN ANALYSIS OF EXCHANGE RATE POLICY AND INFLATION IN NAMIBIA

4.1 Introduction

This chapter presents the analysis of exchange rate policy and inflation in Namibia. Section 4.2 presents some facts on inflation trends for the period 1980-2006 in the context created by factors such as monetary policy, fiscal policy and Balance of Payments flows. Section 4.3 presents the final remarks on the chapter.

4.2 Inflation Trends: 1980 – 2006

Graph 1: Namibia Inflation and South Africa Inflation: 1980 – 2006
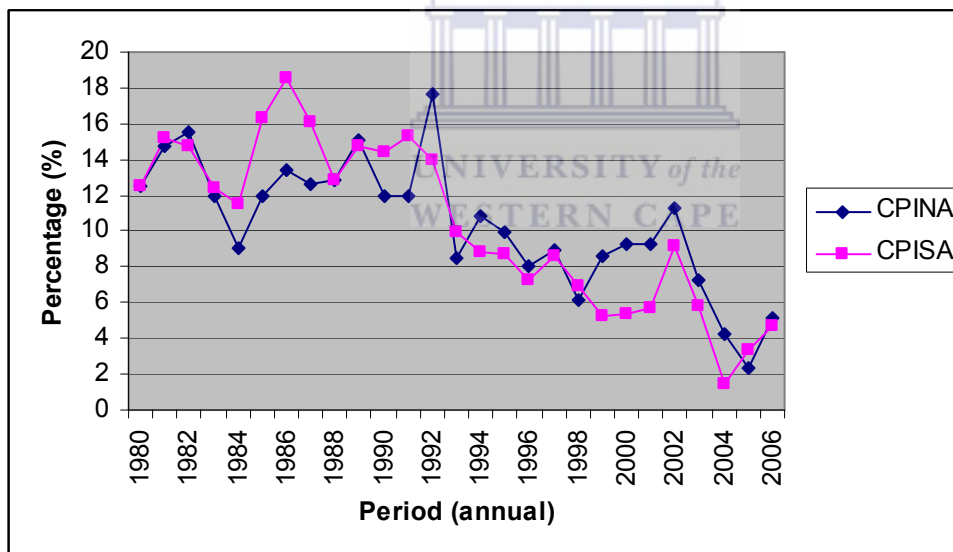
Graph 1 shows the movements of the inflation rates from 1980 to 2006. Inflation is here defined as the annual percentage change in the CPI. CPINA therefore refers to the percentage change in the CPI for Namibia from one year to the next. CPISA is similarly defined for South Africa. The graph shows that the inflation rates of the two countries are moving in the same direction in most years. This pattern is attributed to the close trade integration of the economies of the two countries (Kalenga, 2001:8). For example, a high

proportion of consumer goods (used to determine the CPI) is imported from SA. There is evidence that SA accounts for more than 80 percent of Namibia's imports (See table 1 below).

Table 1: Sources of Imports in 2003

Country	Import Values (N$ in millions)	Share of total (%)
SA	8532	80.4%
Germany	249	2.3%
Spain	144	1.4%
China	136	1.3%
UK	135	1.3%
Namibia	109	1.0%
Others	108	1.0%
US	106	1.0%
Morocco	77	0.7%
Switzerland	76	0.7%

Source: TIPS Report (the data are the most recent trade data that could be found)

Table 1 above shows that Namibia receives more than 80 percent of its imports from SA. It follows that the prices of these SA imports will remain significant in determining domestic inflation. This might be one of the reasons why there are similar movements in the two inflation rates. This would strengthen the interpretation that the correlation between the two inflation rates exists because of the pegged exchange rate.

The hypothesis of a positive relationship between the two inflation rates, as reflected in the correlation coefficient, can be tested with a t-test. The data values (change in CPI) have been transformed into natural logarithmic (ln) values, in order to make the relationship between the data more linear. In this respect this study follows the lead of Ghosh et al (1997:15). A scatter plot of the transformed data is presented in Figure 1 below. In the figure lnCPINAM stands for the natural logarithmic of the annual percentage change in the CPI for Namibia and lnCPISA represents the natural logarithmic of the annual percentage change in the CPI for South Africa.

Figure 1: Scatter Diagram for the Natural Log of the Percentage Change in the CPI's for Namibia and SA
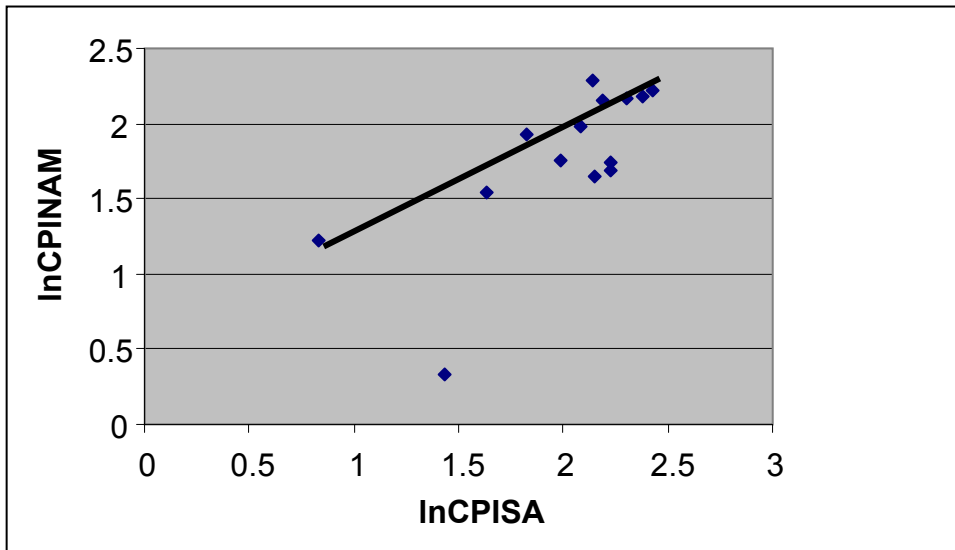
The scatter diagram suggests that there is a positive linear relationship. It is obviously not sufficient to draw conclusions regarding the linear relationship between the two inflation rates, based on the scatter diagram alone. The strength of the relationship can be obtained quantitatively by determining the correlation coefficient of the two inflation rates from the linear regression.
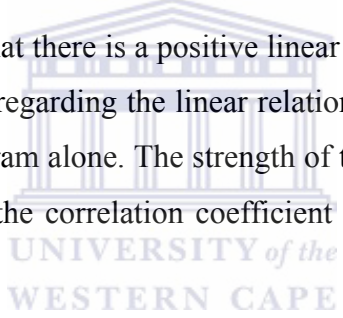
Table 2: Correlation Coefficient of the Natural Log of the Inflation Rates

	lnCPINAM	lnCPISA
lnCPINAM	1	
lnCPISA	0.717893	1

Table 2 above presents the result of the linear regression in the form of the value of correlation coefficient. This value should lie between -1 to +1. A value of correlation coefficient close to +1 indicates a strong positive linear relationship. This suggests that one variable increases as the other variable increases, while a value of correlation coefficient close to -1 indicates a strong negative linear relationship. The value of the correlation coefficient of the two inflation rates is 0.72, i.e. relatively close to +1,

indicating a strong positive linear relationship between the two inflation rates. It follows that Namibia's inflation decreases with a decrease in SA inflation rate, or the opposite. The data show that inflation in both countries has been decreasing. Based on the correlation coefficient, one can confidently conclude that the two inflation rates are linearly related.

The analysis requires as a next step a test whether there is indeed a statistically significant linear relationship between the two inflation rates. The null hypothesis is that the population correlation coefficient equals zero (0). The value of correlation coefficient can be compared with the critical values given in Table 1 in the Appendix. At the 5% level of significance, the computed value of the correlation coefficient is greater than the critical value of correlation coefficient. It follows that the null hypothesis can be rejected. There is sufficient evidence suggesting that the true population correlation coefficient is not equal to 0, and that there is a significant linear relationship between the two inflation rates.

Although the hypothesis test of the correlation coefficient indicates whether there is a linear relationship, it gives no indication of the significance of that relationship. The strength of the statistical relationship between two inflation rates is tested to determine whether the two inflation rates are significantly correlated. The null hypothesis is that there is no significant statistical difference between the two inflation rates. This hypothesis test is conducted using the t-statistic test. The t-test is usually used when there is a small sample (number of observations) and in this case it applies. It also requires the assumption of normality. As already indicated, and following the research already done in other countries, this assumption is also made in this research paper.

**Table 3: Statistical Test for Significance of the Positive Correlation between the two Inflation Rates[a]**

	lnCPINAM	lnCPISA
Mean	1.98781682	1.775868771
Variance	0.18856204	0.264441999
Observations	14	14
Pearson Correlation	0.717893217	
Hypothesized Mean Difference	0	
df	13	
t Stat	1.770933383	
P(T<=t) one-tail	0.024137818	
t Critical one-tail	2.17954298	
P(T<=t) two-tail	0.048275636	
t Critical two-tail	2.160368652	

[a] at 5% level of significance

The results of the t-test summarised in Table 3 suggests the conclusion that the null hypothesis of zero correlation between the two inflation rates is rejected at 5% level of significance. It appears that the calculated value of t is less than the critical t-value. This suggests that there is no statistically significant difference between the two inflation rates of the two countries. Namibia's inflation and SA's inflation exhibit similar movements (see graph 1), therefore suggesting that Namibia's inflation is anchored to that of SA through the exchange rate peg. This is confirmed as significant as there are no statitically significant differences. This gives an indication that the currency peg served as a nominal anchor. Because of the anchor, as the SA inflation rate came down, so did the Namibian inflation rate. This naturally was only analysed for the period after 1993 as before 1993 Namibia was using the SA rand, which also implies that Namibia did not have its own monetary policy then. For the period post-1993, the similar movements in the two inflation rates could be explained at least 72% by the pegged exchange rate arrangement between Namibia and SA. The Namibian dollar has been pegged at the same rate to the rand for the past 15 years. This "nominal anchor" role of the pegged currency was supported by the harmonisation of monetary policy and underpinned by the high proportion of Namibian imports sourced from South Africa.

Monetary policy had to be implemented in order to maintain the pegged exchange rate. That means that the money stock growth rate in Namibia had to be maintained at a similar growth rate as in SA (BON, 1996:21-23). Namibian authorities would then be required to correct the money stock growth rate if there is deviation.

Graph 2: Growth of Money Stock in Namibia and SA: 1993 – 2006
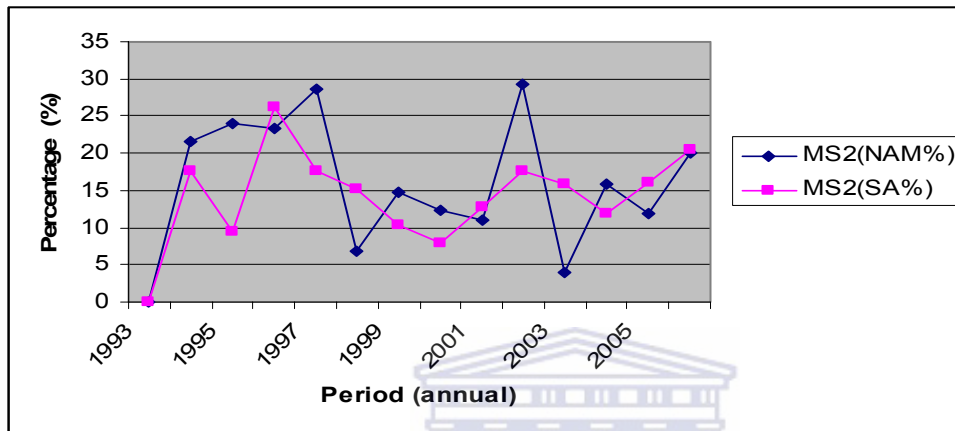
The growth of money stock (defined as the annual percentage change in money stock) in Namibia since 1993 is presented in Graph 2. It is compared to that of SA. The graph shows that the growth in money stock of the two countries are moving in the same direction in most years. This pattern is attributed to the harmonization of monetary policy of the two countries.

The money stock is influenced by various factors, including open market operations of the central bank and financial flows into and out of the country. Monetary policy is precisely about how the central bank responds to these financial flows through its open market operations in order to achieve the money stock that its policy objective requires. A high correlation of money stock growth between the two countries would therefore suggest that the Namibian monetary authorities have conducted their open market operations in such a manner that the net effect on the growth of the money stock of Namibia would be for it to grow at more or less the same rate as the SA money stock.

For the same reasons similar transformations as were performed on the inflation data were performed on the money stock data for the two countries. In Table 4 below the variable lnMSNAM refers to the natural logarithm of the annual percentage change (growth rate) of the money stock in Namibia. Likewise, the variable lnMSSA refers to the natural logarithm of the annual percentage change (growth rate) of the money stock in South Africa. The null hypothesis is that the population correlation coefficient equals zero (0).

Table 4: Statistical Test for the Natural Log of the Growth Rate in Money Stock[b]

|	lnMSNAM	lnMSSA
Mean	2.710261837	2.678603146
Variance	0.344333202	0.110869727
Observations	13	13
Pearson Correlation	0.202726286	
Hypothesized Mean Difference	0	
Df	12	
t Stat	0.186157564	
P(T<=t) one-tail	0.427715523	
t Critical one-tail	1.782287548	
P(T<=t) two-tail	0.855431045	
t Critical two-tail	2.178812827	

[b] at 5% level of significance

A t-statistic test is conducted to test whether the growth in money stock in Namibia deviates from the growth rate in money stock in SA. The null hypothesis is that there is a zero correlation between the growth of the money stock in Namibia and the growth of money stock in SA. The results for the t-test summarised in table 4 above indicate that at 5% level of significance the null hypothesis can be rejected. It appears that the calculated value of t is less than the critical t-value. This suggests that there is indeed no significant difference in the growth rates in money stock of the two countries. This implies that money stock growth rate in Namibia has been maintained at a similar growth as in SA. It gives an indication that the authorities have maintained the peg through control of monetary growth. The results above suggest that the money stock in Namibia grew at the same rate over time, which also implies that the pegged exchange rate has been

maintained; hence a different inflation rate would not have been caused by a different rate of monetary growth.

All the statistic test results above appear to be confidently suggesting that the pegged exchange rate arrangement between Namibia and SA has served as a nominal anchor for Namibia prices. The question remains whether the inflation rate could have been even lower if the peg were not in existence. More than 80 per cent of Namibia's imports come from SA. Under the currency peg, authorities take measures to offset the tendency for the exchange rate to depreciate. If the peg did not exist, any other exchange rate arrangement (i.e. free-float) "will be skewed towards the rand because of the following reasons. Demand for rands in Namibia would continue to be strong, not only because of imports, but also because of portfolio flows into South Africa" (Kalenga, 2001:8). Therefore, it is difficult to conclude how other policy alternatives could have been pursued successfully at a lower cost than the pegged exchange rate arrangement. Therefore, it appears unlikely that the inflation rate might have been lower if another exchange rate regime had been adopted
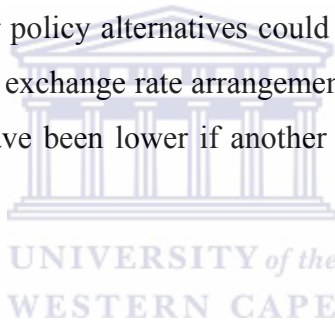
4.3 Concluding Remarks

This chapter presented the analysis of exchange rate policy and inflation in Namibia. The summarised results above suggest that the pegged exchange rate has served as an effective nominal anchor. This "nominal anchor" role of the pegged currency was supported by the harmonisation of monetary policy and underpinned by the high proportion of Namibian imports sourced from South Africa. In fact, the Namibian dollar has been pegged to the rand for the past 15 years. The currency peg prompted authorities to take measures to offset any tendency towards exchange rate depreciation. This strengthens the conclusion that the peg was an effective nominal anchor for price stability in the Namibian economy.

CHAPTER FIVE: GENERAL CONCLUSIONS

This study focused on the impact of the Namibian dollar on its domestic inflation. The study illustrated that pegging the national currency to an international anchor currency may enhance the credibility of anti-inflation policy. This is because currency pegging means exchange rate pegging, which in turn provides a nominal anchor that can assist in controlling domestic inflation.

The major concern with an exchange rate pegging arrangement is the fact that it is subjected to strong commitment. This involves an obligation by the central bank to limit money creation to levels comparable to those of the country to which its domestic currency is pegged, because money creation is associated with domestic inflation pressures. It is necessary for the central bank to do this under a pegged exchange rate as the economy will be as prone to inflationary pressures due to excessive expansionary polices as under any other exchange rage regime. Such expansionary policies would therefore undermine the fundamental purpose of exchange rate pegging and will therefore be contradictory with exchange rate pegging. Therefore exchange rate pegging compels the monetary authorities to show their commitment to the pegged exchange rate through the conduct of a monetary policy approach that will align the domestic growth in money supply with that of the country to whose currency the domestic currency is pegged. It is for this reason that a fixed nominal exchange rate is called an anchor because it restrains the monetary authorities from pursuing monetary policies that can accelerate the loss of value of the domestic currency. This also contributes to the conveyance of credible signals to economic agents. The information that this conveys to economic agents will also facilitate more stable inflationary expectations.

This study showed that the exchange rate pegging arrangement between Namibia and South Africa served as a nominal anchor. Over time, inflation in SA has shown a decreasing trend and the Namibian inflation followed suit. In principle, because of the anchoring, there is supposed to be no difference between the two inflation rates. The statistical test confirmed this proposition. There was not statistical reason for rejecting the

null hypothesis that the two inflation rates moved in tandem with one another. If there was any statistical difference between the two inflation rates, it would suggest that the pegged exchange rate arrangement between the two countries did not serve as a nominal anchor. In other words, a nominal anchor does not prevent inflation per se, but links the inflation rate to that of the anchor. Therefore, if the anchor goes down, so will the domestic inflation rate.

The study also demonstrated that monetary policy in Namibia has indeed been implemented in order to maintain the peg because money stock growth rate in Namibia has been kept at a similar growth rate as in SA. This was statistically tested, and if there was any deviation, Namibian authorities applied corrective measures. This indicates that the authorities have maintained the peg through the control of monetary growth; hence, a different inflation rate would not have been caused by a different rate of monetary growth. In other words, not only can it be argued that the pegged exchange rate was effective as a nominal anchor, but it can also be shown that the Bank of Namibia actively pursued monetary policies that ensured that effectiveness. It raises the interesting question, not to be answered in this thesis, which is the more important: The pegged exchange rate or the alignment of monetary policy with that of the country to which the currency is pegged?

The study showed that exchange rate pegging has been effective to a certain extent. It would probably be difficult to argue that a differently pegged exchange rate or a flexible exchange rate would have resulted in an inflation rate for Namibia much lower than that of South Africa given the intensity of trade between the two countries. Over 80 percent of consumable goods of Namibia are imported from SA. Moreover, with the trade balance heavily in favour of South Africa there would most likely have been pressures over time for the Namibian dollar to depreciate. Under the currency peg, the authorities could offset the tendency for the exchange rate to depreciate. This may have been a significant consequence of the currency peg as the trade deficit and the deficit on the current account had to be financed by capital inflows. The likelihood of this happening would have been considerably undermined by a secularly depreciating currency, especially against the

South African rand as a substantial proportion of capital inflows into Namibia originated from South Africa.

Therefore it can be confidently concluded in this study that exchange rate pegging of the Namibian dollar to the South African rand has been an effective nominal anchor. It therefore also arguably assisted in controlling domestic inflation in Namibia.

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APPENDIX

Table 1

5% and 1% points for the distribution of the correlation coefficient under the null hypothesis that the population correlation is 0 in a two-tailed test

Sample size	r values for two-tailed probabilities (P)		Sample size	Two-tailed probabilities (P)	
	0.05	0.01		0.05	0.01
3	1.00	1.00	23	0.41	0.53
4	0.95	0.99	24	0.40	0.52
5	0.88	0.96	25	0.40	0.51
6	0.81	0.92	26	0.39	0.50
7	0.75	0.87	27	0.38	0.49
8	0.71	0.83	28	0.37	0.48
9	0.67	0.80	29	0.37	0.47
10	0.63	0.76	30	0.36	0.46
11	0.60	0.73	40	0.31	0.40
12	0.58	0.71	50	0.28	0.36
13	0.55	0.68	60	0.25	0.33
14	0.53	0.66	70	0.24	0.31
15	0.51	0.64	80	0.22	0.29
16	0.50	0.62	90	0.21	0.27
17	0.48	0.61	100	0.20	0.26
18	0.47	0.59	110	0.19	0.24
19	0.46	0.58	120	0.18	0.23
20	0.44	**0.56**	130	0.17	0.23
21	0.43	0.55	140	0.17	0.22
22	0.42	0.54	150	0.16	0.21

Generated using the standard formula [2].

Source: http://ccforum.com/content/7/6/451

Table 2: CPI's transformed to natural logarithmic values

lnCPI(NAM)	lnCPI(SA)
2.525728644	2.5257286
2.694627181	2.7212954
2.740840024	2.6878475
2.48490665	2.5176965
2.208274414	2.442347
2.48490665	2.7911651
2.595254707	2.9231616
2.533696814	2.7788193
2.557227311	2.5572273
2.714694744	2.6878475
2.48490665	2.6672282
2.4765384	2.7278528
2.87356464	2.6390573
2.140066163	2.2925348
2.379546134	2.1747517
2.302585093	2.163323
2.079441542	1.9878743
2.186051277	2.1517622
1.824549292	1.9315214
2.151762203	1.6486586
2.224623552	1.686399
2.2300144	1.7404662
2.42568729	2.2192035
1.987874348	1.7578579
1.435084525	0.3364722
0.832909123	1.2237754
1.62924054	1.5475625